

**REPORT OF THE AUDITOR GENERAL
OF THE VILLE DE MONTRÉAL
FOR THE YEAR ENDED
DECEMBER 31, 2016**

**TO THE CITY COUNCIL AND TO THE
URBAN AGGLOMERATION COUNCIL**



Report of the Auditor General of the Ville de Montréal

For the Year Ended December 31, 2016

to the City Council and to the Urban Agglomeration Council

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Please note that this English report has been translated from the original French version. In case of doubt or difference of interpretation, the French version shall prevail over the English.

According to the *Charter of the French Language* and the *Office québécois de la langue française*, municipalities shall designate all official names, such as boroughs, departments, paramunicipal corporations as well as municipal and associated bodies by their French names alone, even in the English version.

This report is available on our website at:
bvgmtl.ca.

June 9, 2017

Mr. Denis Coderre
Mayor of the Ville de Montréal
275, rue Notre-Dame Est
Montréal, QC H2Y 1C6

**Subject: Auditor General of the Ville de Montréal's annual report for the year ended
December 31, 2016**

Dear Mr. Mayor,

Please find enclosed my annual report, for the year ended December 31, 2016, as per Section 107.13 of the *Cities and Towns Act* (CQLR, chapter C-19), as well as the *Highlights* to be tabled at the next regular city council meeting on June 12, 2017 and the next urban agglomeration council meeting on June 15, 2017.

Yours truly,



Michèle Galipeau, CPA Auditor, CA
Auditor General

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Our mission

Provide city council with an accurate picture of whether the municipal government is making wise and optimal use of public funds.

By conducting independent audits and producing reports that are available to the public, the chief auditor plays a critical role in promoting transparency and accountability in municipal operations.

1

INTRODUCTION

1. Introduction

The *Cities and Towns Act* (CTA) requires that Québec municipalities with 100,000 or more residents have an Auditor General. The Auditor General provides city council with an accurate picture of whether the municipal administration is making wise and optimal use of public funds.

The Auditor General mandate includes, to the extent it deems appropriate, financial audit, legal and regulatory compliance audit and value-for-money audit of the Ville de Montréal and of the organizations covered by the section 107.7 of the CTA, which numbered to 16 for fiscal year 2016, within the minimum budget limits imposed in section 107.5 of the CTA.

Pursuant to the CTA, no later than August 31 every year, the Auditor General must forward to the Mayor, for deposit to the city council, the results of its audits for the fiscal year ending on the previous December 31.

This report consolidates the results of the work done by the Bureau du vérificateur général of Montréal for the fiscal year ended December 31, 2016.

Here is a brief overview of each of the chapters included in the 2016 annual report.

Chapter 2 – Observations of the Auditor General

This chapter includes the Auditor General's observations on the challenges of the Bureau du vérificateur général of Montréal and a summary of the important elements resulting from the audit work performed for the year 2016.

Chapter 3 – Financial statement audit and other reports

The results of the audit on the consolidated financial statement of the Ville de Montréal and on the organizations to be audited by the Auditor General under the provisions of section 107.7 of the CTA are presented in this chapter.

Chapter 4 – Legal and regulatory compliance

This chapter presents the results of the audit performed to ensure regulatory compliance of the organizations that receive an annual subsidy of at least \$100,000.

Chapter 5 – Value-for-money and information technology audit

In this chapter, the results of the value-for-money and IT audit are presented. It includes reports on the Management of the Emerald Ash Borer and the Canopy, Sustainable Water Management, Traffic Light Management, the Eco-quartier Program and Eco-Centres, as well as the two preliminary audit study reports on the Système évolué de radiocommunication de l'agglomération de Montréal (SERAM) Project, Transfo-RH Program Management and the summary result of Physical Penetration Tests.

Chapter 6 – Follow-up on recommendations from previous years

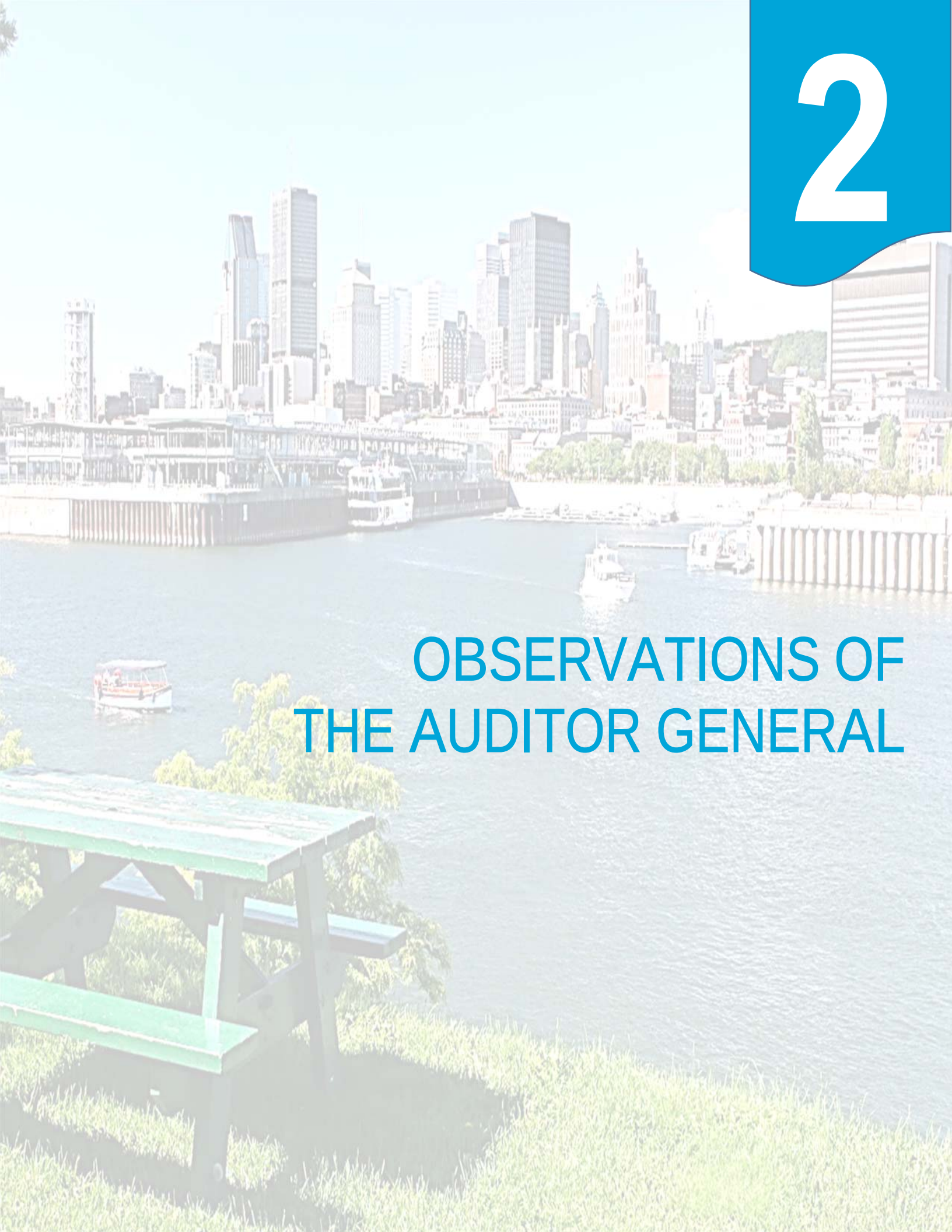
This chapter presents the results of follow-up on recommendations included in the previous reports.

Chapter 7 – Status of the Bureau du vérificateur général

The Auditor General is also required to report on its activities. For purposes of transparency, the final chapter of the 2016 report presents the financial results as well as a set of indicators on the Bureau du vérificateur général of Montréal.

Appendices

Finally, the appendices include the provisions of the CTA concerning the Auditor General, the external auditor and the Director General as well as the audited statement of expenditures of the Bureau du vérificateur général as of December 31, 2016.

A scenic view of a city skyline across a body of water, with a green picnic table in the foreground. The city skyline is composed of numerous tall buildings, including a prominent skyscraper with a pointed top. The water is calm, reflecting the sky and the city. In the foreground, a green wooden picnic table is visible on a grassy bank. The overall scene is bright and clear, suggesting a sunny day.

OBSERVATIONS OF THE AUDITOR GENERAL

2.1 CHALLENGES OF THE BUREAU DU VÉRIFICATEUR GÉNÉRAL

2.2 FORMAT OF THE ANNUAL REPORT

2.3 YEAR 2016

2.4 ACKNOWLEDGEMENTS

2. Observations of the Auditor General

The Auditor General helps provide assurance to the city council, the agglomeration council and taxpayers as to the quality of the management of public funds and the control of city operations and the organizations under its control.

As noted earlier in the report, the Auditor General's mandate includes, to the extent it deems appropriate, audits of the following: financial statements, regulatory compliance, and value-for-money. Its area of jurisdiction covers the municipality, the organizations included in the reporting entity and those for which the city appoints more than 50% of the members of the board of directors or holds more than 50% of the shares.

I took office on August 15, 2016 for a term of seven years. This report is therefore my first annual report as Auditor General of the Ville de Montréal (the city).

2.1. Challenges of the Bureau du vérificateur général

2.1.1. Human Resources

Soon after taking office, I spent some time meeting with each employee to properly determine the issues facing the Bureau du vérificateur général (BVG). I could see that the team in place had done some high quality work over the years and that its considerable experience represented a major asset for the BVG.

However, we will be losing much of that expertise over the next few years. Nearly 20% of the team is eligible for retirement, including two of the four members of the management. As mentioned in my predecessor's 2015 report, the BVG faces a major issue in terms of succession management.

Also, for several years, there have been vacancies and the many attempts to recruit candidates have not yielded satisfactory results. Initiatives undertaken in the past, in consultation with the Service des ressources humaines, to find solutions to the problem of retaining expertise have not led to concrete strategies and measures.

Over the next year, we will review these approaches and undertake new initiatives to try to address these issues of succession planning and retaining knowledge within the BVG.

Some initiatives have already been undertaken. For instance, to handle the financial audit files, we set up teams consisting of two advisers, one principal and one for

backup, for each mandate. We are also starting a project to develop a new risk matrix for the BVG.

2.1.2. Other Challenges

Beyond the human resources issues cited above, there will be many more challenges during the coming years. The Government of Québec's desire to make municipalities more autonomous and changes to standards in value-for-money audits are a few such examples.

We will also undertake a series of projects to enable us, in the medium term, to provide strategic planning for the BVG, update our work tools and complete the development of our website.

Bill 122

With the draft Bill 122, the Government of Québec is aiming to transform the municipalities into real local governments and to redefine municipal institutions in light of current issues by giving them more autonomy, flexibility and power.

To this end, in its address notes to the Commission de l'aménagement du territoire, the Association of Municipal Auditors General of Québec indicated that the new measures proposed under Bill 122 must be supported by rigorous measures of governance and accountability.

It is important to remember that the Auditor General is one of the essential pillars of municipal governance; the Auditor General is there to provide reassurance to the elected officials and the citizens that public funds are being managed efficiently, effectively and economically.

Beyond this bill, sections of the *Cities and Towns Act* (CTA) concerning the Auditor General must also be reviewed in light of today's issues to allow the Auditor General to perform its job independently, without any legal interpretation of its role, the possibility of interference in its work or the management of funds allocated to it.

Over the next year, we will follow developments related to this issue, which will have an impact on the work of municipal auditors general.

Standards for Direct Engagements (CSAE 3001)

In 2017 we are conducting value-for-money audit mandates, having revised our working methodology to comply with the new Canadian assurance standards developed by the Chartered Professional Accountants of Canada for direct engagements. This will change our ways of conducting value-for-money audits,

primarily in the stages of preliminary analysis, quality control and in the standards for issuing reports.

2.2. Format of the Annual Report

The annual report consolidates the results of all work carried out by the BVG. It is an important tool for communicating to the city council, the urban agglomeration council and citizens the results of our audit work regarding financial statement, regulatory compliance, value-for-money and information technology.

We have introduced a few changes to the presentation of the report this year. To enable the reader to more readily understand the main issues raised in our value-for-money and information technology audit mandates, we have added a summary sheet at the beginning of each report. This is divided into two sections: first, the audit's purposes and, second, the results.

We will continue to review the presentation of our report, always with the aim of making it easier to understand.

2.3. Year 2016

In this section I summarize the work done by the BVG during 2016 and highlight the important elements in each file.

2.3.1. Financial Statement Audits

Ville de Montréal

On April 3, 2017, I issued an unqualified auditor's report on the consolidated financial statements of the city as of December 31, 2016. This auditor's report and the report on mixed expenditures are included in the Annual Financial Report filed with the city's Service du greffe on April 19, 2017.

Also, on April 13, 2017, the auditor's reports on the city's consolidated financial statements, the breakdown of mixed expenditures and the city's aggregate taxation rate were produced and recorded on the form prescribed by Ministère des Affaires municipales et de l'Occupation du territoire (MAMOT). This was filed with the city council and the urban agglomeration council before being sent to MAMOT on April 24, 2017.

Other Legal Entities Subject to the *Cities and Towns Act*

At the time of filing this report I had issued 12 independent auditor reports on the financial statements as of December 31, 2016 of the organizations for which the Auditor General acts as auditor under the provisions of section 107.7 of the CTA.

2.3.2. Legal and Regulatory Compliance

Legal Compliance of Organizations Having Received a Subsidy of at Least \$100,000 in 2015

As of May 12, 2017, the BVG had received the audited 2015 financial statements of 176 (or 94%) of the 187 organizations subject to the requirement under section 107.9 of the CTA, for a total of \$104.9 million.

I encourage the city to continue its work of sensitizing organizations on the requirements of section 107.9 of the CTA.

2.3.3. Value-for-Money and Information Technology Audit

We completed seven mandates for the year 2016.

Management of the Emerald Ash Borer and the Canopy

The appearance in 2011 of the emerald ash borer on Montréal's territory undoubtedly represented a major challenge for the city. Under its sustainable development policy, the city was aiming to grow the canopy by 5% over a 10 year horizon, whereas the city estimated that ash trees made up nearly 20% of its arboreal stock and that no solutions existed (and still do not exist to date) to eradicate the emerald ash borer completely.

Although the city has made considerable efforts to combat this pest, it remains difficult to assess to what extent the city's strategy is working efficiently and contributing to the achievement of the set objectives. To date, there is no formal assessment or diagnosis giving an overall picture of the progress of the situation and of the operations carried out. Also, the analysis and evaluation of the results observed are not sufficiently documented.

The direction of the strategy being used to combat the emerald ash borer and concurrently increase the canopy in Montréal should be regularly reassessed to ensure consistency in light of the objectives. The financial package should be revised accordingly.

The city will have to demonstrate to what extent the interventions undertaken to counter the emerald ash borer infestation and grow the canopy have been successful in achieving the set targets.

Sustainable Water Management

Water is one of the central issues of the 21st century. Several countries have introduced water protection measures, notably the United States and the European Union member countries.

In 2002, the Government of Québec adopted the *Québec Water Policy* and, in March 2011, the Québec Strategy for Drinking Water Conservation (QSDWC). The stated objectives were *"to aim for a reduction of at least 20% of the average water consumption per person for Québec as a whole and a reduction in leakage losses to no more than 20% of the total volume of water produced."* The Government of Québec has sent a clear message to the municipalities by making the allocation of financial assistance conditional on achieving these two objectives.

Our audit confirms that the major efforts made with respect to the first QSDWC objective led in 2015 to an agglomeration-wide reduction in the total production and

average distribution of drinking water by 20% and 26%, respectively, per person per day. However, the city's efforts must continue as drinking water consumption remains above the Canadian average.

With respect to the QSDWC second objective estimates of potential water losses in the system in 2015 remain very high.

It is important that the city implement the measures required by QSDWC, including installing water meters and imposing fees, within the timeframe established by the government.

Traffic Light Management

The Montréal road network is comprised of nearly 2,300 intersections equipped with traffic light systems. The city's responsibility for these assets arises, in part, from the *Municipal Powers Act*.

Nine years after the urban agglomeration council adopted a visionary transportation plan for the safety and flow of various types of traffic, pedestrian, bicycle, car and bus, the city has been slow to complete traffic light upgrades prerequisite for the dynamic management of traffic lights.

Despite the large investments made and the extensive work done on traffic lights, the city has not succeeded in setting up a structured and cohesive upgrade program to be carried out within the deadlines imposed by law and set by the authorities.

Given that the planned upgrades have not been completed at all intersections and that other expenses are still required to comply with either the legal requirements, standards or priorities of the municipal administration, the city will most likely not be able to meet the deadlines imposed by law.

It is imperative that the management of the traffic lights upgrade program be closely monitored by the Direction générale in order to meet the deadlines, projected costs and objectives.

Éco-Quartier Program and Eco-Centres

The mission of the Éco-quartier program is to promote and instill eco-conscious habits among Montrealers in order to improve their living environment through targeted and citizen-driven environmental actions.

Eco-centres are sites made available to all residents, where they can bring waste materials to be recovered and reused. Unlike éco-quartiers, which come under local jurisdiction, eco-centres fall under the jurisdiction of the agglomeration.

With regard to compliance in the process of awarding contracts for managing the eco-centres, supplying containers and transporting waste recovered, the audit revealed some deficiencies.

Doubts were raised as to the possibility that the principles of fairness and transparency that should govern contract solicitation procedures and competition among suppliers might have been tainted in the contracts awarded for the management of the eco-centres. We therefore consider it appropriate to forward the file to the Bureau de l'inspecteur général of the Ville de Montréal, so that it may pursue any investigations it deems appropriate.

It is a given that public funds must first be managed in compliance with existing laws and by-laws. All necessary arrangements must be made to ensure the impartiality and objectivity of the contract-awarding process, including the composition of the selection committee and the conduct of its members.

With respect to accountability, the boroughs will need to make the necessary arrangements to demonstrate how the financial contributions allocated to the Éco-quartier agencies are helping the city to meet its strategic targets for sustainable development.

Système évolué de radiocommunication de l'agglomération de Montréal Project

Système évolué de radiocommunication de l'agglomération de Montréal (SERAM) project resulted from the need to modernize the radiocommunication network of the Service de police de la Ville de Montréal which was acquired in 1989 and reached the end of its useful life in 2004.

Before the new Service des technologies de l'information (STI) team initiated a turnaround in the management of the SERAM project, major deficiencies had been noted in the project management. Concurrently with the start of this remedial process, the new network that had just been deployed among the public safety services was experiencing major failures, while major outages kept recurring. Furthermore, the observed recovery times underscored serious deficiencies in SERAM's back-up systems.

Despite the potential issues and pitfalls that remain to be addressed, we are of the opinion that the measures taken or in the process of being taken by the STI to put the SERAM project back on course are relevant and functional, and that they should reduce the number and impact of outages while promoting system stability.

Notwithstanding the STI's efforts to meet the public safety requirements that were expected at the outset of the SERAM project, the resulting network may not, in our

opinion, meet some significant functional and performance requirements, at least within a short- or medium-term time horizon.

Transfo-RH Program Management

The introduction of the Transfo-RH program coincided with the municipal mergers. In fact, several different projects, including SIG RH-Paie and RH-Paie, have been introduced with a view to modernizing human resource and payroll processes, but they have not proven successful.

Ten years have gone by and the city is back to square one. The May 2016 public call for tenders for the Système intégré en ressources humaines (SIRH) project could not be completed. Because this project is the main component of the Transfo-RH program, the program is being completely replanned.

The content of the SIRH project's call for tenders needs to be reviewed to ensure it reflects market practices, and measures must also be taken to correct deficiencies we found in the governance of the program.

The Transfo-RH program deserves special status beyond being one of the city's 75 or so priority projects. Based on the history of attempts to modernize human resource management and payroll processes, coupled with the risks involved in implementing the Transfo-RH program, the municipal administration needs to follow up rigorously to ensure that the implementation of this program will ultimately achieve the modernization objective.

Physical Penetration Tests

For obvious security reasons, the results of our physical penetration tests cannot be disclosed in this annual report.

2.3.4. Follow-Up on Recommendations of Previous Years

Regarding the value-for-money and information technology audit, the implementation rate for the recommendations in the first year of follow-up has improved and remained stable for those in the third year of follow-up.

However, our follow-up work highlights the fact that several business units are not giving adequate consideration to the recommendations addressed to them, which does not favour their implementation.

With regard to the audit of the financial statements, the implementation rate of the recommendations in the first year of follow-up deteriorated. However, it was 100% for recommendations in the third year of follow-up.

We recommend that municipal administration establish performance indicators to measure the degree of implementation of the recommendations included in the Auditor General's audit reports and do the follow-up.

2.4. Acknowledgements

The 2016 report is the result of the efforts of an entire team that supports me on a daily basis by performing quality work. I would like to thank the BVG team for its excellent work and support.

3

FINANCIAL STATEMENT AUDITS AND OTHER REPORTS

3.1 INTRODUCTION

3.2 CONSOLIDATED FINANCIAL STATEMENTS OF THE VILLE DE MONTRÉAL

3.3 FINANCIAL STATEMENTS OF OTHER LEGAL ENTITIES SUBJECT TO THE *CITIES AND TOWNS ACT*

3. Financial Statement Audits and Other Reports

3.1. Introduction

The Auditor General conducts its audits in accordance with Canadian generally accepted auditing standards. The audit is planned and constructed to provide reasonable assurance that the financial statements are free of material misstatement. It involves implementing procedures to obtain evidence about the amounts and information provided in the financial statements. An audit also includes assessing the appropriateness of the accounting methods used and the reasonableness of accounting estimates made by management, as well as assessing the overall financial statements presentation.

The Auditor General's audit of the financial statements does not in any way relieve management of its responsibilities, because it is responsible for the preparation and fair presentation of the financial statements in accordance with the applicable accounting framework and the internal control it considers necessary to enable the preparation of financial statements that are free of material misstatement.

The work done on the risk of fraud by the Bureau du vérificateur général as part of the audit of the financial statements does not relieve the city's management of its responsibility for the prevention and detection of fraud. Therefore, due to the limitations inherent in the financial audit, the risk that some material misstatements resulting from fraud are not detected remains despite the fact that the audit work has been planned and performed in accordance with Canadian Auditing Standards.

3.2. Consolidated Financial Statements of the Ville de Montréal

In accordance with the provisions of the *Cities and Towns Act* (CTA) in force on December 31, 2016, we audited the city's financial statements.

The *Charter of Ville de Montréal* and the CTA both require the city to submit its financial statements to the Service du greffe by March 31 following the close of the preceding year and to the Ministère des Affaires municipales et de l'Occupation du territoire (MAMOT), using the prescribed form, by April 30.

The audit of the financial statements was planned and performed jointly with Deloitte, the independent auditor appointed by the city. Doing this work together avoids duplication of work and costs for the municipality.

The consolidated financial statements include the activities of the organizations included in the city reporting entity. The inclusion of an organization in the reporting entity is based on the concept of control, that is, the power to direct the financial and administrative policies of another organization so that its activities will provide expected benefits to the municipal organization or expose it to a risk of loss. These organizations are: Société de transport de Montréal, Société d'habitation et de développement de Montréal, Technoparc Montréal, Société du parc Jean-Drapeau, Conseil des arts de Montréal, Conseil interculturel de Montréal, Office de consultation publique de Montréal, Anjou 80, Société en commandite Stationnement de Montréal, Bureau du taxi de Montréal and BIXI Montréal.

On April 3, 2017, I issued an unqualified auditor's report on the consolidated financial statements of the city as of December 31, 2016. It should be noted that the city's external auditor has issued a qualified opinion on the city's financial statements. The difference of opinion between the city, the Auditor General and Deloitte involves accounting for government transfers.

According to the accounting standard on government transfers, a Government transfer must be recognized as revenue or an expense when the transfer has been authorized and the eligibility criteria have been met. However, it also specifies the recipient's authorization criterion, linking it with the authorization from the assigner. This explains the divergent interpretations. I believe that government representatives and the city's representatives are qualified to negotiate and enter into valid agreements and that, consequently, a government transfer is considered to be authorized when a duly designated representative signs an agreement and informs the recipient in writing of his decision to make a transfer. According to the city and the Auditor General, these facts establish that there is an expectation that these Government transfers will actually be obtained or paid.

The auditor's report on the city's consolidated financial statements and the report on mixed expenditures are included in the annual financial report filed with the city's Service du greffe on April 19, 2017.

Also, on April 13, 2017, reports on the city's consolidated financial statements, on the breakdown of mixed expenditures and on the city's aggregate taxation rate were produced and recorded on the form required by MAMOT. In accordance with the provisions of the CTA, the form required by MAMOT, along with the three above-mentioned Auditor General's reports and the joint auditor's report on the consolidated financial statements were filed with city council and the urban agglomeration council before being sent to MAMOT on April 24, 2017.

ORGANIZATION AND GOVERNANCE OF PUBLIC TRANSIT IN THE MONTRÉAL METROPOLITAN AREA

On June 1, 2017, the *Act to modify mainly the organization and governance of shared transportation in the Montréal metropolitan area* came into force. The Act provided for the creation of the Autorité régionale de transport métropolitain (ARTM) and the Réseau de transport métropolitain (RTM). The creation of these two organizations could lead to changes in the Société de transport de Montréal's (STM) governance and consequently in its accounting treatment in terms of the city's financial statements. The city is currently assessing the potential impacts of this new legislation.

AGGREGATE TAXATION RATE

The effective aggregate taxation rate is the rate that the municipality would have to impose if all its tax revenues came from a tax on the property value of all its taxable property. The Government of Québec uses the effective aggregate taxation rate to calculate the amounts paid to municipalities under the *Act respecting municipal taxation* including payments in lieu of taxes in respect of buildings in the health and social services system and the education system.

We have audited the Ville de Montréal's effective aggregate taxation rate. This rate is set by the city manager of the city in accordance with division III of chapter XVIII.1 of the *Act respecting municipal taxation* (CQLR, chapter F-2.1).

On April 13, 2017, I issued an unqualified report indicating that the setting of the taxation rate meets compliance requirements in all material respects.

MIXED EXPENDITURES

Under the *Act respecting the exercise of certain municipal powers in certain urban agglomerations* (CQLR, chapter E-20.001), completed by the *Montréal Agglomeration Order* (order-in-council 1229-2005) as subsequently amended, expenditures incurred

by the city in the performance by the municipal administration of an act that comes under both an urban agglomeration power and another power are considered mixed expenditures. They are broken down between local and agglomeration powers in accordance with the criteria established by management pursuant to by-law RCG06-054 adopted by the urban agglomeration council on December 13, 2006 and its subsequent amendments.

I audited the table of mixed expenditures incurred by the city broken down by local and agglomeration powers. On April 3, 2017, I issued an unqualified report indicating that the breakdown of mixed expenditures meets compliance requirements in all material respects.

OTHER REPORTS

In the fall of 2016, the Auditor General and Deloitte sent the city manager director general and the city's audit committee a report, which consolidated deficiencies in internal control, as well as observations related to Information Technology General Controls (ITGCs) which are identified during the audit of financial statements as of December 31, 2015 and related to follow-up on deficiencies reported in previous years. Deficiencies in internal control and ITGCs identified during the audit of financial statements as of December 31, 2016, and the follow-up on previous deficiencies will be reported at the June 2017 audit committee. meeting.

3.3. Financial Statements of Other Legal Entities Subject to the *Cities and Towns Act*

Pursuant to section 107.7 of the *Cities and Towns Act* (CTA), the Auditor General is required to audit the financial statements of other legal entities subject to the CTA that meet any of the following conditions:

- It is part of the reporting entity defined in the municipality's financial statements;
- The municipality or a mandatary of the municipality appoints more than 50% of the members of the board of directors;
- The municipality or a mandatary of the municipality holds more than 50% of the outstanding voting shares or units.

Table 1 on the following page identifies other legal entities that are subject to the CTA and for which we are required to produce an audit report on their financial statements.

Table 1 – Legal Entities Subject to Section 107.7. of the *Cities and Towns Act*

Other legal entities subject to the <i>Cities and Towns Act</i>	Reporting entity	Appointment of more than 50% of the members of the board of directors	Date of the auditor's report for the fiscal year ending December 31, 2016
Anjou 80	n		(3)
BIXI Montréal	n		April 18, 2017
Bureau du taxi de Montréal	n		(3)
Conseil des arts de Montréal	n		April 18, 2017
Conseil interculturel de Montréal	n		(3)
Corporation d'habitations Jeanne-Mance		n	April 11, 2017
Fiducie du Technoparc Montréal	(1)		February 22, 2017
Office de consultation publique de Montréal	n		(3)
Office municipal d'habitation de Montréal		n	May 18, 2017
Société de gestion Marie-Victorin		n	(3)
Société de transport de Montréal (Financial report and MAMOT report)	n		April 7, 2017
Société en commandite Stationnement de Montréal	n		March 21, 2017
Société d'habitation et de développement de Montréal	n		April 25, 2017
Société du parc Jean-Drapeau	n		March 30, 2017
Technoparc Montréal	n		March 8, 2017
Société en commandite Transgesco.	(2)		March 17, 2017

(1) Technoparc Montréal subsidiary

(2) Société de transports de Montréal subsidiary

(3) On the date of this annual report, the financial statements had not been approved by the board of directors.

ANJOU 80

ANJOU 80 is a non-profit organization that acts on behalf of the Ville de Montréal (the city), incorporated by letters patent dated June 22, 1979, pursuant to the legislative powers granted to the ex-city of Anjou by the Government of Québec.

Its purpose is to acquire residential properties for individuals or families other than low- or lower-income families, acquiring, restoring, demolishing, constructing, leasing and administering buildings for the purposes of lodging, leisure, recreation and other ancillary purposes.

It administers the housing complex known as Résidences Neuville and participates jointly with the Anjou borough in activities that promote economic development.

Report

When the annual report was produced, the financial statements as of December 31, 2016 had not been approved by the board of directors.

BIXI MONTRÉAL

BIXI Montréal was incorporated under part III of the *Quebec Companies Act* on March 6, 2014 and started its activities on April 28, 2014. It has the powers, rights and privileges of a non-profit organization under part III of the *Quebec Companies Act* (CQLR, chapter C-38).

Its mission is to organize a self-service bicycle system in the Montréal and the surrounding area in order to provide the public with an alternative mode of urban transportation, complementary to the city's public transit system, allowing its users to ride bicycles to make short trips.

Also, it must also encourage Montréal residents to use bicycles as an alternative means of urban transportation since bicycles are far less harmful to the environment than energy-consuming vehicles.

Report

On April 18, 2017, I issued an unqualified auditor's report for this organization.

This is an extract from the report:

Opinion

In my opinion, the financial statements present fairly, in all material respects, the financial position of BIXI Montréal as of December 31, 2016 and the results of its operations, changes in its net financial assets and cash flows for the year then ended in accordance with Canadian public sector accounting standards.

BUREAU DU TAXI DE MONTRÉAL

The Bureau du taxi de Montréal was incorporated under section 220.1 of schedule C of the *Charter of Ville de Montréal* (CQLR, chapter C-11.4) enacted by the *Act to amend various legislative provisions respecting municipal affairs* (CQLR, 2012, chapter 21) on November 28, 2012 and it started its activities on January 1, 2014. It has the powers, rights and privileges of a non-profit organization incorporated under part III of the *Quebec Companies Act* (CQLR, chapter C-38).

Their mission is to develop the taxi industry, provide services to the taxi industry, supervise and improve this service, taxi driver and user safety, and the skills of drivers on the island of Montréal.

Also, they are responsible for exercising, at the city's request, any powers, other than regulatory powers, that the city delegates to it among those arising from sub-section 9 of division II of chapter III of its Charter and the second paragraph of section 13 of the *Act respecting transportation services by taxi* (CQLR, chapter S-6.01).

Report

When the annual report was produced, the financial statements as of December 31, 2016 had not been approved by the board of directors.

CONSEIL DES ARTS DE MONTRÉAL

The Conseil des arts de Montréal was founded in 1956 and became a public corporation on October 25, 2007 under section 231.2 of schedule C of the *Charter of Ville de Montréal* (CQLR, chapter C-11.4.) The Conseil des arts de Montréal has the powers, rights and privileges of a non-profit organization incorporated under part III of the *Quebec Companies Act* (CQLR, chapter C-38).

Pursuant to section 231.3, its mandate is to:

- Draw up and keep a permanent list of the associations, societies, organizations, groups or persons engaged in artistic and cultural activities in the urban agglomeration of Montréal;
- Combine, co-ordinate and promote artistic or cultural initiatives in the urban agglomeration of Montréal; and
- Within the limits of the revenues available for that purpose and in conformity with the programs referred to in section 231.14, to designate the associations, societies, organizations, groups or persons and the artistic or cultural events to which or in respect of which grants, prizes or other forms of financial assistance are to be paid.

Report

On April 18, 2017, I issued an unqualified auditor's report for this organization.

This is an extract from the report:

Opinion

In my opinion, the financial statements present fairly, in all material respects, the financial position of the Conseil des arts de Montréal as of December 31, 2016 and the results of its operations, changes in its net assets and cash flows for the year then ended in accordance with Canadian public sector accounting standards.

CONSEIL INTERCULTUREL DE MONTRÉAL

The Conseil interculturel de Montréal was incorporated under section 83.1 of the *Charter of Ville de Montréal*.

It advises the city council and the executive committee on municipal services and policies to facilitate the integration and participation of members of cultural communities in the political, economic, social and cultural life of the city and any matter of interest for the cultural communities.

Report

When the annual report was produced, the financial statements as of December 31, 2016 had not been approved by the board of directors.

CORPORATION D'HABITATIONS JEANNE-MANCE

The Corporation d'habitations Jeanne-Mance was incorporated under section 231 of the *Charter of Ville de Montréal* in accordance with the *National Housing Act, 1954*.

Its mandate is to operate, manage and administer low-rent housing for the project known as "Habitations Jeanne-Mance."

Report

On April 11, 2017, I issued an unqualified auditor's report for this organization.

This is an extract from the report:

Opinion

In my opinion, with the exception of the elements described in the "Basis for qualified opinion" paragraph, the financial statements present fairly, in all material respects, the financial position of the Corporation d'habitations Jeanne-Mance as of December 31, 2016 and the results of its operations and cash flows for the year then ended in accordance with Canadian accounting standards for not-for-profit organizations.

FIDUCIE DU TECHNOPARC MONTRÉAL

The purpose of the trust, incorporated under sections 1260 and following of the Civil Code of Québec is to:

- Contribute to the technological and economic development of the island of Montréal;
- Support the establishment and development of technology companies and research centres on the island of Montréal.

Report

On February 22, 2017, I issued an unqualified auditor's report for this organization.

This is an extract from the report:

Opinion

In my opinion, the financial statements present fairly, in all material respects, the financial position of Fiducie du Technoparc Montréal as of December 31, 2016 and the results of its operations and cash flows for the year then ended in accordance with Canadian accounting standards for private businesses.

Observations

Without qualifying my opinion with a reservation, I draw attention to note 6 to the financial statements, which states that subsequent to the end of the year ended December 31, 2016, the trustees of Fiducie du Technoparc Montréal adopted a resolution to initiate a dissolution process. This points to the existence of material uncertainty that could cast substantial doubt on the entity's ability to ensure its sustainability.

OFFICE MUNICIPAL D'HABITATION DE MONTRÉAL

The Office municipal d'habitation de Montréal was incorporated by letters patent on May 8, 2001 under the *Act respecting the Société d'habitation du Québec* (SHQ) (CQLR, chapter S-8 section 5). In accordance with the *Act to reform the municipal territorial organization of the metropolitan regions of Montréal, Québec and the Outaouais*, its official activities started on January 1, 2002. It was formed from the group of 15 municipal on the island of Montréal.

Its mission is to administer buildings on the island of Montréal for low-income individuals and for any other purpose provided for in the *Act respecting the Société d'habitation du Québec* as part of the following programs:

- Low-rental housing – public component (public LRH);
- Low-rental housing – private component (private LRH);
- Logement abordable Québec (LAQ) [Affordable Housing Quebec];
- AccèsLogis Québec (ACL) [HousingAccess Quebec];
- Supplément au loyer (PSL) [Housing supplement program].

Also, it manages the construction of non-profit community-owned housing under agreements with the SHQ, and, since 2007, it also manages rental properties.

Report

On May 18, 2017, I issued an unqualified auditor's report for this organization.

This is an extract from the report:

Opinion

In my opinion, the financial statements present fairly, in all material respects, the financial position of the Office municipal d'habitation de Montréal as of December 31, 2016 and the results of its operations and cash flows for the year then ended in accordance with Canadian accounting standards for not-for-profit organizations.

SOCIÉTÉ DE GESTION MARIE-VICTORIN

The Société de gestion Marie-Victorin was created pursuant to the *Act respecting certain facilities of Ville de Montréal* (1998, chapter 47, Statutes of Quebec.)

Its mission is to carry out any activity that will contribute to the use, development and promotion of the city's scientific equipment.

Report

When the annual report was produced, the financial statements as of December 31, 2016 had not been approved by the board of directors.

SOCIÉTÉ DE TRANSPORT DE MONTRÉAL

The Société de transport de Montréal was incorporated under the *Act respecting public transit authorities* (CQLR, chapter S-30.01)

It is responsible for organizing and providing public transit within the urban agglomeration of Montréal.

Report

On April 7, 2017, I issued an unqualified auditor's report for this organization.

This is an extract from the report:

Opinion

In my opinion, the consolidated financial statements present fairly, in all material respects, the financial position of the Société de transport de Montréal as of December 31, 2016 and the results of its operations, changes in its net debt and cash flows for the year then ended in accordance with Canadian public sector accounting standards.

SOCIÉTÉ EN COMMANDITE STATIONNEMENT DE MONTRÉAL

The Société en commandite Stationnement de Montréal was incorporated under a limited partnership agreement entered into on May 10, 1994.

Since January 1, 2015, it manages paid parking activities under an agreement with the city.

Report

On March 21, 2017, I issued an unqualified auditor's report for this organization.

This is an extract from the report:

Opinion

In my opinion, the financial statements present fairly, in all material respects, the financial position of Société en commandite Stationnement de Montréal as of December 31, 2016 and the results of its operations, changes in its net debt and cash flows for the year then ended in accordance with Canadian public sector accounting standards.

SOCIÉTÉ D'HABITATION ET DE DÉVELOPPEMENT DE MONTRÉAL

The Société d'habitation et de développement de Montréal is a non-profit organization that reports to the city, incorporated by letters patent on June 15, 2010 by the Government of Québec pursuant to chapter V of schedule C of the *Charter of Ville de Montréal* (CQLR, chapter C-11.4).

Its objectives are:

- to contribute to economic and social development through the enhancement of residential, institutional, industrial, commercial and cultural property assets in the city's territory;
- to acquire, renovate, restore, build, demolish, sell, lease or administer buildings in the city's territory;
- grant subsidies and administer programs for the construction, renovation, restoration, demolition and relocation of buildings in the city's territory.

Report

On April 25, 2017, I issued an unqualified auditor's report for this organization.

This is an extract from the report:

Opinion

In my opinion, the consolidated financial statements present fairly, in all material respects, the financial position of the Société d'habitation et de développement de Montréal as of December 31, 2016 and the results of its operations, revaluation gains and losses, changes in its net debt and cash flows for the year then ended in accordance with Canadian public sector accounting standards.

SOCIÉTÉ DU PARC JEAN-DRAPEAU

The Société du parc Jean-Drapeau is a non-profit organization that was incorporated on August 9, 1983 under section 223 of the *Charter of Ville de Montréal*.

Its purpose is to operate, administer and develop Parc Jean-Drapeau, which includes Sainte-Hélène and Notre-Dame islands in Montréal. It manages recreational, cultural and tourist activities and carries out any other mandate entrusted to it by the city.

Report

On March 30, 2017, I issued an unqualified auditor's report for this organization.

This is an extract from the report:

Opinion

In my opinion, the financial statements present fairly, in all material respects, the financial position of the Société du parc Jean-Drapeau as of December 31, 2016 and the results of its operations, changes in its net financial assets and cash flows for the year then ended in accordance with Canadian public sector accounting standards.

TECHNOPARC MONTRÉAL

Technoparc Montréal, incorporated under part III of the Quebec *Companies Act*, is a non-profit organization within the meaning of the *Income Tax Act* and its objectives are to:

- contribute to the technological and economic development of the island of Montréal;
- support the establishment and development of technology companies and research centres and service companies on the island of Montréal.

Report

On March 8, 2017, I issued an unqualified auditor's report for this organization.

This is an extract from the report:

Opinion

In my opinion, the consolidated financial statements present fairly, in all material respects, the financial position of Technoparc Montréal as of December 31, 2016 and the results of its operations, changes in its net debt and cash flows for the year then ended in accordance with Canadian public sector accounting standards.

SOCIÉTÉ EN COMMANDITE TRANSGESCO

The société en commandite Transgesco was formed under a partnership agreement on July 2, 2003, within the meaning of the Civil Code of Québec.

Its purpose is to manage various partnerships with private sector stakeholders in connection with business activities related to the Société de transport de Montréal.

Report

On March 17, 2017, I issued an unqualified auditor's report for this organization.

This is an extract from the report:

Opinion

In my opinion, the consolidated financial statements present fairly, in all material respects, the financial position of société en commandite Transgesco as of December 31, 2016 and the results of its operations, changes in its net debt and cash flows for the year then ended in accordance with Canadian public sector accounting standards.

4

LEGAL AND REGULATORY COMPLIANCE

4.1 LEGAL COMPLIANCE OF ORGANIZATIONS HAVING RECEIVED A SUBSIDY OF AT LEAST \$100,000

4. Legal and Regulatory Compliance

4.1. Legal Compliance of Organizations Having Received a Subsidy of at Least \$100,000

In accordance with section 107.9 of the *Cities and Towns Act* (CTA), “any legal person who receives an annual subsidy of at least \$100,000 is required to have its financial statements audited”. This legal person’s auditor must provide the Auditor General with a copy of its annual financial statements, its report on these statements as well as any other report summarizing the auditor’s observations and recommendations to the board of directors or corporate officers of this legal person.

This auditor must also, when requested by the Auditor General, provide the latter with any document that relates to the audit works and their results, while also providing all information that the Auditor General considers necessary with regard to these audit works and their results. If the Auditor General considers that the information, explanations or documents obtained from the auditor are insufficient, he can arrange for any additional verification that he views as necessary.

In December 2013, the city council also adopted resolution CM13 1157 that requires, amongst other things, organizations having received a subsidy of at least \$100,000 to file an annual report each year.

Moreover, on June 21, 2016, a set of letters identifying the organizations having received subsidies adding up to at least \$100,000 in 2015 was provided by Direction générale to the concerned business units, asking them to provide it, as well as the Auditor General, with a copy of the audited financial statements of these organizations.

OBJECTIVE AND SCOPE OF THE MANDATE

Our mandate was to ensure that every legal person that, in 2015, received a subsidy of at least \$100,000 from the city was complying with the provisions of section 107.9 of the CTA with regard to submitting a copy of its audited financial statements to the Auditor General.

Our efforts were limited to obtaining audited financial statements and, accordingly, we obtained no other report summarizing the external auditor’s observations and recommendations for the board of directors or the corporate officers of the legal person.

Our procedures involved comparing the amounts identified for the organizations included in the letters provided by the Direction générale and the total subsidies listed in the financial statements of the Ville de Montreal. We indicated our differences to the Direction générale and also provided reminder letters to the business units from which we had not yet received all of the audited financial statements for the organizations in question.

From our scope, we excluded any organization for which the Auditor General also serves as auditor, as well as all organizations now grouped under *PME Montréal*.

In 2014 and 2015, Bureau du vérificateur général issued optimization audit reports on the management of financial contributions. The follow-up audits on the recommendations contained in these reports are included in the results on the follow-up of the recommendations presented in chapter 6 of this report.

CONCLUSION

In 2015, the city disbursed a total of \$191.1 million including \$108.7 million (i.e. 57%) to 187 organizations that received subsidies adding up to at least \$100,000, and to which the requirements of section 107.9 of the CTA apply.

By May 12, 2017, the Bureau du vérificateur général had received the 2015 audited financial statements of 176 (i.e. 94%) of the 187 organizations affected by this requirement under the CTA, for a total of \$104.9 million.

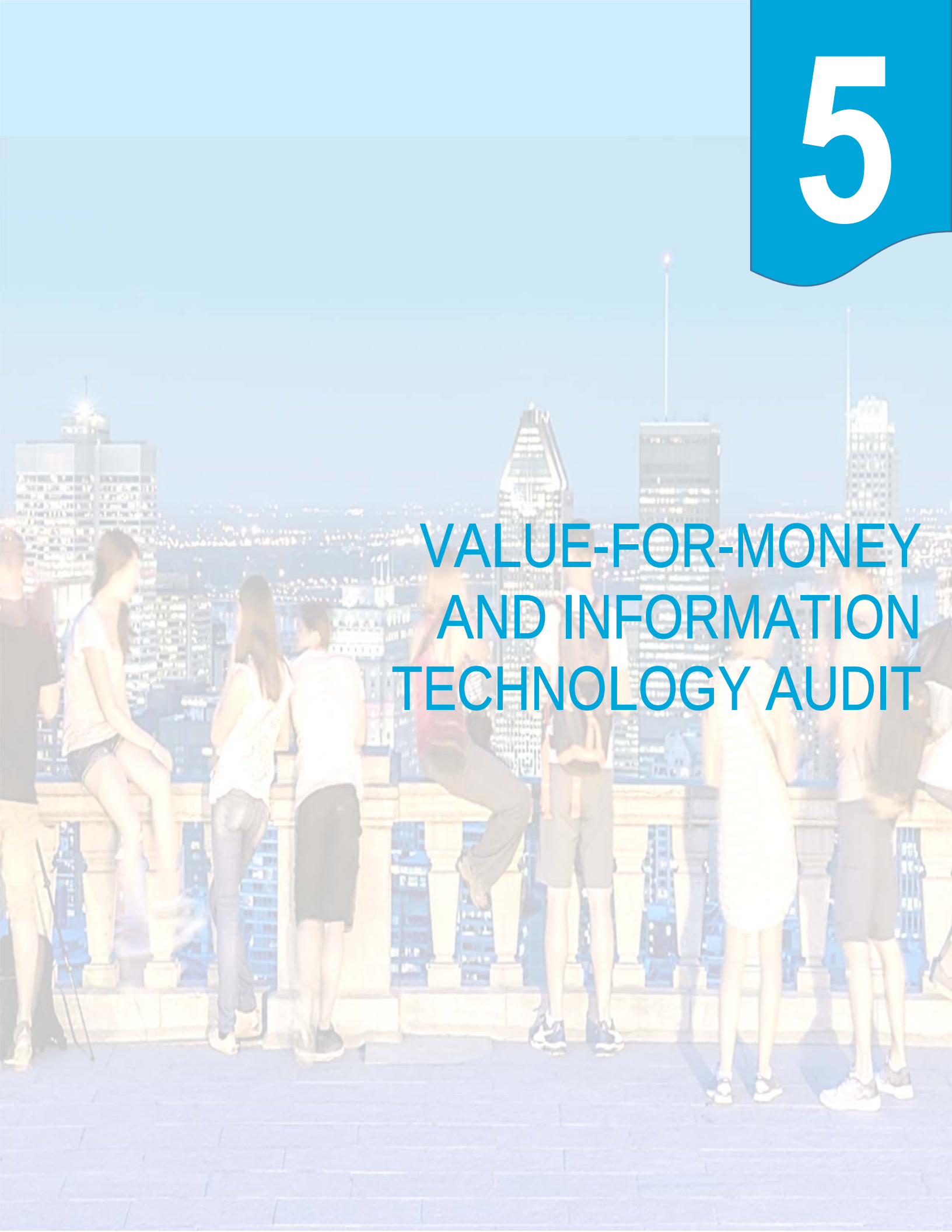
For the 11 non-compliant organizations, 5 of them submitted financial statements requiring an audit even though the CTA requires audited financial statements.

We encourage the city to continue its efforts to make organizations aware of the requirements of section 107.9 of the CTA.

The table on the following page summarizes the results obtained per business unit.

4.1.1. Summary Table – Legal Compliance of Organizations Having Received a Subsidy of at Least \$100,000 in 2015

Business unit	Total subsidies of at least \$100,000		Audited financial statements (number)		Missing financial statements
	\$	Number of organizations	Audited	Audit missions	
Ahuntsic-Cartierville borough	\$1,818,933	8	8	–	–
Bureau des relations gouvernementales et municipales	\$10,000,000	1	1	–	–
Côte-des-Neiges–Notre-Dame-de-Grâce borough	\$3,779,899	10	7	2	1
Direction générale	\$41,128,680	45	40	–	5
Service de la diversité sociale et des sports	\$11,885,636	27	27	–	–
Mercier–Hochelaga-Maisonneuve borough	\$2,536,292	12	11	1	–
Lachine borough	\$519,334	4	4	–	–
LaSalle borough	\$1,010,603	5	4	1	–
Montréal-Nord borough	\$457,498	4	4	–	–
Outremont borough	\$115,755	1	1	–	–
Pierrefonds-Roxboro borough	\$127,743	1	1	–	–
Le Plateau-Mont-Royal borough	\$577,782	3	3	–	–
Rivière-des-Prairies–Pointe-aux-Trembles borough	\$1,392,886	4	4	–	–
Rosemont–La Petite-Patrie borough	\$1,190,721	6	6	–	–
Saint-Laurent borough	\$1,579,969	3	3	–	–
Saint-Léonard borough	\$690,793	3	3	–	–
Service du développement économique	\$9,625,321	20	20	–	–
Service de sécurité incendie de Montréal	\$5,460,934	1	1	–	–
Service des grands parcs, du verdissement et du Mont-Royal	\$671,265	1	1	–	–
Le Sud-Ouest borough	\$1,423,141	6	6	–	–
Verdun borough	\$326,387	2	2	–	–
Ville-Marie borough	\$9,751,827	8	8	–	–
Villeray–Saint-Michel–Parc-Extension borough	\$2,631,471	12	11	1	–
Total	\$108,702,870	187	176	5	6
			94%	3%	3%

A group of people are sitting on a stone ledge, looking out over a city skyline at dusk. The skyline features several prominent skyscrapers, including the Empire State Building. The scene is captured in a warm, golden light, suggesting the 'blue hour' of twilight. The people are dressed in casual summer attire, and their silhouettes are visible against the bright city lights.

VALUE-FOR-MONEY AND INFORMATION TECHNOLOGY AUDIT



Management of the Emerald Ash Borer and the Canopy

Summary of the Audit

Purpose

Evaluate the measures with which the city deployed a strategy governing management of the problem related to the emerald ash borer in the territory of the Montréal agglomeration.

Results

In addition to these results, we have formulated various recommendations for the business units.

The details of these recommendations and our conclusion are outlined in our audit report, presented in the following pages.

Note that the business units have had the opportunity to formulate their comments, which appear after the audit report recommendations.

Considerable efforts have been deployed by the city to fight this plague and tend to enhance the canopy. However, in our opinion, several improvements should be made to the measures already taken by the city to fight this plague taking into account the main findings hereunder.

- Since the adoption by the executive committee in 2012 of the *Plan d'action montréalais de lutte contre l'agrile du frêne 2012-2015*, no other formal action plan has been drawn up and approved to circumscribe the directions.
- In the context of deployment of the strategy against the emerald ash borer:
 - the ash trees initially treated with a biopesticide did not systematically receive another treatment every two years as recommended by the supplier;
 - the results and the underlying analyses of the operations proposed are not all documented.
- The Service des grands parcs, du verdissement et du Mont-Royal (SGPVMR) has not instituted *post facto* controls allowing it to validate that tree felling prescribed in the boroughs was actually performed.
- The business unit responsible for assuming the city-wide leadership to look for and analyze solutions for reclamation of wood from felled ash trees has not been designated.
- By-law 15-040 to stop the spread of the emerald ash borer in the private domain has not received any monitoring of its application in the field.
- The financial setup that should allow anticipation of the budget needs of future years, in order to manage the impacts of the fight against the emerald ash borer, has never been updated since it was drafted in 2014.
- Budget appropriations are transferred from the SGPVMR to the boroughs without instituting control and monitoring measures to assess their contribution to the achievement of the fixed objectives.
- Management reports allowing tracking of the progress of operations and the degree of advancement of the actions taken in relation to the fixed targets, as well as assessments allowing evaluation of the strategy deployed against the emerald ash borer and for canopy enhancement, are not produced periodically.

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List of Acronyms

ASM	Ash Subsidy Management	SGPVMR	Service des grands parcs, du verdissement et du Mont-Royal
BAM	Bureaux Accès Montréal		
CFIA	Canadian Food Inspection Agency	SLAM	<i>Slow Ash Mortality</i>
CHD	chest height diameter	SPO	Service de la performance organisationnelle
CMM	Communauté métropolitaine de Montréal	STI	Service des technologies de l'information
CQEEE	Conseil québécois des espèces exotiques envahissantes	TCEP	Triennial Capital Expenditures Program
NPO	non-profit organization		

5.1. Management of the Emerald Ash Borer and the Canopy

1. Background

The emerald ash borer is a metallic emerald green-coloured insect originating from Asia (see Appendix 6.1, Figure A). This exotic invasive species attacks all types of ash trees, causing the death of the tree within a few years. No effective means of eradicating this insect has been perfected to date.

The insect was discovered for the first time in 2002 in Southern Ontario and in 2008 in Québec. Its presence in Montréal was recognized for the first time in July 2011 in the territory of Mercier–Hochelaga-Maisonneuve borough, near the Port of Montréal. The use of ash pallets for transport of merchandise in trade from Asia to North America allegedly allowed the introduction of the insect. Since then, the emerald ash borer has continued to spread and now is present throughout the territory of the Island of Montréal.

According to the documentation traced on the subject, the insect has the ability to fly short distances, but the main sources favouring its dispersion are human handling associated with transport of ash firewood, branches or logs infested with the insect. We should specify that the insect can live in the wood of a felled and cut ash tree, which accentuates the risks of spreading.

In 2012, the city estimated at 1.2 million the number of trees of all species planted in the public domain.¹ Of this number, the ash population was estimated at nearly 20%, a little over 200,000 trees threatened with destruction by the insect.

Knowledge of the emerald ash borer reveals the fact that, without intervention, the infested tree is doomed to gradual die-out over a period of two to three years and sometimes within a single year if the tree is severely infested. Thus, although it poses no human health hazard, the spread of the insect and the massive and rapid loss of ash trees present many environmental issues, as well as economic and social issues for municipalities and citizens, particularly:

- a loss of quality of life;
- an impairment of the esthetics of neighbourhoods and private property values;

¹ These trees in the public domain occupy space on the public thoroughfare along streets, in parks (off-street) or in the natural environment (woodlands). In opposition, trees in the private domain are planted on land belonging to individuals, industries, businesses or institutions (e.g., universities, hospitals).

- a reduction of the canopy² and a de facto increase in urban heat islands;³
- a decrease in air quality;
- a decrease in rainwater retention capacity (increased risk of sewer overflows during heavy rains);
- an increase in the annual costs mainly associated with felling of dead ash trees for public safety reasons (branches or parts of the tree can fall), replacement of these trees (replanting) and disposal of the infested wood.

In this context, the city has adopted an approach seeking to slow the progression of emerald ash borer in its territory and gain time to reduce its impacts. Thus, the *Plan d'action montréalais de lutte à l'agrite du frêne 2012-2015*, deployed by the city since 2012, is articulated around the "*Slow Ash Mortality (SLAM)*" strategy. This consists of slowing the insect's progression by detecting and treating outbreaks as soon as possible with a biopesticide. This strategy offers the advantage, in particular, of spreading the costs of tree felling and replacement over time instead of clear-cutting all ash trees.

The Service des grands parcs, du verdissement et du Mont-Royal (SGPVMR) is the business unit designated to implement this action plan in the city's territory.⁴ However, we should mention that some boroughs have also adopted local action plans and have invested additional efforts, in collaboration with the SGPVMR, to protect the public ash trees in their respective territories.

Finally, we should mention that the city's Sustainable Development Plan *Montréal durable 2016-2020*, and the previous plan entitled *Plan de développement durable de la collectivité montréalaise 2010-2015*, both identify the target of improving green infrastructure in Montréal by increasing the canopy area index from 20% to 25% by 2025 as one of the main collective targets to be achieved. In view of achieving this objective, the SGPVMR produced a study in 2011 on the Montréal canopy and, subsequently, the *Plan d'action canopée 2012-2021* covering the urban agglomeration. The *Plan d'action canopée 2012-2021* is the result of a joint effort by the city and a non-profit organization (NPO). For the implementation of this plan, it was agreed that the city would coordinate planting in the municipal public domain and the sites under its responsibility, while the NPO would see to coordinating tree planting in the private and institutional domain with the assistance of another NPO, which represents an umbrella group of about 40 organizations. The plan proposes, over a 10-year horizon, the additional planting of 300,000 trees on the Island of Montréal, in

² The **canopy** is the extent of the vegetation cover formed by the trees in a territory. The canopy area index calculates the shade on the ground provided by the tree crowns relative to the territory.

³ **Urban heat islands** are localized temperature elevations, particularly the maximum diurnal and nocturnal temperatures, recorded in the urban environment relative to the neighbouring rural or forest areas or relative to the regional average temperatures.

⁴ In 2012, this activity was the responsibility of the Division de la production et de l'expertise arboricole, Direction des grands parcs et verdissement, of the Service du développement et des opérations. For the purposes of the report, the name Service des grands parcs, du verdissement et du Mont-Royal (SGPVMR) will be retained.

both the public and private domains. For the city, this represents 75,000 additional trees to plant in the public domain, in addition to the 23,000 trees the boroughs plant on the average under their regular planting program, while for the NPOs involved, this represents planting 142,000 trees. For the related cities, this involves planting 60,000 additional trees.

In this perspective it must be recognized that the infestation related to the spread of the emerald ash borer could compromise the achievement of this objective of the sustainable development plan, *Montréal durable 2016-2020*.

2. Purpose and Scope of the Audit

The purpose of the audit conducted was to evaluate the measures with which the city deployed a strategy governing management of the problem related to the emerald ash borer in the territory of the Montréal agglomeration.

Our audit covered the years 2012 to 2016. It began on May 30, 2016, and then intensified over the period from September 6 to December 16, 2016.

This work was performed primarily with the following business units:

- The SGPVMR (Division stratégies, programmes et politiques, Section biodiversité et écologie urbaine);
- The Côte-des-Neiges–Notre-Dame-de-Grâce borough (Direction des travaux publics, Division de la voirie et des parcs);
- The Rivière-des-Prairies–Pointe-aux-Trembles borough (Direction des travaux publics, Division de l'horticulture et des parcs, Direction du développement du territoire et études techniques, Division de l'ingénierie, Section conception de parcs);
- The Sud-Ouest borough (Direction des travaux publics, Division des parcs et horticulture).

The work consisted of conducting interviews with personnel, examining various documents and conducting the surveys we considered appropriate with a view to obtaining probative information. This audit is based on the examination of the evaluation criteria presented in Appendix 6.4.

3. Main Findings

The audit performed found that improvements had to be made because, in particular:

- Since the adoption by the executive committee in 2012 of the *Plan d'action montréalais de lutte contre l'agrile du frêne 2012-2015*, no other formal action plan has been drawn up and approved to circumscribe the directions;
- Under the strategy deployed by the SGPVMR against the emerald ash borer, the ash trees initially treated with a biopesticide did not systematically receive another treatment every two years as recommended by the supplier;
- The results and the underlying analyses of the operations proposed in the context of deployment of the strategy against the emerald ash borer are not all documented;
- The SGPVMR has not instituted *post facto* controls allowing it to validate that tree felling prescribed in the boroughs was actually performed;
- The business unit responsible for assuming the city-wide leadership to look for and analyze solutions for reclamation of wood from felled ash trees has not been designated;
- Since its adoption in May 2015, By-law 15-040 to stop the spread of the emerald ash borer in the private domain, has not received any monitoring of its application in the field;
- The financial setup that should allow anticipation of the budget needs of future years, in order to manage the impacts of the fight against the emerald ash borer, has never been updated since it was drafted in 2014;
- Budget appropriations are transferred from the SGPVMR to the boroughs without instituting control and monitoring measures to assess their contribution to the achievement of the fixed objectives (e.g., tree felling and replacement);
- Management reports allowing tracking of the progress of operations and the degree of advancement of the actions taken in relation to the fixed targets, as well as assessments allowing evaluation of the strategy deployed against the emerald ash borer and for canopy enhancement, are not produced periodically.

4. Audit Results

Regarding roles and responsibilities, we should specify that the SGPVMR, which acts in conjunction with the other departments (e.g., the Service des finances, the Service de l'environnement) and the city's boroughs, as well as the community partners, has the following mission:

- Improve the quality of life of Montrealers and visitors by the protection, development, planning and management of parks, green spaces, natural settings, public places or urban routes;
- Implement the *Plan de protection et de mise en valeur du Mont-Royal*;
- Green the public domain and encourage greening of the private domain;
- Work for the improvement of the urban environment as a whole.

The SGPVMR handles several aspects, including preserving and maintaining the accessibility of green spaces in the territory, designing and carrying out planning projects to improve the network of large parks and public places, ensuring the protection of natural settings and, more broadly, promoting urban biodiversity. It also ensures operations related to growing trees in the municipal nursery, scientific research, prevention of insect pests and analysis of the canopy.

The responsibility for greening is shared. On the one hand, the SGPVMR contributes, by means of contractual agreements, to tree planting with the aim of strengthening the canopy. On the other hand, the boroughs, under their regular programming, are also responsible for operations related to tree planting in their respective territories, their maintenance and operations related to felling and stump pulling. This includes green spaces (local parks) located in their territory, excluding large parks (e.g., La Fontaine Park, Mount Royal Park), which are under the SGPVMR's responsibility.

We find the actions to stop the spread of the emerald ash borer and to expand of the Montréal canopy involve shared powers between the SGPVMR and the boroughs. Nonetheless, it is with the objective of deploying overall intervention strategy affecting environmental aspects common to all the city's business units that the SGPVMR intervenes in the boroughs' territory in the context of implementation, on the one hand, of the *Plan d'action montréalais de lutte contre l'agrile du frêne 2012-2015* and, on the other hand, of the *Plan d'action canopée 2012-2021*. These plans will be discussed subsequently in section 4.1 of this report.

Finally, as information, let us mention that the Canadian Food Inspection Agency (CFIA) is responsible, in particular, for administering the *Plant Protection Act* and its regulations. In this regard, it is responsible for preventing the introduction or the spread in Canada of quarantine plant pests.⁵ For management of the emerald ash borer, the CFIA has identified geographic quarantine areas within which transport of firewood is prohibited.

These clarifications having been made, the following sections of this report will discuss, in turn, all the aspects concerning the implementation and monitoring of actions with the aim of stopping the spread of this plague and concurrently enhancing the canopy.

⁵ Any species, strain or biotype or plant, animal or pathogenic agent injurious to plants or plant products.

4.1. Action Plans for Management of the Emerald Ash Borer and the Canopy

4.1.A. Background and Findings

The development of a documented action plan is the management tool of choice to identify the operational phases to be implemented, in view of the objectives sought. Ultimately, this action plan must serve as a basis of evaluation of the progress of operations, identification of the problems encountered and review of the recommended strategy, as applicable. Also, considering the importance of planning the human and budgetary resources necessary for its implementation, it is important that an action plan be submitted for the purposes of formal approval by the authority concerned, prior to its implementation.

This having been said, in light of the information identified, we find that, starting in 2008, the SGPVMR took steps to prepare for the eventual arrival of the emerald ash borer in Montréal. In particular, communications were transmitted with the aim of raising the boroughs' awareness of the impacts of the plague and the preventive actions to be taken. A Committee to monitor the emerald ash borer, composed of boroughs' representatives and the CFIA, among others, was constituted and is still active to date. Training concerning techniques for detection of the insect was delivered to the personnel concerned.

Following detection of the insect in the city's territory in July 2011, a first action plan, entitled *Plan d'action montréalais de lutte contre l'agrile du frêne 2012-2015*, was drawn up. As already mentioned the chosen strategy seeks to slow the emerald ash borer infestation and gain time to reduce its impacts. This action plan was formally approved by the city's executive committee at a meeting held on April 18, 2012.⁶

The *Plan d'action montréalais de lutte contre l'agrile du frêne 2012-2015* spins off into four main lines of strategic intervention:

1. continuous screening to know the outbreaks as soon as possible and track the progress of the infestation to then adopt the most appropriate interventions;
2. selective felling of ash trees heavily infested by the emerald ash borer in order to contain the outbreaks and slow the insect's dispersion;
3. treatment with a biopesticide of ash trees located around infested ash trees, with the aim of containing the outbreaks by eliminating the next generation of insects;
4. control of transport of ash wood within the territory to reduce the risks of dispersion during the critical period when the insect's adult stage is active (April to September).

⁶ Resolution CE12 0555.

Let us specify this intervention strategy only concerns ash trees under municipal responsibility, namely ash trees in the public domain. Also, a series of other actions that had to be performed in parallel supported the plan's strategy, including:

- introduction of concerted action mechanisms for stakeholders who have a role to play against the emerald ash borer;
- update of the ash tree inventory;
- adoption of municipal by-laws to facilitate detection of infested ash trees in the private domain, with the aim of harmonizing the interventions applied with those for public ash trees and thus reducing the risks of the insect's dispersion;
- deployment of a communications action plan to raise public awareness for protection of their private ash trees.

The examination of this action plan reveals that the city initially envisioned a concerted and harmonized intervention on the scale of the Montréal agglomeration, with the aim of forming a common front to counter the insect invasion. To this effect, we recognize that:

- The plan envisioned the establishment of a centralized expert office on the emerald ash borer, effective in 2012, to deploy strategies against that insect in the agglomeration's territory. It was projected that this centralized expert office would be created within the SGPVMR and that it would have the mandate to develop the best strategies and deploy them with the boroughs and the related municipalities, in order to ensure coordination of actions and follow-up of the proposed measures;
- In April 2014, the executive committee had even adopted a resolution⁷ to put a notice of motion on the urban agglomeration council agenda, for an urban agglomeration council by-law amending the schedule to the order in council concerning the Montréal agglomeration,⁸ by which the following action would be added to the list of activities of collective interest: *"Adoption of a strategy against the spread of the emerald ash borer on the scale of the urban agglomeration, implementation of this strategy and adoption of by-laws against the spread of the emerald ash borer."*

This increase in powers sought to allow the adoption on the scale of the urban agglomeration of an overall strategy against the emerald ash borer. At the same time, it was also resolved to mandate the SGPVMR to establish the actions against the emerald ash borer throughout the agglomeration's territory in collaboration with the related cities.

We find this aspect of the action plan, seeking an intervention strategy on the scale of the agglomeration and the establishment of a centralized expert office, as projected, did not materialize and the action plan in question was put forward only in the city's territory. Indeed, in light of the information obtained, it appears this desired amendment

⁷ Resolution CE14 0671, April 23, 2014.

⁸ Order in council 1229-2005, December 8, 2005; *Act respecting the exercise of certain municipal powers in certain urban agglomerations* (CQLR, chapter E-20.001).

to the order in council concerning the urban agglomeration of Montréal did not receive the unanimous support of the related municipalities and the boroughs. Thus, this project was abandoned and the stakeholders instead relied on everyone's co-operation by creating an agglomeration committee to ensure harmonization of the interventions of each related city. Moreover, in accordance with the directions of the 2014-2024 Metropolitan Strategy Against the Emerald Ash Borer of the Communauté métropolitaine de Montréal (CMM), we find, in studying the 2014-2015 assessment prepared by the CMM, that during this period, the vast majority of the related municipalities constituting the Montréal agglomeration had adopted an action plan against the emerald ash borer adapted to their own reality. Moreover, 80% of them had adopted municipal by-law imposing measures against the emerald ash borer on private land. For the city, this is the *By-law to stop the spread of the emerald ash borer on the territory of Montréal* (By-law 15-040) and the *By-law concerning the subsidy for the treatment of ash trees located on private property in high-risk areas* (By-law 15-063). These by-laws will be discussed subsequently in section 4.2.8 of this report.

To date, it has been confirmed to us that a committee of a more technical nature, called the Comité régional Agrile has succeeded the initial Agglomeration Committee. This committee, constituted of the SGPVMR team of experts in the matter, and representatives of the boroughs and the related municipalities, allows information sharing and tracking of the efforts against the emerald ash borer in the urban agglomeration's territory.

Following the adoption of the first *Plan d'action montréalais de lutte contre l'agrile du frêne 2012-2015* on April 18, 2012, we find the executive committee resolved, at a meeting held on June 19, 2013⁹, to mandate the SGPVMR to produce the financial setup of the *Plan d'action montréalais de lutte contre l'agrile du frêne 2015-2025*. Upon reading the decision-making summary accompanying this resolution, we understand the emerald ash borer has gained ground, because new outbreaks have been discovered and additional budget appropriations will be required to continue the fight against the emerald ash borer. The decision-making summary indicates the following:

*[TRANSLATION] To determine the most profitable interventions for Montréal in the longer term and avoid inflation of unpredictable costs in the years ahead, an action plan for the next 10 years will be proposed in 2015. [...] The plan proposed by the Direction des grands parcs et du verdissement (DGPV) will be associated with a financial setup, which will allow anticipation of the budget needs to manage the impacts of the efforts to stop the spread of the emerald ash borer between 2015 and 2025.*¹⁰

Thus, although the executive committee was informed by the decision-making summary that, effective from 2015, a new action plan associated with a financial setup

⁹ See GDD 1136218007 (Resolution CE13 0939, June 19, 2013).

¹⁰ Our underlining.

would be drawn up, it must be recognized that only the financial setup was produced by the SGPVMR in collaboration with a budget advisor from the Service des finances.

This financial setup, which the SGPVMR's managers entitled *Plan de gestion de la forêt urbaine 2015-2025 (PGFU)* or *Plan de gestion intégré de la forêt urbaine 2015-2025 (PGIFU)*, concurrently combines the required investments (all funding sources) to stop the spread of the emerald ash borer and those required to achieve the canopy enhancement target (20% to 25%) by 2025. We have not traced any evidence that it was formally approved by the SGPVMR's management, nor by the executive committee, even though it had ordered its production.¹¹ Moreover, major loan by-laws (\$7 million and \$14 million in 2015 and \$22 million in 2016), seeking in part to fund these interventions concerning the fight against the emerald ash borer and canopy enhancement, were adopted by city council, without integrating the *Plan de gestion de la forêt urbaine 2015-2025 (PGFU)* or the financial setup in question into the attachments of the decision summaries. For example, the decision files underlying the adoption of the \$14 million and \$22 million loan by-laws indicate the borrowing is required for the fulfillment of the *Plan de gestion de la forêt urbaine 2015-2025 (PGFU)* which, in fact, turns out to be a financial setup extending to 2028, according to what we could observe. These aspects associated with the financial setup will be discussed more fully in section 4.3 of this report.

Questioned to this effect, the managers interviewed within the SGPVMR affirm that management of fight against the emerald ash borer was the subject of various presentations over the years. The division head responsible affirms that quarterly meetings were held with the city manager to discuss the progress of the situation regarding the efforts against the emerald ash borer and the achievement of the canopy enhancement target. According to the information obtained, the financial setup called *Plan de gestion de la forêt urbaine 2015-2025 (PGFU)* received oral approvals.

Over the years, the only two documents we traced and which briefly state the direction of the interventions to continue the fight against the emerald ash borer and enhance the canopy are as follows:

- *Plan d'action montréalais contre l'Agrile du frêne 2012-2015 – Bilan 2012 et programme 2013*. The document is undated;
- *Forêt urbaine – Bilan 2015 – Plan d'action 2016*. This is a PowerPoint presentation dated March 24, 2016.

The document entitled *Bilan 2012 et programme 2013* presents the main objective and the actions proposed for 2013, while the second document *Forêt urbaine – Bilan 2015 – Plan d'action 2016* identifies three action priorities for 2016. We have not traced any documentation discussing all the intervention priorities for the years 2014 and 2015. Moreover, we were unable to identify clearly to whom these documents had been presented, but according to the information obtained from the persons

¹¹ Resolution CE13 0939, June 19, 2013.

interviewed at the SGPVMR, they were transmitted to the management of the department.

In short, since the adoption by the executive committee in 2012 of the *Plan d'action montréalais de lutte contre l'agrile du frêne 2012-2015*, no other formal action plan has been drawn up and approved with the aim of circumscribing the directions.

Moreover, specifically concerning the *Plan d'action canopée 2012-2021*, which we discussed previously, we find it was the subject of a public consultation held on October 3, 2012 by the Commission permanente du conseil d'agglomération sur l'eau, l'environnement, le développement durable et les grands parcs.¹² The report of the standing committee, which mentions unanimous support for the *Plan d'action canopée 2012-2021* project, was tabled at city council and then at the urban agglomeration council in January 2013. In response to the standing committee's report, we find the decision-making summary indicates that the city's executive committee, in particular, resolved¹³ on September 18, 2013, to mandate the SGPVMR to finalize the *Plan d'action canopée 2012-2021*.

However, to date, although actions have been undertaken to implement the *Plan d'action canopée 2012-2021* and major loan by-laws have been adopted to fund its fulfillment concurrently with the interventions against the emerald ash borer, we find the *Plan d'action canopée 2012-2021* is still identified¹⁴ as a working document. We did not trace any evidence of its formal approval by the authorities concerned. This finding was confirmed to us by the division head responsible for the SGPVMR.

To date, in view of the scope of the emerald ash borer's ravages in Montréal's territory and the issue this crisis represents for the objective of enhancing the canopy from 20% to 25% by 2025, it is legitimate to establish joint management of the action plan to continue the fight against the emerald ash borer and the action plan to enhance the canopy. In this sense, it would have been opportune for the SGPVMR to adopt an updated, documented and formally approved action plan with a view to renewing or redefining the strategy to apply and presenting the actions to be implemented in order to circumscribe all the problems identified, given the targets to be achieved and the available budgets.

¹² Resolution CG12 0230.

¹³ Resolution CE13 1511.

¹⁴ The cover page of the *Plan d'action canopée 2012-2021* indicates it is a working document.

RECOMMENDATION

4.1.B.

We recommend that the Service des grands parcs, du verdissement et du Mont-Royal take the necessary actions to adopt an updated action plan, formally approved by the authority concerned, regarding the strategy pursued and the targets sought in fighting the emerald ash borer and enhancing the canopy, in order to benefit from an appropriate intervention framework and a decision help tool to track the achievement of the expected results.

BUSINESS UNIT'S RESPONSE

4.1.B.

Service des grands parcs, du verdissement et du Mont-Royal

[TRANSLATION] The Service des grands parcs, du verdissement et du Mont-Royal has already produced an annual status report on urban forest issues, making it possible to account for the results achieved in relation to the administration's objectives and present the priorities for the coming year. A succinct report is produced and a press conference is organized. A more complete substantive document could be presented every three years. This will allow popularization of the issue as a whole and statement of the priorities for the next three years. (Planned completion: April 2018)

Auditor General's comments

We reiterate the importance for the SGPVMR to adopt, in the very short term, an updated and approved action plan regarding the strategy pursued to fight the emerald ash borer and simultaneously increase the Montréal canopy index. Considering the scope of the plague and the size of the budgets that will still have to be allocated to it, such a plan undoubtedly constitutes the cornerstone for ensuring the conduct of priority actions and the coordination of interventions by all the business units involved. In light of the response submitted by the SGPVMR, we do not perceive that all the necessary actions will be taken to adopt such a management tool, whereas the SGPVMR mentions that a more complete substantive document could be (and not will be) presented every three years.

This is especially relevant, considering that several aspects of the financial framework will have to be updated to anticipate the future budget needs properly and that the Canopy Action Plan 2012-2021 was established without accounting for the devastating effects of the emerald ash borer's presence in the

territory. The objective of increasing the canopy index by 5% by 2025 is at risk of being compromised.

4.2. Intervention Strategy

Concurrent to the strategy against the emerald ash borer put forward by the SGPVMR, let us mention that the Sud-Ouest borough, which is the subject of this audit, is one of the city's boroughs to have adopted its own *Plan d'action de lutte à l'agrile du frêne (2014-2024)*.¹⁵ This action plan is presented as one of the components of the borough's urban forest sustainable development plan. The borough's interventions against the emerald ash borer are complementary to those carried out by the SGPVMR, regarding the detection and treatment of ash trees in the public domain present in its territory.

4.2.1. Ash Tree Inventory

4.2.1.A. Background and Findings

To rapidly counter the inherent impacts of the ravages caused by emerald ash borer, it is essential to rely on an up-to-date inventory and thus have an exhaustive knowledge of the quantity of ash trees existing both in the public domain and in the private domain, which both constitute categories of trees in the urban environment. In the absence of a precise inventory of ash trees existing in the territory, it will be more difficult to deploy an intervention strategy that will be perfectly well coordinated and harmonized, without counting that it could also be more difficult to establish precisely the necessary budgets to fight this plague.

Concerning trees in the public domain, a distinction is made between streetside ash trees, off-street ash trees (local parks) and woodland ash trees (large parks). On the other hand, ash trees in the private domain belong to individuals, merchants, industries or institutions. These trees are entirely and legally under the owners' responsibility.

The municipalities have an interest in knowing the location and quantity of public trees exhaustively, because they are liable for any damage or harm they might cause. As for trees located on private land, it is also necessary to know their inventory to be able to apply a comprehensive strategy of efficient management throughout the city's territory in the presence of a pest like the emerald ash borer.

¹⁵ The borough council authorized a budget allocation of \$1.4 million for the first four years of this plan.

In 2012, shortly after the insect was detected in the city's territory, the SGPVMR estimated the public ash tree population was a little over 200,000 trees, including:

- 50,000 streetside ash trees;
- 50,000 off-street ash trees located in local parks;
- 100,000 woodland ash trees (forests of large parks, e.g., Mount Royal Park).

To date, our audit reveals that the SGPVMR has not yet completed the entire inventory of ash trees in the public domain, particularly for those presented in woodlands of large parks. However, concerning the first two categories (streetside ash trees and off-street ash trees), which were estimated at 100,000 ash trees in 2012, the inventory data obtained from the SGPVMR as of November 18, 2016, reveals that no more than a total of 70,867 streetside and off-street ash trees remain, namely:

- 46,978 streetside ash trees;
- 23,889 off-street ash trees.

According to the information obtained, the recognized difference of 29,133 ash trees relative to the initial estimate (100,000 - 70,867) is particularly explained by annual felling by the boroughs.

To be reliable, the power of an inventory depends primarily on its data, making its update essential. Yet we have found the city-wide tree inventory is not recorded on a uniform computer platform that could be used by all the business units concerned. Indeed, currently different computerized platforms exist, supporting the city's tree inventory. In particular, there is the vegetation management system, which is used by the SGPVMR and by 13 of the city's 19 boroughs, including the 3 boroughs covered by this audit. The other six¹⁶ boroughs use different applications specific to them. It appears these different databases do not communicate with each other. Moreover, in some regards, inventory data (e.g., geopositioning of the trees) in some boroughs is not up to date.

The first version of the city-owned vegetation management system property, restricted to the tree inventory, was adopted in 1991. Since that data, several developments have been dedicated to the system and several modules have been added to it. It now supports the streetside, off-street and woodland tree inventory, as well as the inventory of trees in the private domain, allows georeferencing of their locations, management of procurement at the municipal tree nursery, pesticide management and project-based management of planting, pruning and other tree maintenance projects. According to the information we obtained from the interviewees, and in view of the documentation consulted, this tool is becoming increasingly obsolete, however, due to its age and the capacity to maintain it up to date. Indeed, over the years, although the vegetation management system has undergone modifications and additions, user training has not necessarily followed, due to a lack of budget. Moreover, it turns out

¹⁶ These are the following boroughs: Anjou, Lachine, LaSalle, L'Île-Bizard–Sainte-Geneviève, Montréal-Nord and Outremont.

the application is not used to its full potential due to a lack of knowledge of all its functionalities by the users. This situation thus generates a risk that the users use the system incorrectly due to a lack of knowledge and training. In this regard, it was mentioned to us that the city's Service des technologies de l'information (STI), in collaboration with the Service de la performance organisationnelle (SPO) had been mandated in 2016 to conduct an overall study of asset management at the city, including the vegetation management system, in view of identifying a computer platform that eventually could be used uniformly by all stakeholders.

In the interim, with the goal of being able to collect the data concerning the tree inventory for all the city's business units, the SGPVMR has used an application called ArcGIS®.¹⁷ Thus, by means of Excel files, the data saved in the different inventory databases used by the boroughs (the vegetation management system and the applications of the six boroughs) is extracted to export the information to the ArcGIS® application, which will allow the SGPVMR to obtain the entire inventory.

Moreover, more specifically concerning the vegetation management system, the information obtained reveals that the frequency of data updates relating to the tree inventory can vary from one borough to another. Moreover, we find the boroughs must proceed manually to capture interventions performed in the field by means of paper work orders. Thus, it is possible that the inventory database is not exactly up to date, considering the delays that can be caused by this handling of paper and the risks that work orders have been lost. In addition, contrary to the boroughs, the SGPVMR's personnel have electronic tools (tablets) allowing real-time capture of inventory data directly in the field when they are patrolling the territory. The inventory data captured in this manner by the SGPVMR may not have been communicated systematically to the boroughs, thus causing deviations between the two inventory databases kept by the boroughs and those constituted by the SGPVMR.

Thus, to date, the city does not yet have an exhaustive picture of all the ash trees located in its territory. On the one hand, the picture of the situation in the public domain is incomplete, but also the inventory data on ash trees in the private domains is still provisional.

Indeed, on February 23, 2016, the city council resolved¹⁸ to award a contract for professional services in an amount of \$290,671 to an NPO for the production of an ash tree inventory in the private domain within the city's territory. According to the information obtained, the census of these ash trees in the private domain, within a certain number of risk areas, had initially begun in fall 2015, under a first agreement made with the same organization, for \$24,693. At the time of the audit, it appears the

¹⁷ ArcGIS® is geographic information software developed to provide tools allowing cartographic and geospatial analysis of data, in particular. This system is composed of different platforms, whether office automation, Web or mobile, which allows users of geographic information systems (GIS) to collaborate and share geographic information.

¹⁸ Resolution CM16 0227.

organization had completed the work requested with this second contract. However, because the NPO's employees are not municipal employees, they were not authorized to access the private yards of individuals. In the circumstances, they had to try to reference the ash trees visible from the street. This could have caused many inaccuracies. This is why, with the aim of eventually being able to have a complete and up-to-date inventory, the SGPVMR must now proceed with field validations to obtain the certainty that the trees identified are really ash trees and that all of them have been inventoried. As of December 1, 2016, the provisional data communicated to us by the SGPVMR reveals that a total of approximately 47,253 ash trees existed in the private domain.

From the city's 19 boroughs, we were informed that some of them¹⁹ also undertake to conduct an inventory of the ash trees in the private domain in their respective territories. Of the three audited boroughs, the Rivière-des-Prairies–Pointe-aux-Trembles and Sud-Ouest boroughs have taken actions in this sense, whereas in 2014 and 2015 (for Le Sud-Ouest) and in 2016 (for Rivière-des-Prairies–Pointe-aux-Trembles), the organization responsible for carrying out the Éco-quartier program within the borough had the mandate to conduct this survey in its territory. According to the information obtained from the technical agent within the Sud-Ouest borough, the data collected was validated by sampling.

Finally, without seeking to downplay all the efforts deployed to date to counter the emerald ash borer invasion, it remains that this lack of knowledge of the exact number and the geographic location of the ash trees present in the city's territory will certainly have hindered the campaign and weakened the intervention strategy. On the one hand, portions of the territory might have escaped the SGPVMR's vigilance in view of slowing the insect's spread (e.g., the inventory of ash trees present in the woodlands of large parks is still incomplete). On the other hand, as we will see in section 4.2.8 of this report regarding ash trees in the private domain, an incomplete picture very certainly will have added to the complexity of the application by By-law 15-040,²⁰ as well as the SGPVMR's validation of applications for subsidies under By-law 15-063.²¹

Even though the city has taken steps to have an inventory of ash trees in its territory, it remains incomplete.

¹⁹ According to the information obtained, the following boroughs were involved: Le Plateau-Mont-Royal, Saint-Laurent and Le Sud-Ouest.

²⁰ *By-law to stop the spread of the emerald ash borer on the territory of Montréal*, in the private domain.

²¹ *By-law concerning the subsidy for the treatment of ash trees located on private property in high-risk areas.*

RECOMMENDATIONS	
4.2.1.B.	We recommend that the Service des grands parcs, du verdissement et du Mont-Royal pursue the efforts undertaken to adopt a complete inventory of trees, in order to remain proactive, but also to adapt its intervention strategy better in the presence of insect pests.
4.2.1.C.	We recommend that the Service des grands parcs, du verdissement et du Mont-Royal, in the expectation of the eventual implementation of city-wide harmonized application, take the necessary actions to ensure continuing education of users regarding the vegetation management application.
4.2.1.D.	We recommend that the Service des grands parcs, du verdissement et du Mont-Royal, with the goal of favouring the real-time update of the inventory database of the vegetation management application, evaluate the possibility of enabling the boroughs to have the same technological tools it uses in field interventions.
BUSINESS UNIT'S RESPONSES	
4.2.1.B.	Service des grands parcs, du verdissement et du Mont-Royal [TRANSLATION] The implementation of the corporate municipal asset management system, under the responsibility of the SPO, provides for the gradual update of the inventory of trees in the public domain, starting in 2019. The SGPVMR is a stakeholder in this approach. (Planned completion: July 2019) The SGPVMR will award a contract next July to begin the update of the public tree inventory, with the collaboration of the boroughs. The SGPVMR will award a contract to conduct an inventory of the forest communities. (Planned completion: December 2017) The SGPVMR is currently proceeding to validate the private tree inventory. This is an ongoing update of the data in relation to by-law enforcement. (Planned completion: September 2017)
4.2.1.C.	Service des grands parcs, du verdissement et du Mont-Royal [TRANSLATION] In fall 2016, the SGPVMR met with the Comité des usagers du système de gestion des végétaux to identify the short-term training priorities. Since then, it has coordinated a user group (borough employees) with a trainer (under the responsibility of the STI) to develop this summary training. However, the success of this approach largely depends on the availability of expert users, because this is primarily a system used by the boroughs. (Planned completion: December 2017)

4.2.1.D.

Service des grands parcs, du verdissement et du Mont-Royal

[TRANSLATION] The STI is mandated to develop an application allowing real-time data capture on a mobile device, directly in the field. The tools should be accessible in test mode in August 2017. (Planned completion: December 2017)

4.2.2. Detection

4.2.2.A. Background and Findings

Detection of the emerald ash borer is the first strategic line of the *Plan d'action montréalais de lutte contre l'agrile du frêne 2012-2015* deployed by the SGPVMR.

These detection operations serve to direct the nature of the subsequent interventions intended to slow the spread of the emerald ash borer (tree felling, treatment by biopesticide injection, replacement of the tree), but also to evaluate over time whether the strategy works.

Although the detection operations are under the SGPVMR's responsibility, some boroughs nonetheless have invested additional detection efforts with the aim of covering their territory more widely. In particular, the Sud-Ouest borough conducted detection operations during the years 2014 and 2015. For 2016, the borough decided to cease detection operations given that its territory was widely infested (see Table 2 below). Moreover, the information obtained to date reveals that all Montréal territory is infested. No borough has escaped the insect invasion.

Detection operations are generally performed in the fall (between September and December). They seek to determine whether the ash trees located in a given territory are infested, so that actions then can be taken quickly to stop the spread of the insect, either by treating the infested tree with a biopesticide or by selective felling. Remember these detection operations conducted by the SGPVMR and by some boroughs only concern ash trees in the public domain, because ash trees on private land are the owners' responsibility. According to the information traced on the subject, if the insect is detected at an early stage of infestation, it will be easier to contain it within the intervention area and thus protect the ash trees located outside the area. In the case of major emerald ash borer infestation, the foliage of the ash tree yellows, the branches decay, and the treetop is increasingly sparse. A highly infested tree will die of the infestation eventually.²²

The main feature of the SLAM approach is that the presence of the invasive species is treated by outbreak, i.e., by intervention area. Thus, when the insect's presence is

²² Source: Conseil québécois des espèces exotiques envahissantes (CQEEE).

detected, the SGPVMR draws a 300 m circular intervention perimeter around this point, in order to conduct different pest detection and control activities within it. According to the information obtained from the SGPVMR, the choice of intervention areas to conduct detection operations is guided, in particular, by criteria such as the presence of a high density of ash trees in the territory, the identification of sectors where declining ash trees have been observed, given the higher probability they have been infested by the emerald ash borer, or the proximity of a known outbreak. These intervention area selection criteria appear legitimate.

Thus, these areas, established within a 300 m radius of the places where the ash trees infested by the emerald ash borer have been detected in the public domain (along the street, in local parks, in woodlands and in large parks) are what the SGPVMR calls "high-risk areas". Following the detection campaigns it conducts, the SGPVMR maps the limits of the high-risk areas identified in the territory of each of the city's boroughs (see Appendix 6.2). As we will see in section 4.2.3 of this report, within these areas, the SGPVMR prescribes felling of severely infested ash trees or proceeds with treatment of the neighbouring ash trees by injection of a biopesticide called "TreeAzin®".

For your information, let us mention that in the adult stage, the emerald ash borer is present during a short period of the year, between mid-May and the end of August. After their emergence, the adults reach the top of the ash trees to feed and mate. The females then will lay up to a hundred eggs in the fissures of an ash tree's bark. After hatching, the young larvae penetrate under the bark and dig galleries (see Appendix 6.1, Figure B). It is the larvae that destroy ash trees by feeding on a layer located under the bark, called phloem. By digging galleries, the larvae block the flow of the sap and cause the ash tree to die after two to five years, depending on the tree's vigour. Completion of the biological cycle between the egg stage and the emergence of adults can take one to two years.²³

Apart from visual referencing of the signs and symptoms revealing the presence of the emerald ash borer at an advanced stage (e.g., existence of S-shaped galleries under the bark, decay of the treetop), the SGPVMR has preferred two detection techniques, the use of sticky traps hung on the tree branches and barking branches (see Appendix 6.1, Figure E). These two techniques have the advantage of allowing early detection of the emerald ash borer in infested trees that appear healthy and that show no outer signs or symptoms.

According to the information obtained, until 2013, the detection operations were essentially conducted in house, but since 2014, the SGPVMR has awarded contracts to specialized firms. At the time of our audit, the contracts awarded during the years 2014 and 2015²⁴ for detection amounted to \$1.3 million (see Appendix 6.3).

²³ Source: SGPVMR website.

²⁴ The contracts awarded in 2015 are for a three-year term.

We find the SGPVMR adopted an annual detection intervention target. This target was integrated into the financial setup entitled *Plan de gestion de la forêt urbaine 2015-2025 (PGFU)* and prepared in 2014 by the SGPVMR in collaboration with the Service des finances. Thus, according to this financial setup, the SGPVMR intended to perform 4,000 detections per year, starting in 2015. However, in light of the examination of the decision summaries supporting the award of detection contracts by the SGPVMR since 2014, we find this target was revised downward to 3,450 detections instead of 4,000. As we will see in section 4.3 of this report, dealing with the financial framework, the financial setup in question has not been revised to account for this change in the financial forecasts. Tables 1 and 2 below illustrate the trend of detection operations conducted by the SGPVMR since 2012 and by the Sud-Ouest borough since 2014.

**Table 1 – Trend of Detection Operations
Conducted by the SGPVMR Since 2012**

Detection operations	2012	2013	2014	2015	2016
Annual detection target (according to the financial setup – PGFU ^[a])	2,400	2,650	3,450	4,000	4,000
Number of trees to be detected according to the contracts awarded by the SGPVMR	In house	In house	3,450	3,450	3,450
Actual number of ash trees detected	2,552 ^[b]	2,658 ^[b]	3,476 ^[b]	3,376 ^[b]	N/A
Fulfillment rate	106%	100%	108%	98%	N/A

^[a] *Plan de gestion de la forêt urbaine 2015-2025 (PGFU)*.

^[b] Data compiled by the SGPVMR – *Technical Data Sheet – Status Report – August 9, 2016*.

**Table 2 – Trend of Detection Operations
Conducted by the Sud-Ouest Borough in 2014 and 2015**

Detection operations	2014	2015	2016
Annual detection target	138 ^[a]	112 ^[a]	112 ^[b]
Actual number of ash trees detected	210 ^[a]	160 ^[a]	0 ^[c]
Fulfillment rate	152%	143%	N/A

^[a] According to the assessment reports produced for 2014 and 2015.

^[b] According to the *Plan d'action 2014-2024 de l'arrondissement pour la gestion de l'agrile du frêne*.

^[c] The borough decided to cease detection operations, given that its territory was widely infested.

To date, a little over five years have passed since the emerald ash borer was discovered in Montréal for the first time in July 2011. Thus, considering the magnitude of the budgetary funds required for such operations and the fact that the investigations undertaken over the past few years confirm the infestation of all Montréal territory, we believe it is opportune for the SGPVMR to reassess its strategy so that it can decide on the relevance of maintaining, ceasing or modulating the detection operations to be conducted, depending on the directions that will be adopted for the continuation of the fight against the emerald ash borer.

RECOMMENDATION

4.2.2.B.	We recommend that the Service des grands parcs, du verdissement et du Mont-Royal reassess its strategy and decide on the relevance of maintaining, ceasing or modulating detection operations so that it can better identify the directions to be recommended for the continuation of the fight against the emerald ash borer in Montréal's territory.

BUSINESS UNIT'S RESPONSE

4.2.2.B.	<i>Service des grands parcs, du verdissement et du Mont-Royal</i> [TRANSLATION] The SGPVMR annually reassesses its intervention strategies, in view of the evolution of the emerald ash borer infestation. Thus, detection on the street and on wooded grounds is no longer performed as of this year. The interventions are concentrated on treatment, felling and planting. (Planned completion: April 2017 - Completed)

4.2.3. Biopesticide Treatment

4.2.3.A. Background and Findings

Biopesticide treatment of the ash trees located around infested ash trees in the public domain is part of the SLAM strategy²⁵ at the origin of the *Plan d'action montréalais de lutte contre l'agrile du frêne 2012-2015* deployed by the SGPVMR. This operation depends on the detection results, which give a picture of the state of health of the trees and determined those that must be treated or felled. For example, the ash tree treatments performed in 2016 are based on the detection results from 2015. The SLAM strategy provides that healthy ash trees (15 cm or more in diameter) or ash trees with a low infestation rate are treated, whereas ash trees that are totally infested or that exhibit signs of decay (over 30% dead branches) are prescribed for felling.

²⁵ The strategy seeks to contain outbreaks and stop the spread of the insect.

Thus, since 2012, the SGPVMR has used the pesticide called "TreeAzin®", which has proved its effectiveness, against the emerald ash borer. Let us specify this pesticide does not cause the direct death of the emerald ash borer in the larval or adult stages. However, it is very effective in keeping the tree alive by preventing the emerald ash borer larva from continuing to dig galleries under the bark (see Appendix 6.1, Figures B and D). For the fully mature insect that feeds on leaves, it diminishes its reproductive capacity by reducing the quantity and viability of the eggs. TreeAzin® is injected by means of capsules inserted at the base of the tree (see Appendix 6.1, Figure F). The insecticide then is dispersed in the tree by the sap rising to the foliage. To be effective, the treatments are applied between June 1 and August 31.

According to a study conducted by a team of researchers at the Canadian Forest Service, a TreeAzin® injection protects the tree for two years. Consequently, repeated TreeAzin® treatments every two years are likely to keep healthy or weakly infested trees alive for prolonged periods, at a cost equivalent or lower than the removal and replacement of an urban tree.²⁶

In this sense, the information obtained from the SGPVMR reveals the cost of treatment of an ash tree with the pesticide TreeAzin® can vary according to the number and size of the ash trees to be treated or the competition among the contractors who apply this type of treatment. Currently, the price²⁷ of the treatments on the market may vary between \$3.50 and \$7.00 per cm of diameter. On the other hand, felling the tree, removing the stump and planting a replacement tree can generate expenses ranging between \$1,500 and \$3,000, depending on the size of the tree. Thus, taking the example of an ash tree 60 cm in diameter, the costs associated with felling could reach \$3,000, while with the same expenditure, estimating the cost of treatment at \$5/cm of diameter, the ash tree could be treated every two years over a period of about 14 years.²⁸ It must be recognized that repeated treatments represent an advantageous alternative to keep ash trees alive as long as possible and thus spread the costs related to felling over time, while waiting for an alternative solution to be found that eradicate this pest completely. Added to this are the environmental, economic and social benefits of maintaining these trees, for example, maintenance of the canopy and reduction of heat islands, higher private property values, and the contribution to the quality of life.

Thus, although we could recognize that it is possible for an ash tree to receive a second treatment under the operations conducted by the SGPVMR in the identified high-risk areas, our audit nonetheless sheds light on the fact that the SGPVMR to date has not planned to renew the injections systematically as prescribed. Due to this fact,

²⁶ Source: TreeAzin® – A natural systemic insecticide against the emerald ash borer in Canada, D.G. Thompson, 2013.

²⁷ This price is calculated according to the chest height diameter (CHD) of the ash tree in cm at a standard height 1.4 m above the ground.

²⁸ Estimate calculated according to the following assumptions: treatment cost at \$5/cm CHD, 2% inflation, tree growth of 1 cm/year.

we did not find evidence of any structured monitoring mechanism for the purpose of identifying and documenting the list of ash trees injected during a first round, their location, the date of the injection, etc. In light of the explanations obtained from the managers and personnel contacted on this subject, we understand the detection and treatment strategy deployed to date was not necessarily intended to treat systematically every two years all the ash trees that satisfied the maintenance criteria, but rather to cover as much territory as possible to slow the spread of the insect. Everyone affirms that visual monitoring in the field of the high-risk areas where detection and treatment operations have been conducted is performed by the designated personnel²⁹ within the SGPVMR, to assess the progress of the situation. However, these interventions and the results recognized are not documented in any way.

There was also mention of an experimental monitoring protocol that has now existed for three years within the SGPVMR, concerning a sample of 277 ash trees. This protocol seeks to test the effectiveness of TreeAzin® by monitoring selected trees, which have received a repeated injection after two years. Concerning this experimental monitoring, we find that a table exists, qualifying the overall state of health of these 277 trees, according to the following statuses: "healthy", "low decline", "moderate decline", "high decline" or "dead". However, we do not find evidence of any documented evaluation concerning the analyses performed and the conclusions that must be drawn from this experimental monitoring. The SGPVMR's experts are convinced, however, that the TreeAzin® treatment strategy has paid off, in view of the results observed in the field.

In another vein, as in the case of detection, we recognize that the SGPVMR has adopted an intervention target in the number of trees that must be treated annually. This target was integrated into the financial setup entitled *Plan de gestion de la forêt urbaine 2015-2025 (PGFU)* prepared in 2014 by the SGPVMR in collaboration with the Service des finances. Table 3 illustrates the trend of this target in relation to the number of ash trees actually injected by the SGPVMR since 2012.

²⁹ These personnel are inspectors, technical agents or forest engineers.

Table 3 – Trends of Treatments Applied by the SGPVMR Since 2012 in Relation to the Established Targets

	Number of ash trees				
	2012	2013	2014	2015	2016
Target – treatments "for conservation purposes" – outside the high-risk areas^[a]	–	–	5,000	5,000	5,000
Target – treatments according to the regular program – within the areas^[a]	1,100	1,515	7,000	13,046	14,225
Total treatments projected^[a]	1,100	1,515	12,000	18,046	19,225
Number of ash trees actually treated^[b]	1,100	1,370	12,158	18,379	N/A
Fulfillment rate	100%	90%	101%	102%	–%

^[a] Data from the financial setup entitled *Plan de gestion de la forêt urbaine 2015-2025 (PGFU)* prepared in 2014 by the SGPVMR in collaboration with the Service des finances.

^[b] Data compiled by the SGPVMR – *Technical Data Sheet – Status Report – August 9, 2016*.

In this regard, let us mention the operations related to treatment of ash trees in the public domain located within high-risk areas (SLAM) are carried out under contracts awarded by the SGPVMR to specialized contractors. To this effect, our audit made it possible to identify contracts totalling \$15.3 million over a period from 2013 to 2016. These contracts concern the supply of the insecticide product or the insecticide injection service (see Appendix 6.3).

A more attentive examination of Table 3 above allows us to recognize the existence of a target for treatment of ash trees "for conservation purposes". Since the wording of this target suggest that a lot of 5,000 ash trees/year should receive repeated treatments to keep them alive over a longer period, we carried our investigation farther. It was then explained to us that, since 2014, the SGPVMR has offered the boroughs the possibility of identifying additional ash trees, in their respective territories, that could benefit, based on the central administration's contracts, from a TreeAzin® treatment. The trees thus proposed by the boroughs had to be trees located outside the high-risk areas. By this offer, according to the information obtained, SGPVMR wanted to expand the SLAM intervention areas by favouring treatment of as many ash trees as possible in the territory, with the aim of further slowing the spread of the insect. We understand this initiative sought to fight the emerald ash borer invasion. Nonetheless, we remain perplexed regarding the confusion such an appellation may have occasioned. Indeed, some decision summaries regarding the awarding of contracts for ash tree injection services in the public domain implied the budgetary funds required to carry out what the SGPVMR calls the *Conservation Program* was

supposed to protect superior-quality ash trees in the long term.³⁰ In fact, however, the *Conservation Program*, as its name seems to suggest, in no way concerns a lot of trees the SGPVMR wishes to conserve in the long term by means of treatments every two years.

Finally, let us remember that some boroughs, complementing the operations conducted by the SGPVMR, have invested additional efforts from their operating budget,³¹ in order to treat a greater number of ash trees in their territory. This is particularly the case for the Sud-Ouest borough, which was the subject of this audit, and which has adopted an action plan (2014-2024) against the emerald ash borer. Table 4 illustrates the trend of the targets established by the borough for treatment purposes for the years 2014 and 2015 relative to the number of ash trees actually injected with the insecticide TreeAzin®.

**Table 4 – Trend of Treatments Performed
by the Sud-Ouest Borough in 2014 and 2015^[a]**

	Number of ash trees	
	2014	2015
Projected treatment target	600	600
Number of ash trees actually treated	524 ^[b]	608
Fulfillment rate	87%	101%

^[a] This information is taken from assessment reports produced after the implementation of the action plan. The results for 2016 were not considered, given that the assessment report was unavailable at the time of our audit.

^[b] For 2014, the treatments essentially were applied by the SGPVMR under the proposed SLAM strategy.

The audit conducted in this borough allows us to recognize that, contrary to the SGPVMR, the borough's action plan provides for the renewal of treatment of ash trees every two years. To this effect, the borough has adopted a documented tracking mechanism (on Excel spreadsheet) annually identifying the ash trees treated by the borough and tracking of the renewal of the injection every two years. Thus, based on the information contained in the file, we find the ash trees treated in 2014 (524) received a second injection in 2016, and it is anticipated that the ash trees injected in 2015 will receive a second treatment in 2017. More specifically, we observe that of the 524 ash trees treated in 2014, 18 have since been felled and 506 received a 2nd treatment in 2016, i.e.:

³⁰ See GDD 1156620002 and GDD 1166628003, two contracts for ash tree injection services in the amount of \$693,615.45 and \$106,305.89 respectively.

³¹ We did not proceed to identify all the amounts invested for treatment purposes by the city's boroughs.

- 293 injections applied by the borough;
- 213 injections applied by the SGPVMR in the context of deployment of its SLAM strategy. Indeed, in 2016, the SGPVMR expanded the high-risk areas. Certain ash trees initially located outside the area and that had been treated in 2014 thereby received a second injection under the SGPVMR's interventions.

The other two boroughs covered by the audit³² did not proceed with injections from their operating budget. The treatment operations for their ash trees were conducted entirely by the SGPVMR.

In conclusion, considering that four years ago the SGPVMR deployed its strategy against the emerald ash borer and that the scientific analysis trends to prove that TreeAzin® is effective for two years, we have questions, in some regards, about the coherence of the strategy deployed by the SGPVMR.

Indeed, in the absence of repeated injections every two years, the city exposes itself to the risk the insect will regain the upper hand and that a large proportion of the ash trees initially treated during a first round will have to be felled and replaced more quickly. In the circumstances, the city would only have gained a reprieve of two or maybe three years to protect the Montréal canopy. This very certainly risks compromising the achievement of the canopy enhancement target from 20% to 25% by 2025. Added to this are the risks of seeing an explosion of the costs inherent in felling dead trees and replacing them over a short period of time, with the consequences that a massive demand for services in this regard could generate a price increase on the part of private contractors.

Considering the current state of the infestation and the risks associated with the non-renewal of injections, we believe it is opportune, at this point, that the SGPVMR reassess its strategy with a view to deciding on the proportion of ash trees it wishes to include in a real long-term protection program, within which the ash trees would be repeatedly treated according to a frequency to be determined.

Finally, while the SGPVMR's treatment program only covers ash trees in the public domain, the *By-law to stop the spread of the emerald ash borer on the private domain* (15-040), adopted in 2015, obliges private property owners to treat or to fell their ash trees (depending on the degree of infestation) when their property is located in a high-risk area identified by the city. This by-law will be discussed subsequently in section 4.2.8 of this report.

³² Côte-des-Neiges–Notre-Dame-de-Grâce and Rivière-des-Prairies–Pointe-aux-Trembles boroughs.

RECOMMENDATIONS	
4.2.3.B.	We recommend that the Service des grands parcs, du verdissement et du Mont-Royal reassess the component of its strategy concerning the treatment of ash trees, with a view to deciding on the proportion of them it wishes to include in a real long-term protection program, in order to ensure the coherence of the strategy deployed against the emerald ash borer and favour the achievement of the target of a 5% expansion of the Montréal canopy by 2025.
4.2.3.C.	We recommend that the Service des grands parcs, du verdissement et du Mont-Royal take the necessary actions to document further the results and the underlying analyses of the operations put forward in the context of deployment of the strategy against the emerald ash borer and prove the effectiveness of the treatment, in view of the costs involved.
BUSINESS UNIT'S RESPONSES	
4.2.3.B.	<i>Service des grands parcs, du verdissement et du Mont-Royal</i> <i>[TRANSLATION] The SGPVMR has established its strategy concerning the treatment of ash trees and has targeted 60,000 ash trees for conservation, with treatment cycles every two years. (Planned completion: April 2017 - Completed)</i> Auditor General's comments The SGPVMR indicates in its response that it has targeted 60,000 ash trees for conservation, with treatment cycles every two years. However, let us specify these interventions only concern on-street ash trees and off-street ash trees located in local parks among the 70,867 inventoried at the time of our work. Indeed, the ash trees located in woodlands (estimated at approximately 100,000) found in large parks (e.g., Mount Royal Park, La Fontaine Park) are not yet covered by a customized intervention strategy, even though the emerald ash borer is also present in these parks.
4.2.3.C	<i>Service des grands parcs, du verdissement et du Mont-Royal</i> <i>[TRANSLATION] The SGPVMR uses the only treatment it is possible to use in Montréal against the emerald ash borer, in compliance with federal and provincial laws and municipal by-laws. The SGPVMR refers to the scientific research conducted on the efficacy of the treatment and ensures monitoring of the health of the trees integrated</i>

into the injection program. **(Planned completion: no action will be implemented)**

Auditor General's comments

Moreover, we deplore that the SGPVMR does not intend to implement any action to further document the results and the underlying analyses of the operations put forward under the intervention strategies deployed. Indeed, although we do not challenge the choice of the recommended biopesticide treatment, it appears indispensable, in our opinion, that its efficacy be evaluated, given the operations deployed in the field, and documented. Moreover, to be able to provide the efficacy of the entire strategy deployed, the evaluation of the achievement of the results obtained relative to the targets should be documented, in our opinion, in order to account for it and thus favour informed decision-making for the next steps.

4.2.4. Felling and Disposal of Ash Residue

4.2.4.A. Background and Findings

As already mentioned, the strategy adopted by the city consists of spreading over time the costs associated with felling, particularly to avoid inconveniences (canopy loss and development of heat islands) caused by massive tree felling over a short period. In its strategy against the emerald ash borer, the city strategically fells all infested or declining trees to reduce the emerald ash borer populations. This selective felling has the purpose, on the one hand, of eradicating outbreaks to protect the other ash trees that make up the city's arboreal heritage and, on the other hand, of ensuring public safety, considering the hazards related to potential falling branches from dead ash trees.

Once the trees are felled, the ash tree residues (logs and branches) require safe disposal, always with the objective of restricting dispersion of the insect pest. According to the information obtained, the emerald ash borer can survive inside dead wood or cut logs. This is why the federal government, through the CFIA, which is responsible for the laws and regulations applicable to the presence of the emerald ash borer in Canada, imposes "quarantine" measures, associated with fines, to the regions affected by the insect. One of these measures is the ban on transporting firewood out of the regulated area. In Montréal, the collection of green residues must comply with these rules and requirements. All the branches intended for this collection must be deposited in tied bundles and must not be mixed with other green residues (grass cuttings, leaves and dead flowers).

These requirements are also valid for ash trees in the private domain. Indeed, the owner whose ash tree or trees exhibit(s) signs of decay must resort to the services of an expert to check whether the emerald ash borer is involved and whether the decline observed is irreversible. When 30% of an ash tree's branches are decayed, it is generally considered too damaged to be preserved by treatment. In this case, the tree must be felled without delay between October 1 and March 15 to limit the risk of dispersion of the insect. For this purpose, a felling permit is mandatory in Montréal, but in the case of ash trees, this permit can be obtained free of charge. Thus, following a request made by a citizen, a city inspector will assess the condition of the tree in view of issuing or not issuing an opinion in favour of felling it.

From an operational point of view, tree felling is a responsibility assumed entirely by the boroughs. Felling of ash trees in the public domain is supported by SGPVMR interventions. Indeed, after detection in the high-risk areas, the ash trees are categorized according to their state of health. Those considered dead or declining and not fit for treatment are classified as trees to be felled. A "felling prescription" list thus is provided to each borough concerning its public ash trees to be eliminated, with an indication of the locations and references of these trees.

It follows that, to control the risk the ash tree infestation will spread, the boroughs should plan the felling of the infested trees in the public domain, control felling in the private domain, and provide for sound management of the residues generated by these felling activities. On the other hand, as the department responsible for the emerald ash borer, the SGPVMR should ensure that all the components of its action plan are working and lead to effective results. By this fact, it should take actions to ensure the infested trees are really felled in accordance with the felling prescription formulated. According to the information obtained, the SGPVMR does not validate with the boroughs to ensure the prescribed trees have actually been felled. In this sense, it performs no specific control or validation on a sampling basis. The managers responsible within the SGPVMR justify this situation by the shortage of labour at their disposal, but also because they consider the managers in the boroughs should be accountable for performing the actions for which they are mandated. Nonetheless, with the objective of ensuring the coherence of the strategy against the emerald ash borer, it is our opinion that the SGPVMR should have provided for minimal post facto controls to validate performance by the boroughs of the prescribed felling after the detection operations conducted.

Another important component of the efforts against the emerald ash borer concerns the disposal of felled ash residue. The information obtained indicates that the primary dispersion vector of the emerald ash borer is the transport of infested ash wood. In this regard, two periods of activity of the insect influence the transport and treatment of ash wood:

- the high-risk period, which runs from April 15 to September 15, when the insect is considered to be an active adult. During this period, the transport to treatment sites of ash wood that has not been processed (e.g., into wood chips) is prohibited;
- the low-risk period, which extends from September 15 to April 15. During this period, only the insect's larvae may be present in ash wood. During this period, the boroughs and the related cities may prune, fell and transport ash wood to the treatment sites designated for this purpose, so that it is neutralized before the insect's emergence period.

It is therefore necessary to control the transport of ash wood and the periods during which it is transported to prevent the spread of the insect. The ash wood thus collected during pruning or felling operations must be destroyed systematically or processed so that it does not become the source of new outbreaks. Since the reclamation of residual materials is an agglomeration responsibility, we find that in August 2015, the city awarded three new contracts³³ valued at \$4.1 million for a 58-month term to three specialized companies in order to receive and sort wood and market the sorted wood,³⁴ on behalf of all the cities constituting the urban agglomeration's territory. To respond to the growing pruning and felling activities, particularly of ash trees, these contracts specifically allow the city's boroughs and the ecocentres³⁵ to transport their wood to a site where it can be processed safely or reclaimed. Once the ash residue are transported to these contractors' processing centres, they are bound to comply with the requirements of the CFIA, which imposes restrictions on the transport of ash residue out of regulated areas.

According to the information obtained from the audited boroughs following pruning or felling operations, two approaches are distinguished:

- concerning ash trees in the public domain, when the size of the logs allows, generally for logs less than 20 cm in diameter, the borough must shred the wood and reduce it to chips with a wood chipper. Logs too big to be shredded on site are initially stored at a provisional site chosen by the borough before they are transported to the sorting centres of the companies awarded the above-mentioned contracts;
- for ash trees in the private domain, each property owner must resort to the services of a contractor to fell their declining ash trees. This contractor must comply with the CFIA's requirements to ensure safe disposal of the wood. In this regard, the SGPVMR has developed an authorization form for disposal of ash residue, which must be completed and approved by the borough to allow the contractor mandated by a citizen to dispose free of charge of the wood resulting from felling or pruning of any ash trees. The disposal of the ash residue must be done with one of the three companies specializing in the field, under a contract with the city. By means

³³ Resolution CG15 0461 and CE15 1363.

³⁴ Wood from tree trimming and/or felling activities and collections of Christmas trees.

³⁵ In addition to wood from felled ash trees, these contracts also provide for receiving of construction-renovation-demolition wood from the city's ecocentres.

of this form, the contractor mandated by the citizen undertakes, in particular, to transport:

- only ash wood from the address where it performed the work at the citizen's request;
- only branches or trunk sections with a diameter exceeding 20 cm. Branches with a diameter of less than 20 cm must be shredded on the citizen's property by the contractor according to the terms of their contract.

Moreover, we find that since 2012, always with the objective of limiting the spread of the emerald ash borer in its territory, the city has offered the interested boroughs a curbside service for shredding and collection of hardwood branches. This service, offered under a contract made with a specialized company, ensures citizens take responsibility for shredding branches deposited at curbside. According to the information located, for the years 2015 and 2016, 16 of the 19 boroughs accepted the offer of services.

According to the information obtained, it appears measures were provided for ash trees in both the public and private domains to limit as much as possible the transport of ash residue from felling or pruning and to dispose of it in accordance with the regulations in force.

RECOMMENDATION	
4.2.4.B.	We recommend that the Service des grands parcs, du verdissement et du Mont-Royal, with the goal of ensuring the coherence of its efforts against the spread of emerald ash borer, provide for the establishment of post facto controls allowing it to validate that ash tree felling prescribed in the boroughs has been performed.
BUSINESS UNIT'S RESPONSE	
4.2.4.B.	<i>Service des grands parcs, du verdissement et du Mont-Royal</i> <i>[TRANSLATION] The SGPVMR considers it is not its responsibility to control the felling done by the boroughs and that the costs associated with this validation then would be diverted from the SGPVMR's operations against the emerald ash borer. (Planned completion: no action will be implemented)</i> Auditor General's comments The performance by the boroughs of the felling prescribed by the SGPVMR was an integral part of the intervention strategy deployed to mitigate the insect would spread. Also, considering the fact that the performance of this felling was one of the conditions to

	be observed by the boroughs to be entitled to the financial assistance offered by the SGPVMR, we find that a minimum amount of control should have been instituted to ensure the amounts granted are used for the stipulated purposes and to obtain the assurance that all the components of the strategy deployed work properly and lead to effective results.

4.2.5. Ash Wood Reclamation

4.2.5.A. Background and Findings

Ash wood reclamation is also an issue, considering that the ravages caused by the emerald ash borer will result in the felling of thousands of trees, leading the city to have to manage large quantities of wood. Since the insect acts only under the bark in the larval stage, the heart of the wood generally remains free of infestation. Ash wood is recognized, in particular, for its elasticity and its shock and compression resistance. It is a solid wood that is often used to manufacture sporting goods (e.g., hockey sticks), furniture, tool handles or floors. In the context of the efforts against the emerald ash borer, felling trees offers the city an opportunity to consider the user of wood in different forms and thus optimize its recycling and avoid waste.

Concerned about the reclamation of wood from felled public trees and considering the growth of felling to be anticipated due to the presence of the emerald ash borer in Montréal's territory, the managers interviewed at the SGPVMR told us that, in 2013, they mandated an external firm to conduct a market study of hardwood, and specifically ash wood. The mandate assigned to this firm included the production of a directory of businesses interested in using ash wood from an infested area, and an analysis of the different possibilities for reclamation of this wood. We consulted the report of this study. In particular, it highlights three product categories on the market allowing reclamation of wood:

- energy wood to be crushed or shredded (e.g., branches), which can be used as mulch or for composting;
- pulpwood fashioned in the form of logs intended for pulp and paper production;
- sawn lumber for good-sized logs.

The study in question also mentions that some potential uses could be interested, on condition the wood is already processed (sawn and dried), and points out that the city could also call on subcontractors or companies that use sawn lumber to process urban wood and use it to make special products, such as furniture, sculptures and decorations.

Despite the conclusions of the above-mentioned study, it appears that, to date, the city has not yet deployed real measures to reclaim wood from felled ash trees, except for

a few initiatives conducted locally by certain boroughs. The managers interviewed at the SGPVMR mentioned that, in the past, they have worked in collaboration with the Direction du matériel roulant et des ateliers³⁶ to find solutions to this issue. In particular, a public bench prototype has been proposed. Some NPOs have also expressed interest in using the wood to make urban furniture. There was also mention of efforts undertaken by the CMM which, through the creation of a reclamation committee on which the city was represented, studied several aspects and issues regarding reclamation of ash wood. According to the information obtained from the SGPVMR's designated representative, this committee is no longer active.

The information collected during our audit reveals the fact that some of the city's boroughs are working in isolation to propose felled ash wood reclamation projects, whereas it could be more cost-effective to look for a corporate solution unifying the wood volumes available for reclamation in each borough. In the opinion of the managers interviewed (in the boroughs and at the SGPVMR), the leadership responsibility in this matter is not yet clearly established at the city level. They consider a critical mass would be necessary to ensure the profitability of wood reclamation projects, which requires concerted action with the boroughs, particularly to:

- ensure adequate wood harvesting (training the pruners) according to the features required by the target market (e.g., the sawmill market, which requires the trunks be cut to produce logs (or bolts), offering maximum potential to produce boards without flaws);³⁷
- find common storage sites;
- be able to benefit from the services of specialized appraisers to classify the harvested wood properly;
- find a potentially profitable market;
- evaluate all the legislative or regulatory aspects in relation to the treatment of contaminated wood.

In our opinion, although different reclamation avenues can be suggested, it remains that a comprehensive city-wide analysis should be conducted to evaluate, in particular, the profitability of the various possible solutions and ultimately, if applicable, to adopt a wood reclamation program.

Nonetheless, in the Côte-des-Neiges–Notre-Dame-de-Grâce borough, we find, in light of the information obtained, that initiatives have been undertaken since 2014 to recover wood from felled ash trees. In particular, after felling:

- ash bolts were sold at auction, for transformation into hardwood, among other products;
- ash wood was sold to an NPO to build a sailboat;

³⁶ This directorate previously was under the Service de la concertation des arrondissements et des ressources matérielles. It is now known as the Service du matériel roulant et des ateliers.

³⁷ Source: Market study for hardwood species presented to the city by an external firm, December 2013.

- tree trunks were transformed into boards by a mobile sawmill and used to manufacture a modest quantity of urban furniture;
- ash wood was reduced to chips and used as mulch. Moreover, self-service chip pickup sites and two days per year of free distribution are organized.

Regarding the Rivière-des-Prairies–Pointe-aux-Trembles and Sud-Ouest boroughs, the information obtained reveals that part of the wood from felled ash trees is shredded and reduced to chips, in the case of small-diameter branches. The mulch generated in this way is used for various gardening or composting projects. If applicable, the unused surplus is shipped to the city-owned Saint-Michel Environmental Complex. The large ash logs that cannot be shredded are transported to the sorting centre of one of the three specialized companies for receiving, sorting and wood marketing under contracts awarded by the city, as mentioned in section 4.2.4 of this report. Moreover, according to the information obtained from the Sud-Ouest borough, a contractual agreement soon will be made with an artist for the production of an artwork from felled ash wood.

Although this borough is not the subject of the current audit, we learned from the website of the Rosemont–La Petite-Patrie borough that, since 2015, the borough has set up a cabinet-making project in partnership with a Montréal social and occupational reintegration organization for the production of urban furniture installed on its commercial arteries, using wood from felled ash trees (e.g., multilevel benches, flower boxes and benches with built-in flower boxes). In addition, the wood from a number of ash trees is retained annually for the performance of everyday maintenance operations on various pieces of urban furniture, including the repair of bleachers, picnic tables and rink boards.

On the whole, although ash wood reclamation presents many challenges, solutions exist. To avoid duplication in each borough of the efforts to find wood reclamation solutions, it is important for the city to address this question by taking initiatives that will enable it to exploit and optimize city-wide the potential ash wood could offer.

RECOMMENDATION

4.2.5.B.

We recommend that the city's Direction générale take the required actions to designate the business unit that will be responsible for assuming the leadership in city-wide wood reclamation and producing the necessary analyses that will allow the appropriate decisions to be made.

BUSINESS UNIT'S RESPONSE

4.2.5.B.

Direction générale

[TRANSLATION] The SGPVMR plays a leading role in the fight against the emerald ash borer and the formulation of ash tree felling prescriptions. Parallel to this, the SGPVMR is exploring how to institute good practices in city-wide reclamation of wood. For this purpose, the SGPVMR has created a technical committee composed of experts involved in these reclamation projects and undertakes analyses and discussions with multiple stakeholders. Many small-scale ash reclamation experiments have been conducted over the past few years, but large-scale reclamation of ash residue requires the establishment of a special administrative framework, which is not currently taken over. The SGPVMR is in the forefront on this issue for the time being, but only once the corporate strategy is clearly established will it become expedient to take a definitive position on the roles and responsibilities of the business units that could be involved for ash reclamation. (Planned completion: January 2018)

4.2.6. Awarding of Contracts by the Service des grands parcs, du verdissement et du Mont-Royal

4.2.6.A. Background and Findings

The SGPVMR offers support to the boroughs in the context of the efforts undertaken against the emerald ash borer and, concurrently, to achieve the canopy enhancement target (20% to 25%) by 2025. Apart from the financial assistance granted by the SGPVMR to the boroughs (budget of the Triennial Capital Expenditures Program [TCEP]), related to the program for replacement of felled ash trees in the context the fight against the emerald ash borer, which we will discuss in section 4.3 of this report on the financial framework, the collaboration offered to the boroughs concerns two other programs, the Ash Tree Injection Program and the Canopy Enhancement Program. For these two other programs, the collaboration offered to the boroughs is orchestrated by means of various contracts awarded by the SGPVMR.

4.2.6.1. Ash Tree Injection Program

4.2.6.1.A. Background and Findings

The SGPVMR applies the SLAM strategy which, as described above, seeks to slow the emerald ash borer infestation. A campaign for detection of the insect's presence allows the production of a list of high-risk areas and confirmation to the boroughs of the treated ash trees or the felling prescriptions. Complementing the SLAM strategy, the SGPVMR's *Conservation Program*, as explained above in section 4.2.3 of this

report, offers the boroughs the possibility of targeting, in their respective territory, a list of additional ash trees they wish to protect and that are located outside the high-risk areas identified by the SGPVMR. The ash trees on this list will be able to benefit from a TreeAzin® treatment under the injection contracts awarded by the SGPVMR.

Thus, the SGPVMR coordinates the awarding and performance of the emerald ash borer detection contracts, as well as all the ash tree injection contracts in the public domain. The supervision of the injection contracts has also been contracted out since 2016, due to the shortage of personnel within the SGPVMR.

Regarding the *Conservation Program*, we found that, in 2016, the SGPVMR gave the boroughs a 14-day deadline to send it the list of ash trees they wanted to include in the *Conservation Program*. This is a short deadline, considering the budget of the *Conservation Program* is known in advance by the SGPVMR.

Since the detection and injection efforts are coordinated entirely by the SGPVMR, no major problem was raised in this regard by the audited boroughs, except for the Sud-Ouest borough. Indeed, it is one of the three boroughs³⁸ of the city to have adopted a local action plan against the emerald ash borer, which is being carried out parallel to the SGPVMR's action plan. Its 10-year strategy, adopted in February 2014³⁹ by its borough council, covers all public ash trees in its territory. The borough thus provides for injection, reinjection and felling plans. The borough's strategy is different from the SGPVMR's strategy in the sense that the borough calls for a comprehensive approach instead of a sample-based approach. This means it also treats ash trees located outside the high-risk areas, since the entire territory has been considered infested since 2016, whereas the SGPVMR only treats ash trees located within the high-risk areas, as well as those covered by the *Conservation Program*.

According to the Sud-Ouest borough's stakeholders, the SGPVMR implemented its strategy without considering the one deployed by the borough, which results in duplication of efforts and inefficiency in the execution of its own plan. The borough's initial plans therefore must be adjusted each year according to the high-risk areas identified by the SGPVMR. Moreover, since the injection period is the summer, this leaves little time for the borough to review its planning and the distribution of its budget. Indeed, the greater the extent of the high-risk areas identified by the SGPVMR, the greater the budget that can be allocated by the borough for felling and planting, and vice versa. In a context of limited resources, it would be wise for the SGPVMR to adapt its support parameters when the borough has deployed and obtained approval of its local urban forestry plan. Sharing of the different responsibilities would facilitate the work in the field and prevent duplication of efforts. For example, it could envision a distribution of work based on the territory or a different budget modulation.

³⁸ These are the following boroughs: Le Plateau-Mont-Royal, Saint-Laurent and Le Sud-Ouest.

³⁹ *Plan de développement durable de la foresterie urbaine, Volet gestion de l'agrile du frêne, plan d'action 2014-2024.*

RECOMMENDATION	
4.2.6.1.B.	We recommend that the Service des grands parcs, du verdissement et du Mont-Royal adopt its strategy when a borough has deployed a local urban forestry plan, in order to avoid duplication of efforts and favour better coordination.
BUSINESS UNIT'S RESPONSE	
4.2.6.1.B.	<i>Service des grands parcs, du verdissement et du Mont-Royal</i> <i>[TRANSLATION] The SGPVMR constantly adapts and improves its strategy with the three boroughs that have deployed a local plan to fight the emerald ash borer. The SGPVMR intends, on an annual basis, to pursue the discussions with the boroughs concerned and make the required adjustments.</i> <i>For example, in June 2016, the SGPVMR made an agreement with the Saint-Laurent borough to provide financial compensation for the borough's efforts. In addition, the SGPVMR maintains a discussion and constant collaboration with the Plateau-Mont-Royal and Sud-Ouest boroughs and also compensates their efforts. (Planned completion: December 2017)</i>

4.2.6.2. Canopy Enhancement Program

4.2.6.2.A. Background and Findings

In 2015, the SGPVMR became the prime contractor of an intensive planting program, which is in addition to the planting efforts already undertaken by the boroughs under their regular programs. Table 5 below presents a recapitulation of the tree planting and planting supervision, watering and maintenance contracts awarded for this purpose by the SGPVMR.

Table 5 – Recapitulation of the Contracts Awarded by the SGPVMR for Tree Planting, Planting Supervision, Watering and Maintenance Since 2015

Call for Tenders number	Nature of the contract	Quantity forecast (trees)	Quantity fulfilled (trees)	Amount in GDD ^{[a],[d]}	Average price per tree
AO 15-14275	Supply, planting and maintenance of trees	7,000	5,400 ^[b]	\$8,620,876	\$1,232
AO 16-15070	Supply, planting and maintenance of trees	4,273	3,901 ^[c]	\$4,245,824	\$994
Total		11,273	9,301	\$12,866,700	
Call for Tenders number	Nature of the contract	Quantity forecast (trees)	Duration	Amount in GDD ^{[a],[d]}	
AO 16-15085	Supervision of watering, maintenance and the warranty	5,000	2016	\$135,082	
AO 16-15087	Supervision of planting, watering, maintenance and the warranty	4,273	2016-2017	\$416,095	
AO 16-15254	Supervision of watering, maintenance and the warranty	9,675	2016 to 2019	\$579,219	
Total				\$1,130,397	

^[a] Amount of the contract, including taxes and contingencies, if applicable.

^[b] Plantings for this contract are spread over the period from fall 2015 (2,701 trees) to summer 2016 (2,699 trees) for a total of 5,400 trees. The remaining 1,600 trees (7,000 - 5,400) will not be planted and will not be paid for by the SGPVMR.

^[c] Forecast obtained from the SGPVMR based on the progress of the work as of November 15, 2016 (6,600 - 2,699). Final figures unavailable.

^[d] Gestion des dossiers décisionnels.

In 2015, the city thus authorized a budget to award contracts for the supply, planting, maintenance and watering of 7,000 trees.⁴⁰ This number is aligned with the tree-planting objective of the *Plan d'action canopée 2012-2021*, which provides for the additional planting of 75,000 trees in the city's public domain over a 10-year horizon.

The 2015 call for tenders, underlying the contract awarded in the amount of \$8.6 million, was the first of this magnitude to be issued for tree planting by the SGPVMR, since this operation is usually performed in the boroughs by blue-collar workers. Several failures were observed, particularly due to the technical specifications, which turned out to be imprecise regarding the nature and extent of certain work to be performed. For example, during the performance of the contract, it was realized that the tree transport costs during a change of planting sites were not stipulated in the contract. Moreover, the parties did not agree on the definition of stump pulling when root removal was required and on the quality of the loam that had to be used. This had the consequence of adding to the complexity of the relationship with the vendor and led to delays in the performance of the work.

⁴⁰ Public call for tenders 15-14275.

Moreover, when this call for tenders was issued, not only were the tree planting sites not identified by the boroughs, but the tree species to be planted were not specified. According to the information obtained, the call for tenders was issued hastily to ensure the city honoured its commitment to its sustainable development plan⁴¹, to improve the green infrastructure in the city by increasing the canopy index from 20% to 25% by 2025. This missing data regarding the planting sites and the type of tree species to be planted was specified after this contract was awarded, which would explain why the price of the tenders received turned out to be higher than expected.

The subsequent identification of the planting sites also turned out to be at the basis of the problems during the performance of the contracts. Among these problems, we particularly note the late transmission of the lists of planting sites by the boroughs and the errors they contained. Some boroughs even sent their list during the performance of the contract. Coordinates of proposed sites were wrong, and some sites were not ready (presence of stumps) or simply not suitable for planting. Once the lists were transmitted, the SGPVMR proceeds to validate the sites, ensuring that no conflict of use or development that cannot be referenced in the tools and systems, such as a water or gas inlet, does not conflict with the selected location. These problems related to the specifications and deficient planning caused substantial delays in the planting schedule. The planting work foreseen in 2015 therefore continued until June 2016, necessitating that an extension to the contract of one of the vendors be granted. The vendor is claiming additional costs from the city in relation of losses of time, unforeseen conditions and the additional costs of vegetation and transport. A portion of the additional costs billed was rejected by the SGPVMR. Thus, a decision-making summary for submission to the city authorities was prepared to obtain approval of additional expenditures totalling nearly \$95,000 out of a total claimed of nearly \$220,000.

In a project of this magnitude, the SGPVMR realized that the cancellation of planting sites will have a major impact on the implementation of the planting plan. Indeed, under this contract, the vegetation orders quite often were fulfilled before validation of the sites. The cancellation had the consequence that a substitute site had to be found quickly to plant the tree. Ultimately, despite the extension of the deadlines, the planting target was not achieved, because only 5,400 trees were planted out of the 7,000 planned and budgeted. The SGPVMR therefore reviewed its methods and undertook a correction of its program in the context of the 2016 call for tenders.⁴²

The correction undertaken necessitated coordination of the efforts among all the stakeholders involved in the process, particularly the SGPVMR itself, the Service de l'approvisionnement and the boroughs, in order to review the alignment of the planning and tendering periods with the procurement, injection, felling and planting periods.

⁴¹ This is the *Plan de développement durable de la collectivité montréalaise 2010-2015* and subsequently *Montréal durable 2016-2020*.

⁴² Call for tenders 16-15070.

Thus, one of the first initiatives was to ask the boroughs to submit a list of potential locations and types of trees to be planted before the call for tenders is issued. Moreover, the SGPVMR opted for a sector-based procurement strategy. The city's territory thus was divided into four sectors and the technical specifications integrated maps of each borough, indicating the locations of all the projected plantings, as well as the tree genera and species to be planted. This would have allowed tenders to be obtained at better prices. Thus, with the needs better defined, the average price for the planting, maintenance and watering of a tree decreased from \$1,232 to \$994. This corresponds to a 24% reduction of the average price per tree.

Regarding the advancement of the deadlines for transmission of the planting location lists, this translated into a deadline fixed in February 2016 for the fall 2016 plantings and in May 2016 for the plantings scheduled for spring 2017. This earlier deadline means that only 12 boroughs were able to provide a list and thus participate in the program. It must be understood that the production of these lists of locations is added to the regular tasks of the borough's personnel and that this task may conflict with another task when not planned in advance. Moreover, site identification turned out to be more complex than anticipated in certain boroughs, which are faced with a shortage of sites available for planting. According to the information obtained from the SGPVMR, steps are anticipated to survey the priority areas in the territory where soil demineralization work⁴³ will have to be performed in order to generate new planting sites. Consequently, many fewer locations than the target stipulated in the *Plan d'action canopée* could be provided by the boroughs. In addition, although the available budget allowed planting of 7,000 trees in 2016, only 4,273 plantings were stipulated in the call for tenders.

Nonetheless, the corrective measures taken concerning the process had many positive effects. The lists transmitted by the boroughs still contained many errors. However, since they had been transmitted to the SGPVMR earlier in the process, this allowed it to cancel the sites, postpone them to a subsequent year, or find substitute locations before the contractors' crews arrived on the land. In 2016, a replacement site would not have been found for about a hundred trees purchased by the contractors, whereas in 2015, this problem occurred for several hundred trees. While waiting for a replacement site to be chosen, a storage site must be found for these trees. This obviously results in additional costs.

Well aware that the transmission of these lists is an essential factor in the procurement process and the smooth running of the contract, the people interviewed in the boroughs consider the time granted for communication of these lists was insufficient. According to the SGPVMR, the procurement schedule now is better coordinated with the planting schedule, meaning that the boroughs have more reasonable deadlines to produce their lists. The boroughs are informed by a letter, in some cases, up to

⁴³ Over time, urbanization led to the creation of a considerable number of mineralized surfaces in the territory (e.g., streets, parking lots, asphalt-paved yards).

12 months in advance and periodically during meetings with the SGPVMR, the division heads and the technical agents in the borough.

Other initiatives were deployed to favour exchanges between the SGPVMR and the boroughs, such as the establishment of a work coordination table, allowing the division heads and the technical personnel in the boroughs to be kept informed, work kickoff meetings between the contractors and the technical personnel in the boroughs, and retrospective analysis meetings upon completion of an intervention to draw conclusions and establish lessons learned. Better planning and better coordination upstream from the work, both by the SGPVMR and by the boroughs, would have allowed the number of plantings stipulated in the contract to be achieved. However, the final results were unavailable at the time we concluded our work.

The coordination and communications efforts already undertaken by the SGPVMR are laudable and had positive impacts on the fulfillment of the reforestation plan undertaken. Nonetheless, we believe it is expedient for the SGPVMR to establish a schedule of the key list production dates so that the stakeholders in the boroughs know the deadline for the documents they must produce. To draw up its schedule, the SGPVMR must also discuss and agree on deadlines with the stakeholders of the Service de l'approvisionnement in order to coordinate their interventions and provide for their timely availability. In addition to the communication of this schedule to the stakeholders involved, we believe the SGPVMR must oversee its fulfillment.

RECOMMENDATION	
4.2.6.2.B.	We recommend that the Service des grands parcs, du verdissement et du Mont-Royal establish and distribute a precise schedule of the key document production dates in order to improve communication of information to the stakeholders concerned and improve coordination of the performance of the work.
BUSINESS UNIT'S RESPONSE	
4.2.6.2.B.	<i>Service des grands parcs, du verdissement et du Mont-Royal</i> <i>[TRANSLATION] The SGPVMR communicates on a recurring basis with the boroughs to request production of documents and responses to requests in relation to the planting programs (canopy enhancement and replacement of felled ash trees). Starting in 2017, two letters will be sent in spring of each year.</i> <i>The first letter pertains to the supply of lists of planting locations (including the vegetation choices) that will be integrated into the specifications for planting contracts (Canopy Enhancement Program).</i>

*The second letter concerns financial support for the various programs implemented by the SGPVMR, particularly the Felled Ash Tree Replacement Program. It is also addressed to the borough directors. It is accompanied by a request for a commitment by the boroughs to replace ash trees after prescribed fellings. A deadline to honour their commitments is also indicated in this letter. **(Planned completion: April 2017 - Completed)***

4.2.7. Communication and Awareness

4.2.7.A. Background and Findings

To ensure the coherence of its strategy against the emerald ash borer, the city had to adopt provisions to favour public adherence by providing information on the insect's particularities and the recommended strategy to fight it. Measures to raise public awareness about the role and responsibility of citizens in fighting the emerald ash borer also had to be taken regarding ash trees not under the city's control, i.e., ash trees in the private domain.

In this perspective the first *Plan d'action de lutte contre l'agrile du frêne 2012-2015* integrated a communications component and, since then, measures have been undertaken and different initiatives were pursued in the following years, with the aim of informing the public and raising awareness. In particular, we were able to recognize the implementation of the following measures:

- Holding of press conferences;
- Publications in metropolitan newspapers and neighbourhood weeklies;
- Communication of information and video clips on the SGPVMR or boroughs' portals (e.g., photos of the insect, identification of an ash tree and the damage caused by the insect, treatment of an ash tree);
- Creation of a fact sheet concerning the emerald ash borer with the aim of responding to the public's requests in calls to 311;
- Distribution in the Bureaux Accès Montréal (BAM) of the boroughs of a guide for the public to identify and treat their ash trees.

Following the adoption in May 2015 of the *By-law to stop the spread of the emerald ash borer on the territory of Montréal* (By-law 15-040) and in June 2015 of the *By-law concerning the subsidy for the treatment of ash trees located on private property in high-risk areas* (By-law 15-063), the information obtained reveals that, in 2015, a little over 122,000 letters were sent to the property owners located in high-risk areas to inform them of their obligations regarding By-law 15-040. These by-laws will be discussed in more detail in section 4.2.8 of this report.

At the beginning of 2016, we were able to recognize that a major communications strategy had been deployed, with ash tree owners as the target audience. This

mandate entrusted to the city's Service des communications will have made it possible to observe the implementation of a series of actions, particularly:

- the holding in June 2016 of seven public information meetings in boroughs most affected by the emerald ash borer problem⁴⁴;
- publication and distribution of information pamphlets (intervention guide) for citizens and tree pruners, small posters for the BAM officers, site posters to be affixed to public ash trees, indicating, in particular, that they have been treated or are to be felled, door hangers distributed to citizens who have an ash tree on their land;
- preparation and mailing of other letters intended for ash tree owners, reminding them of their regulatory obligations;
- development of different Web tools (e.g., Info-citoyens [public information] buttons, promo button);
- print advertising in the media (e.g., Le Journal de Montréal, Le Métro, Le 24 H).

All of these measures give reason to believe public awareness has been raised regarding the emerald ash borer problem in Montréal's territory. Nonetheless, it is our opinion that communication and awareness efforts regarding the public's roles and responsibilities concerning emerald ash borers in the private domain will have to continue, based on the changes in the situation and the directions adopted by the city against this plague.

RECOMMENDATION	
4.2.7.B.	We recommend that the Service des grands parcs, du verdissement et du Mont-Royal and the Côte-des-Neiges–Notre-Dame-de-Grâce, Rivière-des-Prairies–Pointe-aux-Trembles and Sud-Ouest boroughs continue the communication and awareness regarding citizens' respective responsibilities concerning ash trees in the private domain, in order to encourage them to make an effort to stop the spread of the emerald ash borer.
BUSINESS UNITS' RESPONSES	
4.2.7.B.	<i>Service des grands parcs, du verdissement et du Mont-Royal</i> <i>[TRANSLATION] The SGPVMR constantly adapts and improves its communications strategy with the public, in partnership with the Service des communications. In this regard, an evaluation of achievement of the communications objectives is produced, at the end of each year, and a communications plan is drawn up at the beginning of each year, based on this evaluation. This practice will</i>

⁴⁴ These are the following boroughs: Ahuntsic-Cartierville, Mercier–Hochelaga-Maisonneuve, Pierrefonds-Roxboro, Rivière-des-Prairies–Pointe-aux-Trembles, Saint-Laurent, Le Sud-Ouest and Villeray–Saint-Michel–Parc-Extension.

be maintained for future years. However, the current reorganization of the Service des Communications adds to the complexity of the production and fulfilment of the communications plans and result in delays. **(Planned completion: April 2017 - Completed)**

Côte-des-Neiges–Notre-Dame-de-Grâce borough

[TRANSLATION] Projected actions:

- Six video clips;
- Improvement of the website page on the emerald ash borer;
- Social media. **(Planned completion: September 2017)**

Rivière-des-Prairies–Pointe-aux-Trembles borough

As of May 12, 2017, the Bureau du vérificateur général had not received the action plan requested from the borough.

Sud-Ouest borough

[TRANSLATION] The Sud-Ouest borough uses different means of communication and awareness raising regarding the emerald ash borer.

Activities scheduled for 2017:

- Door hanger delivered to the property owners near a public ash tree scheduled for felling;
- Press releases about pickup of deciduous branches;
- Various tools to be deployed for the inauguration of the work "Freinons la chute" (Stop the ash trees from falling) (billboards, workshops);
- Installation of green ribbons with an awareness message on certain treated public ash trees (about 600 trees);
- Information booths during the flower distribution of the beautification campaign;
- Sending of notices to ash tree owners is anticipated in partnership with the SGPVMR. **(Planned completion: September 2017)**

4.2.8. Municipal By-Laws Governing the Efforts Against the Emerald Ash Borer in the Private Domain

4.2.8.A. Background and Findings

By-Law 15-040

Remember that the interventions conducted in the city's territory by the SGPVMR and the boroughs, in the context of the efforts against the emerald ash borer (e.g.,

detection, injection treatment, felling), are aimed at municipally-owned ash trees, i.e., ash trees in the public domain.

In the circumstances, to facilitate the detection of ash trees in the private domain and ensure harmonization of the interventions against the insect in public and private ash trees, the *Plan d'action montréalais de lutte contre l'agrile du frêne 2012-2015* envisioned amending the municipal by-laws.

Thus, at a meeting held on May 25, 2015⁴⁵, Montréal's city council adopted the *By-law to stop the spread of the emerald ash borer on the territory of Montréal* (By-law 15-040). This by-law, in force since June 2, 2015, provides for fines in case of an offence, ranging from \$350 to \$2,000. In addition to prohibiting the planting of ash trees, it prescribes the following aspects, among others:

- **Felling of dead or declining ash trees:** The owner of any ash tree, regardless of whether it is located in a high-risk area, of which 30% or more of the branches are dead, must fell or arrange for the felling of the ash tree before December 31 of the year the tree is discovered to be in this state. A felling permit issued free of charge must be obtained in advance;
- **Treatment of ash trees located in high-risk areas:** The owner of land located fully or in part in a high-risk area, as identified in the by-law, must proceed with the treatment of the ash trees on said land using a pesticide registered in Canada, before August 31 of the year the area was declared high-risk, if the ash trees have a diameter greater than 15 cm measured at 1.4 m above the ground;
- **Measures for disposal of ash wood:** Any person who fells or prunes an ash tree must dispose of the ash residue, depending on the period in which the operation is conducted, by a technique that completely destroys the emerald ash borer or the parts of the wood that can house the insect (e.g., shredding the wood into chips that measure no more than 2.5 cm on at least two sides, drying, roasting, fumigating).

Since the regulatory power in urban forestry belongs both to city council and the borough councils, it was necessary prior to the adoption of this by-law for city council to declare, at a meeting held on April 28, 2015⁴⁶, under section 85.5 of the *Charter of Ville de Montréal* (the Charter), that it has power over tree felling for a 10-year period in the case of ash trees.

At the same time, during this same meeting, city council adopted a by-law to amend the *By-law concerning the delegation of city council powers to borough councils*.⁴⁷ Thus, since June 2, 2015, this by-law has delegated the responsibility to the borough councils to see to the application of By-law 15-040 in their respective territories, except

⁴⁵ Resolution CM15 0690, May 25, 2015.

⁴⁶ Resolution CM15 0543, April 28, 2015.

⁴⁷ City council, By-law 02-002, December 18, 2001.

for the provisions regarding the action plans for woodlands, which are under the responsibility of the SGPVMR.

This having been said, our audit sheds light on the fact that, to date, the application in the field of By-law 15-040 concerning management of ash trees in the private domain has not really been monitored. Indeed, the responsible managers contacted in the three boroughs covered by this audit confirm that no intervention has yet been undertaken to ensure the application of this by-law. Moreover, a survey we conducted of the city's 16 other boroughs allows us to affirm only three of them⁴⁸ (16%) have taken measures to enforce By-law 15-040 in their respective territories. In all, 84% (16/19) of all of the city's 19 boroughs have taken no measure concerning the application of this by-law.

This situation undoubtedly accentuates the risks of wiping out the efforts against the spread of the insect conducted by the city on ash trees in the public domain. The reasons invoked by the boroughs to justify this situation cite the shortage of personnel necessary to cover this sphere of activity, both in terms of the number of inspectors and the qualifications required for the personnel assigned in arboreal matters.

Aware of this finding, the managers interviewed at the SGPVMR informed us their department had been mandated to take the required measures in view of enforcing the by-law in the boroughs' territory. For this purpose, on August 17, 2016, the city's executive committee resolved⁴⁹ to authorize the budget appropriations for the SGPVMR necessary for the creation of positions, including one technical agent and two inspectors in arboriculture, for a three-year period.

In the present case, although this responsibility to enforce By-law 15-040 has been delegated to the boroughs, the information obtained reveals the intention would not be to repatriate this delegation of powers. Indeed, it appears the SGPVMR instead proposes to offer the boroughs that so desire that its personnel, in collaboration with the borough, take charge of the interventions with a view to enforcing the by-law in their territory. At the time of our audit, it was anticipated that a presentation would be drawn up and delivered to the boroughs concerning the services to be offered by the SGPVMR, following which oral consent could be obtained from the interested boroughs.

This *modus operandi* leads us to question best management practices, whereby a formal offer of services is made between the stakeholders. Also, even though it is legally acceptable to proceed in this manner, we point out nonetheless that the *Charter of Ville de Montréal* provides for the terms of acceptance of an offer of services when

⁴⁸ These are the following boroughs: Mercier–Hochelaga-Maisonneuve, Le Plateau-Mont-Royal and Saint-Laurent.

⁴⁹ Resolution CE16 1371.

delegated responsibilities are involved. In particular, section 85 of the Charter stipulates the following:

“The city council may, subject to the conditions it determines, provide a borough council with a service related to a jurisdiction of the borough council; the resolution of the city council shall take effect on passage by the borough council of a resolution accepting the provision of services.”

This section of the *Charter of Ville de Montréal* shows the official nature of an offer of services and its acceptance by means of resolutions.

In our opinion, the formulation of a formal offer of services, which would be rendered official as prescribed in section 85 of the *Charter of Ville de Montréal* would have the following benefits, in particular:

- increase the transparency of the decisions made regarding the agreement concluded between the parties;
- clarify the sharing of the roles and responsibilities of the parties and the nature of interventions to be performed;
- set the benchmarks of the accountability to be provided to the boroughs that accepted the proposed offer of services.

Finally, let us mention that, in accordance with section 147 of the *Code of Penal Procedure*,⁵⁰ which prescribes, that a person must be authorized in writing by the prosecutor to issue a statement of offence, the executive committee resolved,⁵¹ on August 16, 2016:

[TRANSLATION] “to authorize, for the territory of Ville de Montréal, any horticulture inspector, technical agent in horticulture, foreman, or any other employee of Ville de Montréal reporting to the Service des grands parcs, du verdissement et du Mont-Royal whose tasks consist of enforcing the by-laws, to issue, for and on behalf of Ville de Montréal, a statement of offence for any offence under one of the by-laws, resolutions or ordinances of Ville de Montréal adopted by the city council, the executive committee or the borough council of one of the boroughs of Ville de Montréal or for any offence under a statute or one of the regulations adopted under that statute, when Ville de Montréal is the prosecutor.”

In view of this resolution, there thus would be no problem to anticipate regarding the validity of the statement of offence the SGPVMR eventually could issue in the territory of the boroughs.

⁵⁰ CQLR, c-25.1.

⁵¹ Resolution CE16 1406, paragraph 7.

RECOMMENDATIONS

4.2.8.B.	We recommend that the Service des grands parcs, du verdissement et du Mont-Royal, in a concern for instituting sound management practices and accelerating the startup of interventions in the private domain against the emerald ash borer, promptly establish the parameters of a formal offer of services to be presented to the boroughs for the application of By-law 15-040 in their respective territories and anticipate the possibility of rendering the agreement between the parties official, as prescribed in section 85 of the <i>Charter of Ville de Montréal</i> .
4.2.8.C.	We recommend that the Côte-des-Neiges–Notre-Dame-de-Grâce, Rivière-des-Prairies–Pointe-aux-Trembles and Sud-Ouest boroughs, in the event they do not adhere to the offer of services of the Service des grands parcs, du verdissement et du Mont-Royal, adopt the necessary provisions without delay to ensure in their respective territories the application of By-law 15-040 to stop the spread of the emerald ash borer in the private domain, in accordance with the responsibility that has been delegated to them to this effect.

BUSINESS UNITS' RESPONSES

4.2.8.B.	<i>Service des grands parcs, du verdissement et du Mont-Royal</i> <i>[TRANSLATION] The SGPVMR has developed an offer of services for the application of By-law 15-040, however, the distribution of powers between the SGPVMR and the boroughs concerning the implementation of this by-law must be clarified. A request for an opinion has been sent to the Service des affaires juridiques to improve the offer of services that will be proposed to the boroughs in 2017. (Planned completion: December 2017)</i>
4.2.8.C.	<i>Côte-des-Neiges–Notre-Dame-de-Grâce borough</i> <i>[TRANSLATION] On February 15, 2015, we sent an email for adherence to the SGPVMR offer of services. (Planned completion: February 2017)</i> <i>Rivière-des-Prairies–Pointe-aux-Trembles borough</i> As of May 12, 2017, the Bureau du vérificateur général had not received the action plan requested from the borough.

Sud-Ouest borough

[TRANSLATION] The borough partially assures the enforcement of the by-law in its territory, in relation to the treatment and felling of private ash trees and the transport of wood:

- Felling requests are all processed according to the by-laws in force;*
- An authorization for compliant disposal of ash logs is provided to citizens who have obtained an ash felling authorization certificate. This measure is made possible by the corporate contract awarded by the Service de l'environnement;*
- The borough adheres to the deciduous branch pickup program;*
- The borough undertakes to pursue its approaches with Parks Canada in relation to management of ash trees on federal property present on the portion of the Lachine Canal contained in our territory. These approaches made it possible to treat the majority of the ash trees in 2016. Parks Canada has committed to proceed with felling of the untreated ash trees. **(Planned completion: December 2017)***

*The borough undertakes to adhere to any SGPVMR offer of services that would be consistent with its efforts to achieve all the objectives sought by the enforcement of By-law 15-040. We are currently waiting for such an offer. **(Planned completion: will depend on the SGPVMR's offer)***

By-Law 15-063

Subsequent to the adoption of By-law 15-040, the city council, during a meeting held on June 15, 2015, also adopted⁵² the *By-law concerning the subsidy for the treatment of ash trees located on private property in high-risk areas* (By-law 15-063). This by-law came into force on June 22, 2015, and applies to all the city's territory.

The objective of By-law 15-063 is to encourage, by financial support, the interventions in the private domain imposed under By-law 15-040, and more specifically for citizens who must have their ash trees treated and whose property is located in the high-risk areas identified in the schedule to By-law 15-040. The SGPVMR is the business unit responsible for the funding and administration of the financial assistance program. For the years 2015 and 2016, a budget envelope⁵³ totalling \$1 million for each year respectively was available for this purpose.

Thus, By-law 15-063 provides that a cash subsidy is granted to the arboreal services company in consideration of the work that it carries out at the request of the owner, on

⁵² Resolution CM15 0830, June 16, 2015.

⁵³ This budget envelope comes from the operating budget of the SGPVMR.

private property located in a high-risk area, on condition this company provided a reduction to the owner for an amount equal to that of the subsidy received. The calculation of the subsidy and the terms and conditions of its payment are those stipulated in the regulation. In particular, the amount of the subsidy, which cannot exceed \$2,000 per private property over a two-year period, is calculated as follows:

- 50% of the cost of the work up to a maximum of \$3 per cm of trunk diameter, measured at 1.40 m above the ground, to which a lump sum of \$20 per private property is added.⁵⁴

Regarding the main conditions of payment of the subsidy, the by-law stipulates the following:

- The arboreal services company must have been authorized in advance by the city, in consideration of compliance with certain conditions, including the obligation to hold the valid permits and certificates for the sale and use of pesticides;
- The lot on which any private ash trees have received pesticide treatments must be located within a high-risk area officially identified by the city (schedule to By-law 15-040);
- Any ash trees that have received treatments must have a diameter equal to or greater than 15 cm measured at 1.40 m above the ground;
- The work must not have been performed before June 1 or after August 31;
- The cost of the work performed shall not exceed \$6 (\$5 in 2015) per cm of trunk diameter, measured at 1.40 m above the ground;
- The arboreal services company must submit its subsidy application to the SGPVMR no later than five days after performing the work.

In light of the compilations performed by the SGPVMR, we recognize this financial assistance program has not had the expected success. Indeed, although the year 2016 presents better results, it remains that the budget envelopes available were little used. Table 6 presents the results obtained for 2015 and 2016.

⁵⁴ On April 18, 2016, the city council resolved to make amendments to By-law 15-063. Thus, the amount of the subsidy increased from \$2.50 to \$3 per cm of trunk diameter and it was decided to allocate a lump sum of \$20 per private property, which was not the case in 2015.

Table 6 – Threshold of Use of the Financial Assistance Program for the Treatment of Ash Trees in the Private Domain for the Years 2015 and 2016

	2015	2016 ^[a]
Number of private properties ^[b]	620	1,918 ^[a]
Number of ash trees treated	1,393	4,055 ^[a]
Approximate number of ash trees inventoried in the private domain	N/A	47,253 ^[c]
Proportion of private ash trees treated	–	9%
Threshold of available budget envelope	\$1,000,000	\$1,000,000
Subsidies disbursed by the SGPVMR	\$141,422 ^[d]	\$500,000 ^[d]
Percentage use of the budget envelope	14%	50%

^[a] Results obtained from the SGPVMR as of November 29, 2016.

^[b] In accordance with By-law 15-063, this is a unit of assessment made up of land or parcels of land entered on the city's property assessment roll, as well as land or parcels of land that constitute a common area for an immovable held in divided co-ownership and that is included in each unit of assessment registered under the names of the undivided co-owners of the immovable.

^[c] Preliminary result confirmed by the SGPVMR as of December 1, 2016.

^[d] In December 2016, at the time of our audit, the SGPVMR had not finished processing all the applications received. It estimated at nearly \$500,000 the total amount of subsidies disbursed for the year 2016.

As we mention in section 4.2.7 of this report, considerable efforts have been deployed, however, to raise public awareness about the impacts of this insect pest and encourage ash tree owners in the private domain to adhere to the plan undertaken by the city against the emerald ash borer, by taking action to have their ash trees treated. In particular, in 2015 and 2016, letters were sent (in English or French, as the case may be) to all owners of properties located in a high-risk area affected by the emerald ash borer. This communication, which we studied, sought to inform property owners of their obligations regarding By-law 15-040 and the existence of financial assistance offered by the city for treatment of ash trees displaying little or no signs of decline.

Nonetheless, we recognize mobilization in the private domain appears to be more difficult, without counting the fact that the financial assistance only concerns ash trees in the private domain located within an identified high-risk area. Consequently, the lack of measures taken by the owners of private ash trees to slow the infestation in the past few years will very certainly have favoured the spread of the insect, thus attenuating the efforts against the emerald ash borer undertaken by the city. This is why the introduction of the supervision mechanism to see to the application of the municipal by-laws adopted takes on its full meaning.

Moreover, our audit also consisted of examining the operation and the compliance of the application of By-law 15-063 concerning the disbursement, by the SGPVMR, of the subsidies requested by the arboreal service companies for the treatment of ash trees in the private domain.

The review of the main terms of payment of the subsidy made it possible to recognize the following facts:

- The arboreal service companies that obtained the payment of a subsidy in 2015 and 2016 under By-law 15-063 held the valid permits and certifications for the sale and use of the pesticide TreeAzin®;
- On the whole, the inspections conducted on the land prior to the disbursement of the subsidy by the SGPVMR made it possible to validate, in accordance with section 1 of the by-law, that these were treatments of an ash tree with a trunk 15 cm or more in diameter and that was not a declining ash tree (30% or more dead branches);
- The subsidies were paid to arboreal service companies for work performed during the permitted period (section 5 of the by-law), namely between June 1 and August 31.

Moreover, in light of the surveys conducted and the information obtained from the personnel assigned to processing the subsidy applications to the SGPVMR, we were able to recognize the unwieldiness of the process. On the other hand, the application of Ash Subsidy Management (ASM), which was developed in 2015, involves operating deficiencies that contributed to compromise the efficiency of processing of applications and to generate long delays for the disbursement of the subsidies. In particular, the rigidity of the application means it is impossible to change an erroneous data entry, record the history of the evolution of a non-conformity initially surveyed in the field and already integrated into ASM, or save a revised subsidy amount.

On the other hand, given the SGPVMR does not yet have a complete inventory of ash trees in the private domain, it was necessary to proceed with validation of queries by visiting the field directly, which requires more time. All these deficiencies will have necessitated numerous validations and maintenance of other parallel tracking tools. For example, for the year 2016, we recognize the processing periods of the subsidies disbursed sometimes exceeded 60 days and even reached as much as 126 days, i.e., over four months.

As of November 17, 2016, the SGPVMR still had to proceed with processing of approximately 130 subsidy applications (concerning about 450 trees). On that date, the processing periods of these applications ranged between 8 and 135 days. In our opinion, these delays eventually could discourage some contractors from doing business with the city, and have an upward effect on prices, in view of the limited supply of such services.

Also, in the current state of affairs and considering the budget envelopes available for the subsidy program have been fairly little used overall, it is appropriate to question the SGPVMR's capacity to process a greater number of applications within reasonable periods.

RECOMMENDATION	
4.2.8.D.	We recommend that the Service des grands parcs, du verdissement et du Mont-Royal take the necessary actions to process the subsidy applications under By-law 15-063 within reasonable periods, which will have been defined in advance by the Service des grands parcs, du verdissement et du Mont-Royal.
BUSINESS UNIT'S RESPONSE	
4.2.8.D.	<i>Service des grands parcs, du verdissement et du Mont-Royal</i> <i>[TRANSLATION] The SGPVMR and the STI have collaborated to improve the GSF computer application, so that businesses can amend their reimbursement requests in the application. This adjustment will accelerate processing of the requests. (Planned completion: June 2017)</i>

4.3. Financial Framework for Management of the Emerald Ash Borer and the Canopy

4.3.A. Background and Findings

As mentioned previously, in reaction to the discovery of new emerald ash borer outbreaks and recognizing that the budget appropriations allocated were going to be insufficient to perform all the necessary interventions to slow the progress of the infestation, the city's executive committee mandated the SGPVMR, in collaboration with the Service des finances to develop the financial setup entitled *Plan de gestion de la forêt urbaine 2015-2025 (PGFU)*.⁵⁵ As indicated for the related decision-making summary, this financial setup was supposed to allow anticipation of the budget needs in order to manage the impacts of the fight against the emerald ash borer between 2015 and 2025.

According to the information obtained, the financial setup was produced in 2014 and the estimated costs it presented covered the period up to 2028. This is presented in two parts. Firstly, it distinguishes the intervention targets to be achieved annually and the costs to be anticipated against the spread of the emerald ash borer. Secondly, it also integrates the targets to achieve annually and the related costs in terms of tree planting for the implementation of the *Plan d'action canopée 2012-2021*.

For the establishment of the estimated annual costs related to the fight against the emerald ash borer, the managers responsible for the development of this financial setup indicate that the targets chosen regarding interventions to be performed

⁵⁵ Resolution CE13 0939, June 19, 2013.

annually (e.g., the number of detections, the number of treatments, the number of ash trees felled) were established by taking inspiration from the experience of other North American cities and studies on the subject. The intervention scenarios for which the SGPVMR had the possibility of opting consisted of:

- not conducting any special intervention and thus having to fell all the ash trees quickly over a short period of time; or
- applying a certain number of ash tree treatments to save as many as possible and thus protect the canopy.

According to the solutions established by the SGPVMR, the options of doing nothing to protect the ash trees would have represented an overall cost of a little more than \$500 million⁵⁶ for the city. The SGPVMR instead recommended the scenario of saving 75% of the population estimated at 200,000 ash trees, for a total of 150,000 ash trees over a period extending up to 2028. The overall cost then was estimated at \$169.5 million for this first part of the financial setup.

For the second part of the financial setup, consisting of implementing the *Plan d'action canopée 2012-2021* to increase the canopy index by 5% by 2025, the Montréal canopy study produced in 2011 by the SGPVMR established that, to achieve this goal, the city would have to plant 98,000 trees in the public domain. Considering a program already exists for regular tree planting by the boroughs, which contributes to canopy enhancement, the SGPVMR's planting objective was reduced to 75,000 additional trees to be planted by 2025. Thus, according to the financial setup, considering a certain number of trees had already been planted between 2012 and 2014, it was established that the annual planting target would be 7,073 trees from 2015 to 2024. In the financial setup prepared in 2014, the overall cost of this component then was estimated at nearly \$94 million. In short, also considering certain administrative costs associated with management of the strategy, the SGPVMR, based on this financial setup, estimated the fight against the emerald ash borer, and concurrently the efforts to enhance the canopy, were going to generate expenditures of around \$294 million by 2028 (see Table 7).

⁵⁶ Estimate established according to a population of 200,000 ash trees and an average cost per tree, including the costs associated with felling, stump pulling and the purchase, planting and maintenance of a replacement tree.

Table 7 – Overall Cost Estimated by the SGPVMR to Stop the Spread of the Emerald Ash Borer and Implement the *Plan d'action canopy* 2012-2021

	Period	Scenario chosen – SLAM strategy
Stopping the spread of emerald ash borer ^[a]	2011-2028	\$170M
<i>Plan d'action canopy</i> 2012-2021 ^[b]	2012-2026	\$94M
Management expenses ^[c]	2012-2028	\$30M
Total		\$294M

^[a] Detection work began in 2011.

^[b] According to the scenario established by the SPVGMR, the plantings began in 2012 and were supposed to continue up to 2024 to reach the target of 75,000 trees. The expenditures projected for the years 2025 and 2026 concerned maintenance over two years of these new planted trees.

^[c] No management expenses were projected for 2011.

Regarding the budget, let us specify the underlying interventions against the emerald ash borer (e.g., detection, treatment of ash trees, felling) are funded from the operating budget. The interventions related to the implementation of the *Plan d'action canopy* 2012-2021 (purchase and planting of trees) and the annual financial support granted to the boroughs by the SGPVMR to ensure the replacement of felled ash trees, are funded from the TCEP budget dedicated to the SGPVMR. Since 2012, the trend of the TCEP adopted by the city authorities is illustrated in Table 10 presented below. In relation to the TCEP, we find over time that four loan by-laws totalling \$45.5 million (see Table 8) were adopted by the city council between 2012 and 2016. Of this amount, approximately \$23 million had been spent or incurred at the time of our audit (see Table 9).

Table 8 – Loan By-Laws Related to the TCEP

Purpose of borrowing	By-law No. Resolution No. Resolution date	2012	2013	2014	2015	2016	Total
Purchase and planting of trees – <i>Plan d'action canopy 2012-2021</i>	12-032 CM12 0751 August 21, 2012	\$2.5M					\$2.5M
Fulfillment and management of the <i>Plan d'action canopy 2012-2021</i>	15-038 CM15 0364 March 24, 2015				\$7M		\$7M
Fulfillment and management of the PGIFU ^[a]	15-067 CM15 1013 August 18, 2015				\$14M		\$14M
Fulfillment and management of the PGFU ^[b]	16-047 CM16 0982 August 23, 2016					\$22M	\$22M
Total		\$2.5M			\$21M	\$22M	\$45.5M

^[a] *Plan de gestion intégré de la forêt urbaine 2015-2025 (PGIFU).*

^[b] *Plan de gestion de la forêt urbaine 2015-2025 (PGFU).*

Table 9 – Use (Expenditures and Commitments) of the Loan By-Laws Related to the TCEP

Loan By-law No.	Loan By-law amount	2012	2013	2014	2015	2016 ^[a]	Total
12-032	\$2.5M	\$1.14M	\$0.43M	\$0.46M	\$0.22M	\$0.06M	\$2.31M
15-038	\$7M	–	–	–	\$7M	–	\$7M
15-067	\$14M	–	–	–	\$2.48M	\$8.1M	\$10.58M
16-047	\$22M	–	–	–	–	\$3.2M	\$3.2M
Total	\$45.5M	\$1.14M	\$0.43M	\$0.46M	\$9.7M	\$11.36M	\$23.09M

^[a] Financial data recorded in the city's accounting system as of November 30, 2016.

Table 10 – Trend of the TCEP from 2012 to 2019

TCEP budget/ year	2012	2013	2014	2015	2016	2017	2018	2019	Total
2012	–	–	–	–	–	–	–	–	–
2013	–	–	–	–	–	–	–	–	–
2014	–	–	\$0.75M	\$0.75M	\$0.75M	–	–	–	\$2.25M
2015	–	–	–	\$7M	\$7M	\$7M	–	–	\$21M
2016	–	–	–	–	\$12M	\$12M	\$12M	–	\$36M
2017	–	–	–	–	–	\$15.5M	\$15.5M	\$15.5M	\$46.5M

Although the financial setup must allow anticipation of the budget needs of future years to manage the impacts of fighting the emerald ash borer and enhancing the canopy, it appears it has never been reviewed or updated since its establishment in 2014. Our audit discovered that various aspects of the initial strategy were not carried out as anticipated. Thus, the initial budget estimates in the financial setup should have been reviewed to allow better planning of the required budgets. For example, a reconciliation of certain parameters of the estimates used in the financial setup with the actual data compiled, and the facts recognized after operations were conducted in the field, allows us to recognize the following:

- The number of annual detections projected in the financial setup amounted to 4,000 interventions beginning in 2015, whereas in reality, the contracts awarded by the SGPVMR for the purposes of this operation between 2014 and 2017 instead projected 3,450 detections per year;
- The number of ash trees detected as positive (infested by the emerald ash borer and to be felled turned out to be greater than the number projected in the financial setup. Let us mention that the actual data we used comes from the most recent compilation report prepared by the SGPVMR. The report in question is entitled *Fiche technique – État de la situation – Évolution de la forêt urbaine*. It is dated August 9, 2016. No other more recent report was available at the time of our audit in December 2016. The result of the comparison is presented in the following Table 11.

Table 11 – Number of Ash Trees Detected as Positive and to be Felled – Projected Versus Actual

	2015	2016
Number of ash trees detected as positive and to be felled – projected according to the financial setup (PGFU ^[a])	400	480
Number of ash trees detected as positive and to be felled – actual	572	783
Variance	+ 172	+ 303

^[a] *Plan de gestion de la forêt urbaine 2015-2025 (PGFU).*

The greater than expected number of ash trees infested by the emerald ash borer translates concretely into additional costs to be anticipated regarding felling, stump pulling and tree replacement operations, in particular. This finding reveals an underestimate of the costs in the financial setup.

- The number of trees actually planted under the implementation of the *Plan d'action canopée 2012-2021* turned out to be less than the number planned in the financial setup. The comparison is presented in the following Table 12.

Table 12 – Number of Plantings Performed Relative to the Number of Plantings Planned in the Financial Setup for 2015 and 2016

	2015	2016	Cumulative
Number of plantings planned according to the financial setup (PGFU ^[a])	7,073	7,073	14,146
Number of plantings performed – actual	2,701	6,600 ^[b]	9,301
Variance	4,372	473	4,845

^[a] *Plan de gestion de la forêt urbaine 2015-2025 (PGFU)*.

^[b] Results obtained from the SGPVMR according to the progress of the work as of November 15, 2016. Trees may be planted up to December 5, according to the specifications.

To date, we therefore recognize a planting deficit of a little over 4,800 trees. This aspect was addressed in section 4.2.6 of this report dealing with tree planting in replacement of felled ash trees and for canopy enhancement. In light of this result, it appears that to achieve the planting objective of the *Plan d'action canopée 2012-2021*, the strategy and concurrently the financial setup will have to be revised, because the accumulated delay will have to be carried over to subsequent years. This must result in a re-evaluation of the necessary financial and human resources in order to increase the canopy index as projected.

- Expenditures made in 2015 and 2016, some of which will affect the subsequent years, had not been projected in the financial setup, in particular:
 - contracts to conduct the inventory of ash trees in the private domain;
 - contracts to ensure supervision of the plantings and quality control of the work;
 - a subsidy program for the treatment of ash trees located in the private domain;
 - five additional people were hired in 2016 within the SGPVMR, including a forest engineer, a planning advisor, a technical agent and two horticulture inspectors.⁵⁷
- Beginning in 2017, expenditures will be necessary to proceed with the performance and supervision of soil demineralization work in view of creating additional sites for planting new trees.

In the final analysis, a large number of factors may cause the strategy deployed to evolve differently than the one initially foreseen. In the circumstances, it is therefore unavoidable the parameters of the estimates supporting the financial setup will have to be reviewed. In addition to the above-mentioned aspects, other factors must be taken into account, in particular:

- the effectiveness of the pesticide depending on the frequency of treatment and the proportion of trees treated;

⁵⁷ Resolution CE16 1374, decision-making summary No. 1164107005.

- citizen adherence to fighting the plague and proceeding to treat their ash trees on their private property;
- the resources available to perform the required interventions (in house or external).

Moreover, considering many municipalities in Québec and in the rest of Canada are now faced with an emerald ash borer problem in their territory, there is good reason to expect the demand for replacement trees will increase strongly and that the pressure on supply will have an impact on market prices. There could even be a shortage of trees on the market, which could compel the SGPVMR to reassess its criteria regarding the type of tree it requires by accepting smaller trees. This would lead to additional maintenance costs to ensure their survival (e.g., installation of protectors).

In this context, we consider the periodic and even annual review of a financial setup is indispensable to allow planning of budget needs.

RECOMMENDATION	
4.3.B.	We recommend that the Service des grands parcs, du verdissement et du Mont-Royal periodically update the financial setup supporting the approved action plan, so it reflects the revised parameters and the budget needs, in view of allowing better coordination of resources.
BUSINESS UNIT'S RESPONSE	
4.3.B.	<i>Service des grands parcs, du verdissement et du Mont-Royal</i> [TRANSLATION] The SGPVMR has solicited the Service des finances to update the financial setup for the urban forest. (Planned completion: June 2017)

Moreover, aware of the additional financial efforts generated for the boroughs by felling⁵⁸ of infested or declining ash trees, the SGPVMR offered them financial assistance to help them proceed, in particular, with replacement of the ash trees felled in the fight against the emerald ash borer.

Thus, since 2015, a program for replacement of felled ash trees has been set up by the SGPVMR and budget appropriations from its TCEP have been transferred to the boroughs. The terms of this budget transfer to the boroughs were stipulated in a commitment letter addressed to the director of each borough. Obtaining budget appropriations was conditional on the boroughs' written commitment to perform the following operations, in particular:

⁵⁸ The trees are felled by and at the expense of the boroughs from their respective operating budgets.

- fell the number of ash trees stipulated in accordance with the felling prescription provided by the SGPVMR following its emerald ash borer detection operations;
- proceed with planting of a specified number of trees (exact number indicated in the commitment letter in consideration of the budgets transferred) in replacement of the felled ash trees, in addition to the plantings projected in the borough's regular program.

Our audit first involved ensuring that the amounts promised to the boroughs had actually been transferred to them and, secondly, evaluating the control and monitoring measures instituted by the SGPVMR to ensure the budgets allocated were used for the purposes projected by the boroughs.

Thus, we were able to recognize, for the years 2015 and 2016, that the boroughs shared a TCEP budget of \$2.98 million in 2015 and \$2.91 million in 2016 (total of \$5.89 million).

However, an examination of the commitment letters signed by the three boroughs audited for the years 2015 and 2016 and the form of terms and conditions attached to them allowed us to recognize the absence of certain specifications it would have been relevant for the SGPVMR to provide, in our opinion. In particular, we note that:

- no clear indication or directive exists, specifying the nature of the expenditures the boroughs are authorized to fund by means of these TCEP budget appropriations transferred to them. Although these budget appropriations must serve to proceed with the replacement of the felled trees, it would have been useful, for the benefit of the boroughs, to specify the nature of the eligible expenditures for performance of the operation (e.g., purchase of the tree, labour or tools necessary for planting). In light of the comments obtained from some stakeholders interviewed in the boroughs, these imprecisions created confusion regarding the use of the available funds. Although this cannot be the only reason, we nonetheless find, as of November 30, 2016, that 49% of the TCEP budget appropriations thus transferred to the city's boroughs by the SGPVMR still had not been utilized (\$2.9 million out of \$5.89 million);
- no mention is made of the consequences of non-compliance with the commitments made by the borough in consideration of the budget funds obtained;
- no mention exists regarding the accountability mechanisms expected by the SGPVMR on the part of the boroughs, so it can control that the money transferred is used for the stipulated purposes and that the trees felled are indeed replaced as stipulated in the commitment.

Moreover, the responsible managers interviewed at the SGPVMR confirmed to us they have not instituted special measures to corroborate the boroughs' compliance with the commitments they made in terms of trees to be replaced in consideration of the financial assistance obtained, and have not monitored the use of the budget appropriations granted. They justify this situation by the internal staff shortage, but

also by the fact they consider the managers in the boroughs must be accountable for the actions to which they have committed.

In a context where resources are limited and considering the impacts the non-performance of the operations underlying this budget transfer could represent for the achievement of the targets of the *Plan d'action canopée 2012-2021*, we believe controls should be instituted by the SGPVMR to ensure the financial assistance allocated to the boroughs serves the stipulated purposes and contributes to achieve the objectives.

RECOMMENDATION	
4.3.C.	We recommend that the Service des grands parcs, du verdissement et du Mont-Royal review the terms of application of the financial assistance granted to the boroughs so the documents attesting to the commitment made between the parties incorporate the required specifications regarding the use of the funds, non-compliance with the commitments, and the expected accountability mechanisms, so it can exercise better control of the funds transferred to the boroughs.
BUSINESS UNIT'S RESPONSE	
4.3.C.	<i>Service des grands parcs, du verdissement et du Mont-Royal</i> [TRANSLATION] The SGPVMR plans to integrate the necessary details into the letter addressed to the boroughs regarding the use of the funds, non-fulfillment of commitments and the expected accountability mechanisms. (Planned completion: June 2017)

4.4. Accountability

4.4.A. Background and Findings

The implementation of major action plans, such as the *Plan d'action montréalais de lutte contre l'agrile du frêne 2012-2015* and the *Plan d'action canopée 2012-2021*, must be governed by the establishment of accountability mechanisms to allow evaluation of the effectiveness of the actions undertaken. For this purpose, management reports must be produced periodically and contain enough information to enable the responsible managers, and ultimately the city's authorities, to assess the efficiency of the operations and the degree of progress of the measures proposed, given the targets set.

Our audit allowed us to recognize there is no formal report periodically presenting an overview of the progress of the situation, in view of the targets set to fight the emerald

ash borer, and concurrently to achieve the canopy enhancement objectives. According to the information obtained, such a report concerning 2016 would be scheduled for the beginning of 2017.

According to the division head responsible at the SGPVMR, the dossier nonetheless is followed closely by the city's Direction générale; quarterly meetings have been held to discuss its progress. However, we have not found reports or minutes supporting the content of the aspects discussed at these meetings.

This having been said, to allow a better evaluation of the nature of the monitoring performed, we looked up and consulted the documentation produced by the SGPVMR since the deployment of the strategy to fight the emerald ash borer and manage the canopy. Thus, as we mentioned previously, the only reports we traced since the adoption of the *Plan d'action montréalais de la lutte contre l'agrile du frêne en 2012* are as follows:

- *Plan d'action montréalais contre l'Agrile du frêne 2012-2015 – Bilan 2012 et programme 2013*;
- *Forêt urbaine – Bilan 2015 – Plan d'action 2016*.

We notice the first document is undated, while the second, dated March 24, 2016, takes the form of a PowerPoint presentation. In both cases, we were unable to identify the recipients of these documents precisely. According to the information obtained, it appears these reports were not deposited officially with the authorities, but were transmitted to the management of the SGPVMR. These reports present the results obtained in terms of units of measure or highlights.

For example, they present:

- the number of new outbreaks discovered in 2012 relative to 2011;
- the number of streetside ash trees treated with the pesticide TreeAzin® in 2011 and 2012;
- the number of plantings carried out in 2015 and the forecasts for 2016;
- the trend of the number of ash trees detected, treated and to be replaced from 2011 to 2015;
- the different actions taken (e.g., the adoption in 2015 of By-law 15-040 to stop the spread of the emerald ash borer on the territory of Ville de Montréal and By-law 15-063 concerning the subsidy for the treatment of ash trees located on private property in high-risk areas);
- the results of the subsidy program (By-law 15-063);
- certain eventual action priorities.

It appears no report was produced for the years 2013 and 2014.

We also learned of several documents prepared for the purposes of public communications to the media. These are technical data sheets or press releases

transmitted to the Mayor's office and the executive committee. These documents, prepared for communications purposes in the years 2012, 2013 and 2014, present a summary picture of the progress of the fight against the emerald ash borer in the city's territory and also present the results obtained in terms of units of measure (e.g., the number of ash trees detected, the number of ash trees treated, the number of ash trees felled). However, these are not reports prepared for management and monitoring of the progress of operations.

Strategically and operationally, we recognized the existence of targets sent annually, which were integrated into the financial setup prepared in 2014. On the one hand, these targets to be achieved annually concern the operations against the emerald ash borer (e.g., the number of detections, the number of treatments, the number of ash trees felled and replaced). On the other hand, targets were also established concerning the number of additional trees to be planted annually in order to increase the canopy index by 5% by 2025.

In this regard, remember that in the context of the implementation of the *Plan d'action canopée 2012-2021*, it was agreed the city would coordinate planting in the municipal public domain, whereas an NPO would see to coordination of tree planting in the private and institutional domain. The 2014 financial setup therefore envisioned the SGPVMR had to plant 7,073 trees per year beginning in 2015 in the public domain, whereas in the private domain, the NPO undertook to plant 13,550 trees beginning in 2015. Regardless of whether these are targets are related to the operations against the emerald ash borer or annual planting targets for the implementation of the *Plan d'action canopée 2012-2021*, we do not find any assessment, management report or presentation document comparing the achievements in the field with the targets set. Moreover, no annual assessment has ever been produced more specifically concerning the *Plan d'action canopée 2012-2021*. However, this was one of the recommendations formulated by the Commission permanente sur l'eau, l'environnement, le développement durable et les grands parcs following the study, in May 2014, of the emerald ash borer issue and the *Plan d'action canopée 2012-2021*. In response to this report, the executive committee also considered it opportune to table an annual report of activities of the *Plan d'action canopée 2012-2021* in the city council.⁵⁹

Also, we find the SGPVMR does not have any management report allowing compilation of the actual trends of all the costs incurred to date city-wide (including the expenditures made by the boroughs) to fight the emerald ash borer and enhance the canopy in Montréal. As we mentioned previously in section 4.3 of this report regarding the financial framework, the only report at the SGPVMR's disposal in this sense concerns a document entitled *Fiche technique – État de la situation – Évolution de la forêt urbaine*. The most recent available version of the report is dated August 9, 2016. The first part of the report presents, for the years 2012 to 2016 (in progress), the results

⁵⁹ GDD 1143430015, response to Recommendation R-1.

in terms of number of interventions performed (e.g., the number of detections, the number of treatments, the number of ash trees felled), whereas the second part presents an approximate summary of the actual expenditures and the TCEP budgets pertaining to these same years, only for the SGPVMR.

Upon examining the documents presented to the Commission sur les finances et l'administration, in view of the adoption of the operating budgets and the TCEP budgets from 2012 to 2016, we perceive the exercise of a certain form of accountability regarding the main actions performed and the actions projected for the following year. However, this again is a presentation in terms of units of measure compiled (e.g., the number of trees planted, the number of injections applied), but these results do not provide indications regarding the degree of achievement of the established targets. Without comparison with the objectives, it is more difficult, and even impossible, to evaluate the results of the implemented strategy at their fair value, accounting for the human and budgetary resources available.

Finally, we find it is only very recently, on September 2 and 23, 2016 in the context of the approval and coordination process for the city's major projects and programs, that a PowerPoint presentation⁶⁰ was delivered to the members of the two management committees, namely the Comité corporatif de gestion des projets d'envergure (CCGPE), chaired by the city manager, and the Comité de coordination des projets d'envergure (CCPE), chaired by the chairman of the city's executive committee. These two presentations, which were identical, all in all, essentially sought to report on the changes in the TCEP budget approved relative to the actual expenditures invested for the year 2015 and the year 2016 in progress. According to the information obtained from the SGPVMR's managers, although the implementation of the *Plan d'action montréalais contre l'agrile du frêne 2012-2015* and the *Plan d'action canopée 2012-2021* began in 2012, it is only since January 2016 that the dossier is considered a major program and that the SGPVMR must complete a quarterly table entitled *Tableau de suivi des projets et programmes d'immobilisations prioritaires pour l'année 2016* for the Bureau des projets et programmes d'immobilisations reporting to the city's Direction générale.

For the three boroughs audited, we recognize the following facts:

- The Sud-Ouest borough, which is only one of the three boroughs audited to have adopted a 10-year action plan (2014 to 2024) against the emerald ash borer in its territory, has produced two reports to date, concerning the years 2014 and 2015. According to the information obtained from the people interviewed, these reports were presented to the elected officers of the borough. In both cases, the results of the operations conducted by the borough (e.g., detection, treatment, felling, planting) are close to the targets established in the action plan;

⁶⁰ The presentation document was entitled: *Plan de la forêt urbaine – Verdissement (Plan d'action canopée 2012-2021) et remplacement de frênes – N° investi : 34 700 – État d'avancement.*

- For the Côte-des-Neiges–Notre-Dame-de-Grâce and Rivière-des-Prairies–Pointe-aux-Trembles boroughs, since the operations against the emerald ash borer are essentially conducted by the SGPVMR, they have various Excel files identifying the operations under their responsibility (e.g., the list of trees felled, the list of plantings).

RECOMMENDATIONS	
4.4.B.	We recommend that the Service des grands parcs, du verdissement et du Mont-Royal adopt management reports allowing periodic tracking of the progress of operations and the degree of advancement of the actions undertaken, accounting for the targets set, in view of facilitating the evaluation of the strategy deployed and favouring informed decision-making in fighting the emerald ash borer and in canopy enhancement.
4.4.C.	We also recommend that the Service des grands parcs, du verdissement et du Mont-Royal annually produce a formal report to account for the overall situation regarding the fight against the emerald ash borer and, concurrently, the achievement of the Montréal canopy target.
BUSINESS UNIT'S RESPONSES	
4.4.B.	<i>Service des grands parcs, du verdissement et du Mont-Royal</i> [TRANSLATION] The SGPVMR has adopted management reports allowing tracking of operations and the progress of the actions taken. (Planned completion: April 2017 - Completed)
4.4.C.	<i>Service des grands parcs, du verdissement et du Mont-Royal</i> [TRANSLATION] See the proposed action for Recommendation 4.1.B. (Action plans for management of the emerald ash borer and the canopy). (Planned completion: April 2018)

5. Conclusion

The appearance in 2011 of the emerald ash borer in Montréal's territory undoubtedly represented a major challenge. Indeed, the city's sustainable development directions sought to enhance the canopy by 5% over a 10-year horizon,⁶¹ whereas ash trees represented a significant portion of its arboreal stock (one tree in five was an ash) and

⁶¹ The *Plan d'action canopée 2012-2021* envisioned the additional planting of 75,000 trees in the public domain, in addition to the 23,000 planted on the average by the boroughs under their regular planting program and the 142,000 trees in the private domain.

no solutions existed (and still do not exist to date) to eradicate the emerald ash borer completely.

Thus, starting in 2012, while countering the negative impacts associated with canopy loss,⁶² the action plan deployed by the city to fight this plague sought to gain time by slowing the insect infestation, while offering the benefit of spreading over time the costs associated with massive felling of ash trees and their replacement over a short period. In 2014, the financial setup developed by the city revealed the fight against the emerald ash borer and, concurrently, the efforts to enhance the canopy, could generate expenditures then estimated at approximately \$294 million up to 2028, without considering the cost of the actions undertaken within the boroughs.

Since then, we have been able to recognize the considerable efforts deployed by the city to fight the insect infestations and tend to enhance the canopy. In particular, several contracts totalling approximately \$30 million have been awarded since 2013 to external firms in relation to detection, treatment and planting work.

Nonetheless, we must recognize it is difficult to date to assess the extent to which the strategy deployed by the city is working efficiently and contributing to the achievement of the objectives. On the one hand, no assessment or formal diagnosis exists to date presenting the overall picture of the progress of the situation, given the targets established and incorporated into the 2014 financial setup against the emerald ash borer and, concurrently, achieve the canopy enhancement targets. On the other hand, the operations performed and the evaluation of the recognized results are not documented sufficiently. Periodic tracking of the progress of operations currently tends to be done informally instead of being part of a well-defined accountability process.

Whether they concern interventions against the emerald ash borer or interventions related to canopy enhancement, the facts recognized reveal the necessity of reassessing the direction of the strategy deployed in order to ensure coherence, accounting for the objectives. For example, the following aspects will have to be considered:

- Systematic renewal of ash tree injections every two years, as recommended, has not been planned by the Service des grands parcs, du verdissement et du Mont-Royal (SGPVMR). This exposes the city to the risk the insect will regain the upper hand and that a large proportion of the ash trees initially treated during a first round will have to be felled and replaced more quickly. As applicable, it thus will be necessary to decide what proportion of ash trees the city wishes to include in a long-term protection program;
- The late planting of additional trees necessary to meet the canopy enhancement target of 5% by 2025 and the problem related to the identification of new planting sites in the territory, combined with the fact the *Plan d'action canopy 2012-2021*

⁶² In particular, increase in heat islands, decrease in air quality, impairment of neighbourhood esthetics and property values.

did not really account for the magnitude of the damage caused by the insect infestation;

- The problem associated with the non-enforcement of By-law 15-040⁶³ concerning ash trees in the private domain, which represent approximately 22% of all ash trees in Montréal territory, and low interest of citizens in the financial assistance program instituted for the treatment of ash trees on their property (By-law 15-063).⁶⁴ The inaction in the private domain could have contributed to lessen the city's efforts to fight the insect in the public domain.

We find the SGPVMR will have to prove the extent to which the strategy deployed has made it possible to counter the insect invasion and achieve the objectives enabling the municipal administration to decide what strategy to put forward to meet the new targets. Consequently, an updated action plan based on the actual results obtained should be drafted and formally approved, which invariably will have an impact on the financial framework. In particular, the investments will have to be adjusted according to the operational rhythm sought to achieve the annual and long-term targets. Agreements will also have to be made with the boroughs to favour the achievement of common objectives.

Finally, citizens are increasingly aware of the importance of the environment and want public administrations to become more involved to provide them with a pleasant living place. The city's sustainable development plan, *Montréal durable 2016-2020*, sets out directions in this sense. However, it must be demonstrated that this plan is respected in the context of the established budget constraints, and that the best decisions are made to achieve it. Both the public domain and the private domain will have to contribute to this collective reforestation effort.

⁶³ By-law to stop the spread of the emerald ash borer on the territory of Montréal, adopted in May 2015.

⁶⁴ By-law concerning the subsidy for the treatment of ash trees located on private property in high-risk areas, adopted in June 2015.

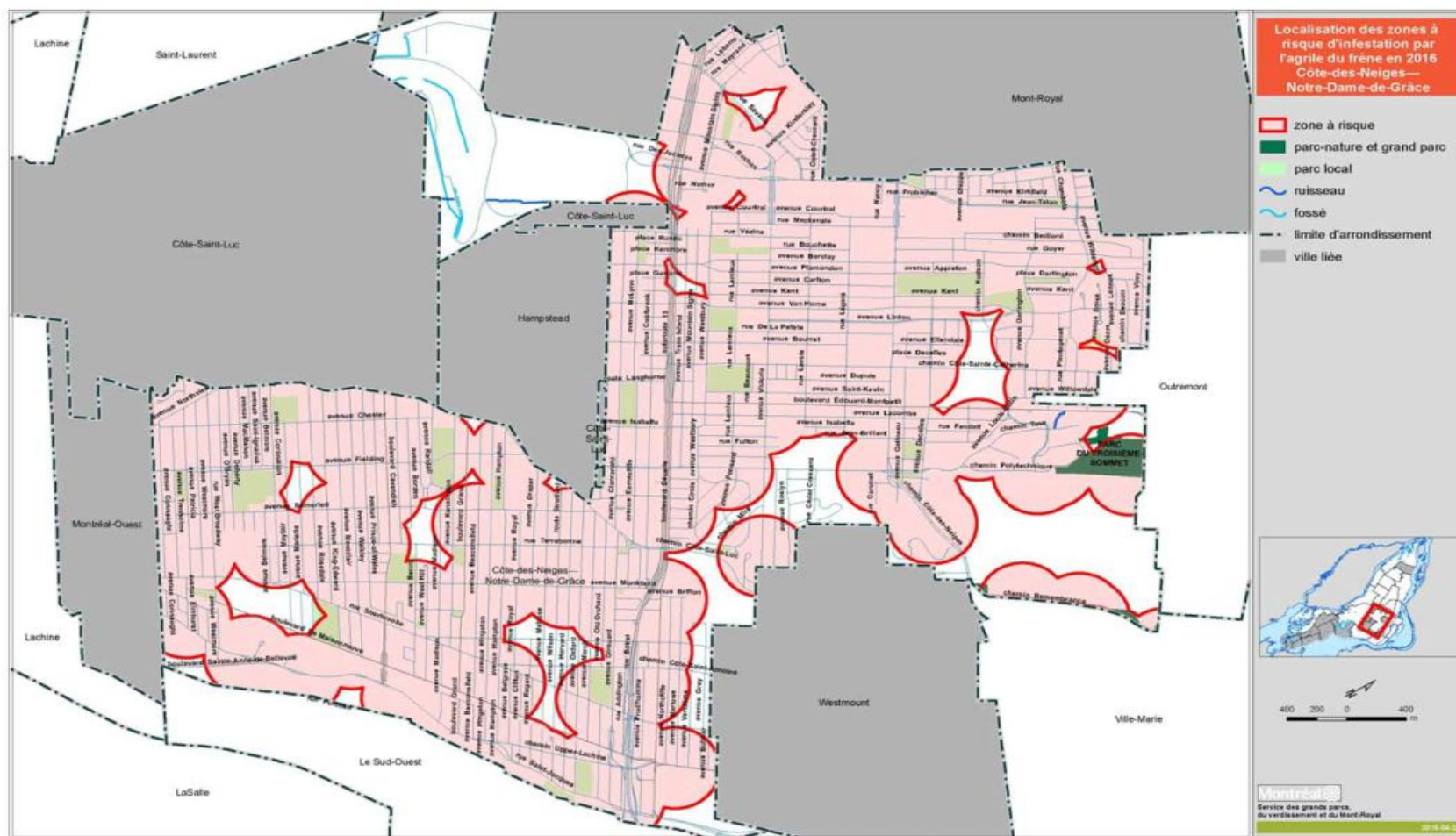
6. Appendices

6.1. Images Associated with the Emerald Ash Borer

Figure A – Adult emerald ash borer  Source: © David Cappaert, Michigan State University, Bugwood.org, CQEEE	Figure B – Sinuous galleries created by the emerald ash borer in the larval stage  Source: © David Cappaert, Michigan State University, Bugwood.org, CQEEE
Figure C – Ash tree foliage  Source: Portail des grands parcs et verdissement, Ville de Montréal	Figure D – Damage caused by the emerald ash borer in the larval stage  Source: © CFIA
Figure E – Branch barking technique  Source: CQEEE	Figure F – Injection treatment with the bioinsecticide TreeAzin®  Source: Portail des grands parcs et verdissement, Ville de Montréal

6.2. High-Risk Areas in 2016 Concerning the Three Boroughs Audited

Figure A – Côte-des-Neiges–Notre-Dame-de-Grâce Borough⁶⁵



⁶⁵ Source: SGPVMR, May 2016.

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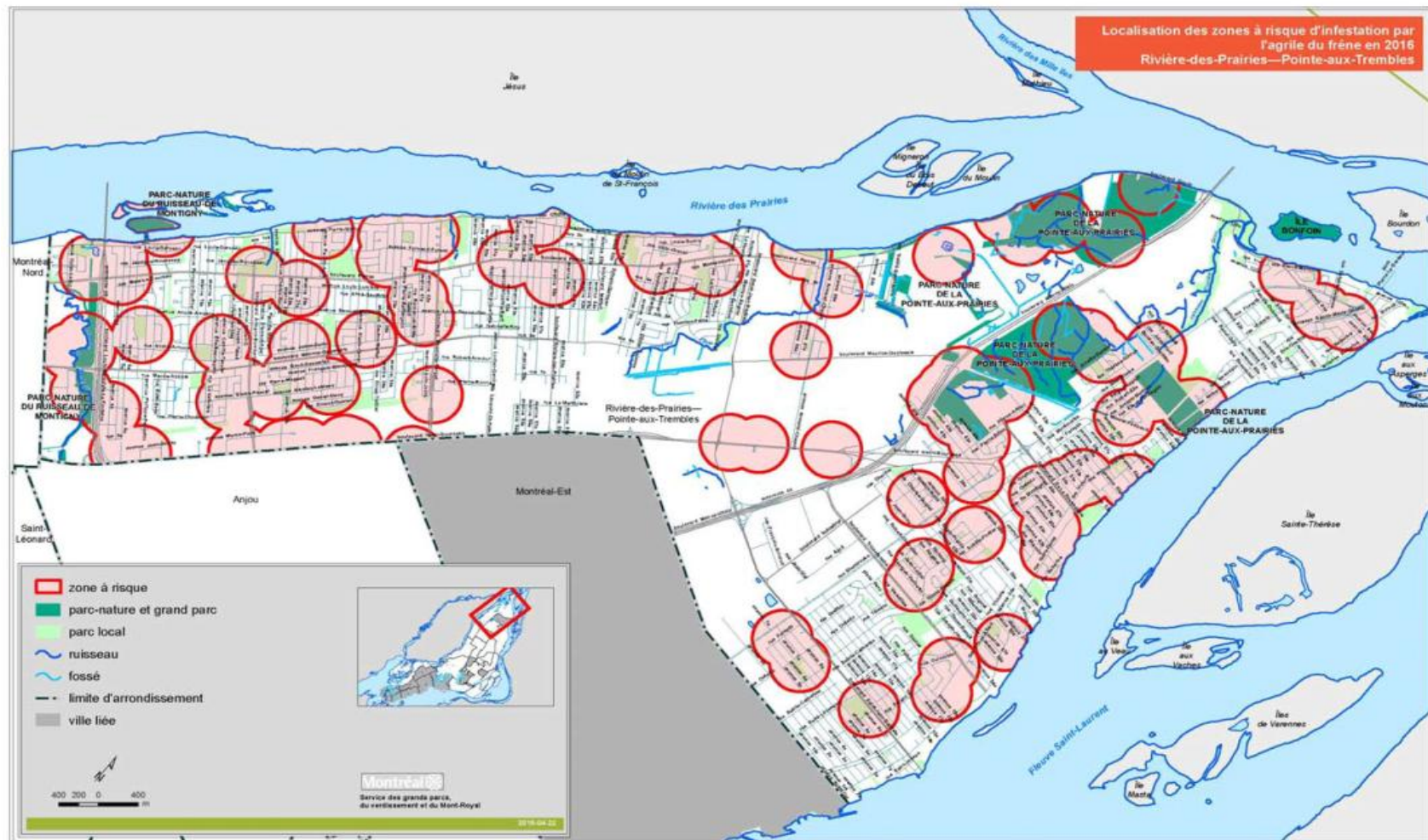
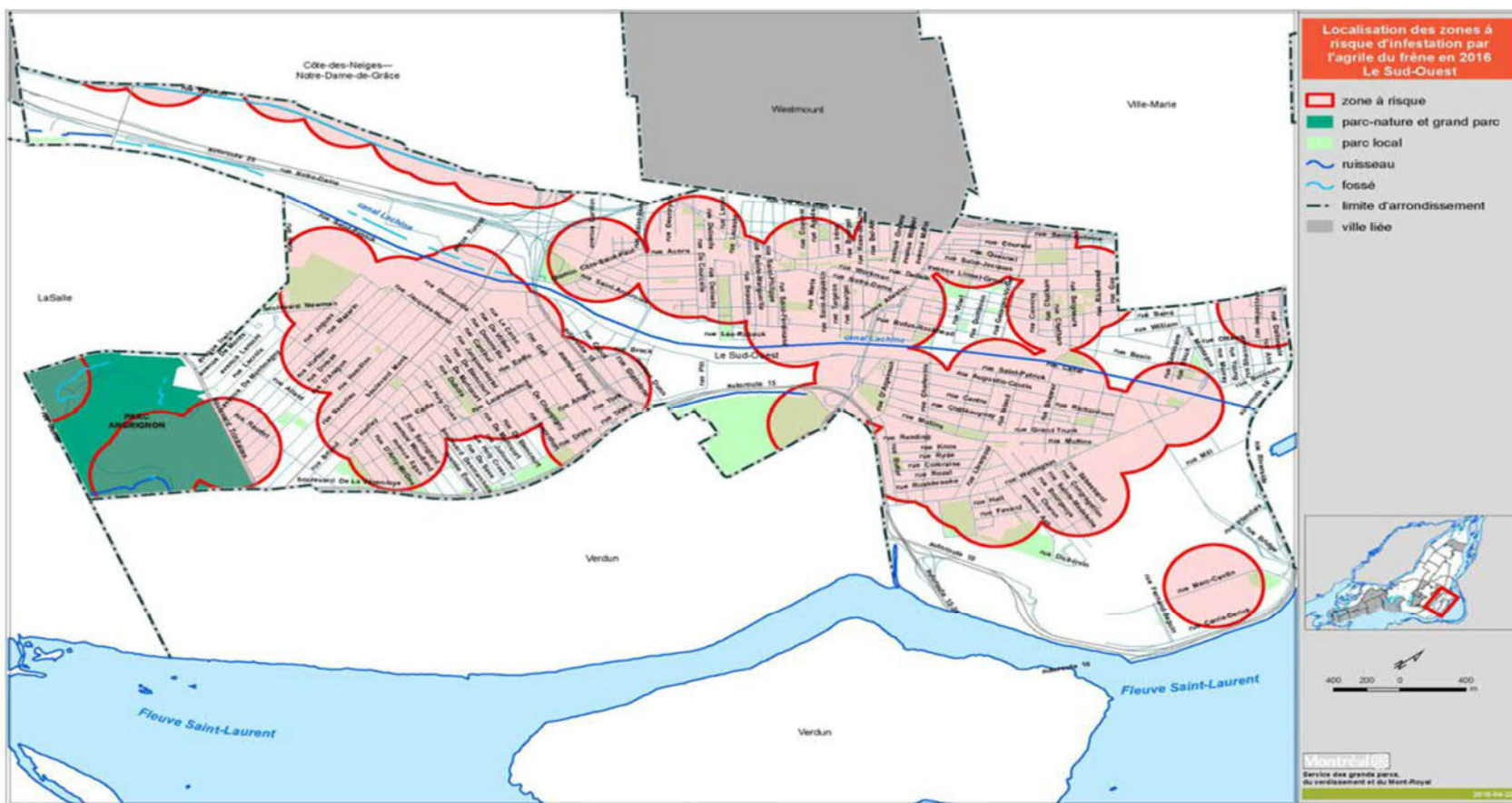


Figure C – Sud-Ouest Borough



6.3. Main Contracts Awarded by the Service des grands parcs, du verdissement et du Mont-Royal to Fight the Emerald Ash Borer and Enhance the Canopy

Work categories	Call for Tenders or decision number	Term of the contract	Amount in GDD ^[a] ^[c]
Detection			
· Public domain	14-13899	2014	\$77,264
· Public domain	14-13900	2014	\$69,762
· Public domain	15-14498	2015 to 2017	\$733,793
· Large parks	14-13898	2014	\$113,474
· Large parks	15-14497	2015 to 2017	\$350,099
Total – detection			\$1,344,392
Products and injection			
· Products (insecticides)	Negotiated agreement CM13 0431	June 2013 to May 2016	\$450,000
· Products (insecticides)	Negotiated agreement CM13 0431	12 additional months	\$2,092,505
· Products (insecticides)	Negotiated agreement CM16 0604	30 months	\$9,363,564
· Injection and supply of insecticide	14-6698	2014	\$1,998,553 ^[b]
· Injection (High-risk area and <i>Conservation Program</i>)	15-14268	2015	\$693,615
· Injection (High-risk area)	16-15237	2016	\$610,027
· Injection (<i>Conservation Program</i>)	16-15349	2016	\$106,307
Total – products and injection			\$15,314,571
Planting			
· Site identification	14-13992	2015	\$99,241
· Supply, planting and maintenance of trees	15-14275	2015-2019	\$8,620,876
· Supply, planting and maintenance of trees	16-15070	2016-2018	\$4,245,824
· Supervision of planting (internal)	–	2015	\$–
· Supervision of watering, maintenance and warranty	16-15085	2016	\$135,082
· Supervision of planting, quality control, maintenance and watering	16-15087	2016-2017	\$416,095
· Supervision of planting, quality control, maintenance and watering	16-15254	2016-2019	\$579,219
Total – planting			\$14,096,337

^[a] Amount of the contract, including taxes and contingencies, if applicable.

^[b] This amount includes a sum of \$1,341,029 representing insecticide costs.

^[c] Gestion des dossiers décisionnels.

6.4. Purpose and Evaluation Criteria

Purpose

The purpose of this audit was to evaluate the measures with which the city deployed a strategy governing management of the problem related to the emerald ash borer in the territory of the Montréal agglomeration.

Evaluation Criteria

- An inventory of the existing ash trees in the urban agglomerations territory (public and private domains) was conducted and made it possible to obtain an overview of the progress of the situation.
- An action plan against the emerald ash borer was drafted and formally approved by the authorities concerned. Measures arising from this action plan were implemented (e.g., infestation detection, treatment or tree felling measures, tree replacement and raising public awareness).
- A financial framework indicating the main funding sources was adopted to support the initiatives to stop the spread of the emerald ash borer.
- Reports presenting the progress of the situation in terms of the results of the actions undertaken, accounting for the amounts invested, are produced and periodic accountability is exercised with the municipal authorities.



Sustainable Water Management

Summary of the Audit

Purposes

- Ensure that the action plan adopted within the framework of Montréal's Water Strategy would enable the city to meet the goals and measures set out by Ministère des Affaires municipales et de l'Occupation du territoire as part of the implementation of Québec Strategy for Drinking Water Conservation (QSDWC) in relation to the *Québec Water Policy*.
- Ensuring the application of the current regulations concerning the use of drinking water by the boroughs.

Results

In addition to these results, we have formulated various recommendations for the business units.

The details of these recommendations and our conclusion are outlined in our audit report, presented in the following pages.

Note that the business units have had the opportunity to formulate their comments, which appear after the audit report recommendations.

Our audit confirms, for the first goal of the QSDWC, that major efforts have made it possible, across the agglomeration, to reduce the total production and average distribution of drinking water per person per day. However, there remains a significant gap compared with the Canadian average.

Regarding the QSDWC's second goal, we note for 2015, on the one hand, a potential water loss rate estimated at 31%, whereas the goal is to achieve less than 20% of the water volume distributed, and, on the other hand, a leakage rate estimated at 98 cubic metres per day per kilometre of water line, compared with the objective of 15 cubic metres.

In order to fulfill the QSDWC's requirements and to achieve a responsible drinking water management, improvements need to be made, in our opinion, taking into account the main findings hereunder.

- A specific action plan to meet QSDWC's requirements has not been integrated into Montréal's Water Strategy.
- There is no evidence that water use regulations have been applied by the boroughs regarding equipment in industries, companies and institutions.
- Accountability mechanisms have not adequately informed decision-makers about all QSDWC issues.
- There has been no overall performance assessment regarding the implementation of measures to meet QSDWC's requirements.

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List of Acronyms

CC	city council	MAMOT	Ministère des Affaires municipales et de l'Occupation du territoire
ICI	industries, companies and institutions		
l/pers/d	litre per person per day	QSDWC	Québec Strategy for Drinking Water Conservation
m ³ /d/km	cubic metre per day per kilometre of water line	UAC	urban agglomeration council

5.2. Sustainable Water Management

1. Background

Water is one of the central issues of the 21st century. Globally, the freshwater needed to sustain life and to develop the living world represents only a very small proportion of the total water covering the earth. However, a small part of this freshwater is located in Québec. The St. Lawrence River, which supplies the Ville de Montréal (the city), is one of Québec's major freshwater reservoirs.

Since the early 1990s, various international conferences and forums on the subject have been held. Water has become a matter of great concern both internationally and locally. The issue of water has also become integral to the concept of sustainable development, with a growing desire to conserve this resource and protect it to ensure its renewal.

Several countries have introduced water protection measures, notably the United States and the European Union member countries. Worldwide, since the early 1990s, there has been increasing pressure to improve water management. In 2002, the Government of Québec came up to speed by adopting the *Québec Water Policy*. More than 50 commitments were implemented under this policy. Commitment 49 expressed a determination *"to develop a Québec strategy for the conservation of drinking water which makes the allocation of any financial assistance contingent upon the adoption, by municipalities, of measures to conserve water and reduce leakage"*¹.

In March 2011, as part of this commitment, the Government of Québec adopted the Québec Strategy for Drinking Water Conservation (QSDWC), the application of which is the responsibility of the Ministère des Affaires municipales et de l'Occupation du territoire (MAMOT). QSDWC took up the two goals of commitment 49, namely: *[TRANSLATION] "To aim for a reduction of at least 20% of the average water consumption per person for Québec as a whole and a reduction in leakage losses to no more than 20% of the total volume of water produced"*². According to the Government of Québec, these are the two main factors contributing to an abnormally high consumption of drinking water across the province. In Québec, there is overconsumption, or an overuse of this resource. Québec is also the province with the highest average leakage rate in water systems compared to other provinces.³

¹ Government of Québec. *Water. Ouf Life. Ouf Future. Québec Water Policy*, 2002, p. 70.

² Ministère des Affaires municipales et de l'Occupation du territoire, *Québec Strategy for Drinking Water Conservation*, 2011, p. 8.

³ *Ibid.*, p 7.

The government subsequently added five measures to these two goals, which will be more fully discussed in section 4.1.2. In order to encourage municipalities to comply with the application of QSDWC, the Government of Québec, in accordance with commitment 49 of the *Québec Water Policy* and the *Sustainable Development Act*⁴, provided financial assistance to municipalities for water infrastructure projects conditional on the implementation of these five measures. From 2011 to 2015, the city received a total of \$157.4 million in financial assistance for drinking water projects, such as the supply and treatment of drinking water (\$50.2 million), as well as for the drinking water distribution system (\$107.2 million). The funding obtained for the infrastructure projects related to the water supply system was significant. Although this financial assistance to the city was not denied or suspended, there was still a risk of not receiving all the financial assistance if the required measures were not put in place and the goals set out by MAMOT not met.

Compliance with the goals and implementation of the measures needed to be achieved gradually. To do this, QSDWC set a schedule for implementation in stages.

In addition, Montréal's Water Strategy, which is included in a document entitled *Enjeux, orientations et objectifs pour une nouvelle stratégie de l'eau, compteurs ICI et optimisation des réseaux*, was approved by the urban agglomeration council (UAC) in June 2012.⁵ The Strategy identifies five major issues for the city:

- Public health and safety;
- Responsible asset management and optimal use of assets;
- Sustained funding and responsible financial management;
- Increased environmental responsibility through sustainable water management;
- Adoption of sound management and operational practices.

These issues were reflected in a series of strategic goals to which was attached an action plan containing a series of activities to be carried out up to 2020.

In this context, the city, like other Québec municipalities, had to meet the goals set out in QSDWC and implement the various measures recommended. To this end, it was important that the city put in place monitoring and evaluation mechanisms that would enable it to ensure compliance with QSDWC and to integrate them into Montréal's Water Strategy action plan.

2. Purposes and Scope of the Audit

The purpose of this audit was to ensure that the action plan adopted within the framework of Montréal's Water Strategy would enable the city to meet the goals and

⁴ CQLR, chapter D-8.1.1.

⁵ Resolution CG12 0166, June 21, 2012.

measures set out by MAMOT as part of the implementation of QSDWC in relation to the *Québec Water Policy*.

This audit was also aimed at ensuring the application of the current regulations concerning the use of drinking water by the boroughs.

The audit mainly concerns the Service de l'eau and covers actions carried out between 2011 and September 30, 2016. Regarding the boroughs, and more particularly, the application of the regulations, the audit covers actions taken between the adoption of these by-laws in 2013 and August 31, 2016.

Our audit work consisted of conducting interviews with staff, examining various documents and conducting surveys that we considered appropriate in obtaining evidence. This audit is based on a review of the evaluation criteria presented in Appendix 6.1.

3. Main Findings

The audit work carried out revealed that improvements need to be made because:

- A specific action plan to meet QSDWC's requirements has not been integrated into Montréal's Water Strategy;
- There is no evidence that water use regulations have been applied by the boroughs regarding equipment in industries, companies and institutions (ICI);
- Accountability mechanisms have not adequately informed decision-makers about all QSDWC issues;
- There has been no overall performance assessment regarding the implementation of measures to meet QSDWC's requirements.

4. Audit Results

From the outset, it should be pointed out that within QSDWC's requirements certain aspects concern the agglomeration, while others only the city. Under *an Act Respecting the Exercise of Certain Municipal Powers in Certain Urban Agglomerations*⁶, the water supply (e.g., the production and distribution of drinking water from water treatment plants) falls within UAC's jurisdiction. However, with respect to the water supply, since the city is the central municipality, it can act on this matter.⁷ Thus, the city, in the framework of QSDWC's requirements, provides answers to MAMOT for both itself and the agglomeration.

⁶ CQLR, chapter E-20-001, article 19, paragraph 5.

⁷ CQLR, chapter E-20-001, article 17.

QSDWC incorporates two goals, which are accompanied by five measures, as has already been mentioned. In order to fully understand QSDWC's requirements, we will describe these two goals and the five measures that the city, along with Québec's other municipalities, must implement in accordance with the schedules set by MAMOT. We will also outline the current situation with regard to compliance with QSDWC's two goals, mainly using the latest Annual Report filed by the Service de l'eau to the authorities, i.e., the 2015 report.

Our audit work consisted of:

- Presenting QSDWC's requirements in terms of goals and measures;
- Reviewing the action plan of Montréal's Water Strategy to determine if it includes every element necessary to meet all of QSDWC's requirements;
- Assessing the current situation for the city and the agglomeration regarding their contribution to both the goals and implementation of the five measures required by QSDWC.

4.1. Government Requirements Under the Québec Strategy for Drinking Water Conservation

4.1.1. In Terms of Goals

4.1.1.A. Background and Findings

QSDWC's requirements for all Québec's municipalities are founded on the following two goals:

- A reduction of at least 20% in the amount of water distributed per person compared to 2001. The reduction should have reduced water consumption to 622 litres per person per day (l/pers/d), a threshold equal to the Canadian average for 2001. MAMOT uses as a base the average volume of water distributed⁸ at the launch of the *Québec Water Policy* (777 l/pers/d in Québec);
- A reduction in the leakage rate for all waterworks to a maximum of 20% of the volume of water distributed and a maximum of 15 cubic metres per day per kilometre of water line (m³/d/km).

These two goals were required to be met by December 31, 2016. They were linked to five measures that municipalities had to put in place according to a set schedule.

⁸ The volume of water distributed corresponds to the sum of residential, industrial, commercial, institutional and municipal consumption, including losses.

4.1.2. In Terms of Measures

4.1.2.A. Background and Findings

Table 1 presents the measures to be implemented under QSDWC.

Table 1 – Measures Planned Under QSDWC

Measure	Description
1	Production of a status report and an action plan, including a description of the water conservation measures and the adoption of drinking water regulations by April 1, 2012. These documents then had to be kept up to date annually. ^[a]
2	Production of a water use report, measurement of production and distribution with calibrated flow meters and, if required, a leak detection and repair program: - Effective April 1, 2012, all municipal bodies, in submitting a request for financial assistance, were required to file a water use report based on the 2011 data and to update it in subsequent years; - Effective April 1, 2012, if the report showed a leakage rate for the distribution system greater than 20% of the volume of drinking water produced, or 15 m³/d/km, the municipal body had to put in place a detection and repair program for leaks on its drinking water distribution system.
3	- Installation of water meters in non-residential buildings (ICI) and certain mixed-use buildings, part of which are used for any commercial activity known for their heavy use of water (e.g., hotel, beauty salon, food retail, laundry, dry cleaner); - Assessment of typical residential consumption. This measure would apply from April 1, 2014, if the Québec reduction targets of at least 10% of unit consumption and a leakage rate of less than 20% or 5 m³/d/km were not achieved. The deadline for completing the installation of the meters is September 1, 2018.^[b]
4	Introduction of appropriate pricing for non-residential buildings (ICI) that receive water from municipal distribution systems, if Québec's targets of at least 20% reduction in unit consumption and a leakage rate below 20% or 15 m ³ /d/km were not achieved in the 2016 Report. An appropriate fee structure is planned for 2018.
5	Presentation of an Annual Report on water management to city council (CC) (starting in 2012, and for subsequent years).

^[a] The dates for submitting the drinking water form were changed by MAMOT for the years 2012 to 2015. They were as follows: Year 2011 → April 1, 2012; Year 2012 → July 1, 2013; Year 2013 → September 1, 2014; Year 2014 → September 1, 2015; Year 2015 → September 1, 2016.

^[b] MAMOT had set September 1, 2017 as the deadline for completing the installation of the water meters. This deadline has been extended to September 1, 2018, or later if a municipality installs more than 1,000 meters per year from 2018 (MAMOT, *Rapport annuel de l'usage de l'eau potable 2014, 2016*, p. 5 and MAMOT press release - *Révision des échéanciers*, July 18, 2016).

Effective January 1, 2012, the Government of Québec added cross-compliance clauses to its financial assistance programs for water infrastructure projects based on the achievement of QSDWC's goals.

Failure to meet QSDWC's requirements involved risks. Any municipality that did not comply with these requirements would be subject to the cross-compliance clause, that is, the suspension of provincial financial assistance applications until they were completed.

The most recent *Rapport annuel de l'usage de l'eau potable* from MAMOT⁹ did not precisely indicate the date for setting up fees. In addition, as part of our work, we observed that several schedules had been changed since the adoption of QSDWC and that more specific requirements had also been added in press releases or Annual Reports posted by MAMOT on its website. In order to ensure compliance with all of QSDWC's requirements, we believe that the Service de l'eau should request MAMOT to make available an updated summary of QSDWC's requirements and schedules to which the city is subject.

RECOMMENDATION	
4.1.2.B.	We recommend that the Service de l'eau request that the Ministère des Affaires municipales et de l'Occupation du territoire make available on its website an updated summary of all the requirements and schedules of the Québec Strategy for Drinking Water Conservation to facilitate compliance by the city.
BUSINESS UNIT'S RESPONSE	
4.1.2.B.	Service de l'eau <i>[TRANSLATION] Requests were made at the April 11, 2017 meeting of the committee established by MAMOT to develop the new version of the QSDWC. The meeting minutes outlining the requests made by the Service de l'eau will be sent to the Auditor General for information. (Planned completion: April 2017 – Completed)</i>

4.2. Montréal's Water Strategy

4.2.A. Background and Findings

Montréal's 10-year Water Strategy (2011-2020) was approved by UAC on June 21, 2012, and covered five main issues:

- Public health and safety;

⁹ MAMOT, *Rapport annuel de l'usage de l'eau potable* 2014, 2016.

- Responsible asset management and optimal use of assets;
- Sustained funding and responsible financial management;
- Increased environmental responsibility through sustainable water management;
- Adoption of sound management and operational practices.

This strategy incorporates an action plan that supports its implementation. For example, Montréal's Water Strategy action plan identifies three important elements: What should be done? When? How much will it cost? It thus aims to implement the goals related to the five issues of this strategy, which concern aspects affecting the territories of both the agglomeration and the city.

QSDWC requires, in Measure 1, that a status report be produced, as well as an action plan that should be updated annually. However, MAMOT had produced, for the municipalities, a standard drinking water use form. It included an action plan indicating specific aspects it wished to see put in place by the municipalities. In addition, the form was approved by MAMOT and this approval was a condition of eligibility for any application for financial assistance under the infrastructure programs.¹⁰

It is important to distinguish between Montréal's Water Strategy action plan and the action plan required by QSDWC, the latter of which is included in the drinking water use form and which prescribes or identifies actions that QSDWC considers useful for each municipality to know regarding drinking water conservation. The first is a plan that incorporates measures, cost estimates and schedules in the framework of the five issues of Montréal's Water Strategy and the city's choices for water management.

In addition, QSDWC has goals and measures that contain several requirements that must be implemented by the city. As with all five issues of Montréal's Water Strategy, it is important that an action plan incorporate actions to be taken to meet QSDWC's requirements. The action plan is important because it provides a process to be followed and an overview of the project to be carried out, as well as serving as an operational control tool for decision-making.

At this stage of our work, we wanted to know if the action plan supporting Montréal's Water Strategy included all the elements needed to meet QSDWC's requirements: i.e., the governmental requirements concerning the conservation of drinking water.

Our audit work has shown that no other action plan specifically designed to meet QSDWC's goals and measures had been developed by the city following its adoption in 2011 by the Government of Québec. However, in addition to Montréal's Water Strategy action plan, we found that the 2010-2015 sustainable development plan, and more recently the 2016-2020 plan, also included actions related to sustainable water management without, however, covering all aspects of QSDWC.

¹⁰ *Ibid.*, page 6.

A review of Montréal's Water Strategy reveals that it mentions various aspects that concern QSDWC, in particular:

- The Strategy's two main goals of reducing water produced by plants by 20% and reducing water line breakdowns in the distribution systems by 20%;
- The leakage and auscultation investigation research program;
- Renewal of the water supply system;
- Restarting the water meter installation program in ICIs;
- Updating regulations on the use of drinking water.

However, our work also revealed that Montréal's Water Strategy action plan was not always consistent with certain elements required by QSDWC, specifically:

- The action plan had not been updated since its adoption in June 2012, although some deadlines had been changed. For example, QSDWC indicated that meter installation was to be completed by September 1, 2018, or later if 1,000 meters were installed annually, and it now sets September 1 of each year as the deadline for filing the drinking water use form;
- The meter installation project in ICI was no longer up to date and did not take into account QSDWC's schedule. Montréal's Water Strategy called for the installation of 16,200 meters in ICI buildings over a six-year period. This number is now 23,500 meters, and the last deadline we found for installing meters was July 2022, while QSDWC had set this deadline for September 1, 2018;
- There is no provision for the actions to be taken in preparing the documents required by QSDWC for MAMOT (drinking water use form) and for CC (Annual Report);
- The action plan made no mention of the measures that would have to be taken related to QSDWC's requirements. For example, the introduction of user fees for drinking water, flow meter accuracy verification and sampling to determine residential consumption.

According to information we obtained from people we met from the Service de l'eau, after the Working Committee on Non-Residential Taxation and Economic Development,¹¹ a committee was set up in fall 2016 at the Direction générale's request to examine aspects related to user fees with a view to submitting a proposal to the municipal administration in 2017. However, we question the fact that in fall 2016 a committee was set up to examine user fees for drinking water, but Montréal's Water Strategy action plan did not include a scenario to this effect, although it had been included in one of the measures provided for by QSDWC since 2011. The implementation of these user fees corresponds to Measure 4 and its completion was initially planned for April 1, 2017.¹²

¹¹ Working Committee on Non-Resident Taxation and Economic Development, *Pour une métropole en affaires*, August 2016.

¹² The *Rapport annuel de l'usage de l'eau potable 2014* by MAMOT as well as information obtained from MAMOT now indicate a schedule "from 2018" to set up pricing.

In this regard, we realized that there had been some confusion when the 2017 operating budget was presented by the Service de l'eau to the Finance and Administration Commission, there being some misunderstanding on the part of certain managers regarding the setting-up of the user fees measure. We believe that a matter of such importance should not have escaped the attention of the city. The Service de l'eau was certainly aware that, since 2011, one of the goals set by MAMOT in QSDWC (reducing the leakage rate of all water supply systems to a maximum of 20% of total volume distributed and to a maximum of 15 m³/d/km) could not be achieved by the city within the planned schedule.

Consequently, in the light of all of these findings, we believe that a specific action plan should have been developed and incorporated into Montréal's Water Strategy so as to determine all the actions that needed to be undertaken in meeting QSDWC's requirements. In addition, since MAMOT extended some deadlines, in particular for meter installations, user fees and flow meter accuracy verification, we believe that the development of such an action plan would still be useful and even necessary in order to inform the managers concerned and the elected representatives about all the scenarios currently playing out in meeting QSDWC requirements that apply to both the city and the agglomeration. It would also minimize the potential for confusion resulting from the use of various documents that include information that is inconsistent with that found in Montréal's Water Strategy action plan, and consequently favour the application of measures while reducing the risk of losing some government funding. A specific action plan would certainly have permitted better monitoring of the city's obligations to make the necessary decisions at the appropriate time.

RECOMMENDATION

4.2.B.	We recommend that the Service de l'eau integrate into Montréal's Water Strategy a specific action plan that includes the measures to be undertaken to meet all the requirements of the Québec Strategy for Drinking Water Conservation in accordance with the schedules that the Ministère des Affaires municipales et de l'Occupation du territoire has set, or will set, in order to reduce the risk of not being able to take advantage of the financial assistance provided.

BUSINESS UNIT'S RESPONSE

4.2.B.	<i>Service de l'eau</i> <i>[TRANSLATION] Include a section specific to the QSDWC objectives in the future version of Montréal's Water Strategy. (Planned completion: December 2019)</i>

4.3. Status Report

It is therefore important to know the status of the city and the agglomeration with respect to the two goals that we presented previously, as well as the five measures stemming from them.

4.3.1. Goals

4.3.1.A. Background and Findings

As previously mentioned, the first goal was to reduce by at least 20% the average amount of drinking water distributed per person per day throughout Québec.

The *Rapport annuel de l'usage de l'eau potable 2011* submitted by MAMOT shows that the target of achieving the Canadian average of 622 l/pers/d by December 31, 2016, was reached for the entire province of Québec. The amount of water distributed per person per day decreased from 777 litres in 2001, the base year, to 620 l/pers/d¹³ in 2011, or a reduction of 20% (see Table 2).

For the Montréal agglomeration, Table 2 shows that, compared with 2001, water production per person per day decreased by 22% in 2014 (2014 Annual Report filed with CC and UAC) and by 26% in 2015 (2015 Annual Report filed with CC and UAC). For the Montréal agglomeration, QSDWC's target of a 20% reduction was therefore reached two years before the set deadline, i.e., before December 31, 2016. The 20% targeted reduction was achieved and even exceeded in 2014 and this trend continues. It should be noted, however, that the percentage reduction was estimated in relation to the average water production in 2001 (the base year), which was then 1,120 l/pers/d for the agglomeration. However, this average production was well above both the Québec average (777 l/pers/d) and the Canadian average (622 l/pers/d) in 2001. The last Annual Report (for the year 2014) produced by MAMOT in 2016 indicates that the Canadian average has since fallen to 466 l/pers/d. The difference of 498 litres distributed per person per day in 2001 relative to the Canadian average was 407 l/pers/d in 2014, a reduction of 91 l/pers/d, or 18%.

As previously mentioned, for the Montréal agglomeration, these were the water production data that were used to determine the 26% reduction.

However, our audit work revealed some confusion regarding the terminology used to achieve this goal. MAMOT refers to "water distribution" in its latest Annual Report published in 2016, while the Service de l'eau refers to "water production". In order to avoid confusion and to present identical information, we believe that the Service de

¹³ MAMOT, *Rapport annuel de l'usage de l'eau potable 2011*.

l'eau should request that MAMOT clarify this situation since the results obtained would be somewhat different if one term were used instead of another.

Regarding the second goal: the *Rapport annuel de l'usage de l'eau potable* by MAMOT for 2014 indicates that QSDWC's overall goal, which aims to limit losses to a maximum of 20% of the total volume distributed and to a maximum of 15 m³/d/km, has not been reached.¹⁴

Regarding the city, Table 2 shows that, for the years 2011 to 2015, the leakage rates remained high compared to the 20% maximum of water volume distributed and a maximum of 15 m³/d/km. For 2015, these rates were 31% and 98 m³/d/km, respectively.

As a result, since the goals relating to potential water losses, compared to the quantity of water distributed and to the minimum cubic metre per day per kilometre of water line, did not meet QSDWC's requirements, all of Québec municipalities, including the city, must implement the measures we have described above, in accordance with the conditions and the schedule associated with them.

It should be pointed out that Montréal's Water Strategy provides for a 20% reduction in drinking water produced by plants and a 20% reduction in water line breakage in distribution systems (2011-2020).

Also, the 2010-2015 Sustainable Development Plan provided for a 15% reduction in drinking water production by 2015 compared to 2000, while the 2016-2020 plan provides for a 20% reduction in drinking water produced by the city's plants between 2011 and 2020.

¹⁴ *Op. cit.*, p. 7.

**Table 2 – Comparative Data for Two of QSDWC's Goals
(All of Québec, Montréal Agglomeration and Ville de Montréal^[a])**

	2001	2011	2012	2013	2014	2015
First QSDWC goal for all of Québec targeted for the 2016 report: Reduce by at least 20% the amount of water distributed ^[b] per person compared to 2001 (777 litres per person per day)	Target set for December 31, 2016: 2001 Canadian average for all of Québec (622 litres per person per day) The first goal was achieved for all of Québec ^[c]	620 l/pers/d 20%	612 l/pers/d 21%	596 l/pers/d 23%	589 l/pers/d 24%	
Concurrently: Data for water production in the Montréal agglomeration^[d]	Water production 751 M m ³ Reduced production Water production per person per day 1,120 litres per person per day Reduced production per person per day	654 M m ³ 13% 941 l/pers/d 16%	651 M m ³ 13% 934 l/pers/d 17%	639 M m ³ 15% 903 l/pers/d 19%	630 M m ³ 16% 873 l/pers/d 22%	600 M m ³ 20% 823 l/pers/d 26%
Second QSDWC goal for all of Québec targeted for the 2016 report: Reduce the leakage rate of all waterworks to a maximum of 20% of the water volume distributed and a maximum of 15 cubic metres per day per kilometre of water line	Target: maximum of 20% of total volume of water distributed Goal was not reached for all of Québec ^[c] Target: maximum of 15 cubic metres per day per kilometre of water line Goal was not reached for all of Québec ^[c]	26% 28 m ³ /d/km	26% 27 m ³ /d/km	28% 30 m ³ /d/km	26% 27 m ³ /d/km	
Concurrently: Data on potential losses for Montréal^[e]	Estimated leakage of 40% of water produced in 2002 Estimated leakage in cubic metre per day per kilometre of water line No estimate for 2001	33% of total water volume distributed 117 m ³ /d/km	33% 117 m ³ /d/km	30% 98 m ³ /d/km	33% 112 m ³ /d/km	31% 98 m ³ /d/km

^[a] Data from the Annual Report filed by the Service de l'eau to the authorities.

^[b] The Service de l'eau used the water production data to establish the decrease in the Montréal agglomeration.

^[c] Data from MAMOT's Annual Reports on drinking water use for the years 2011 to 2014.

^[d] Supplying drinking water is an agglomeration jurisdiction.

^[e] Data from the drinking water use form sent to MAMOT for the years 2011 to 2015.

RECOMMENDATION

4.3.1.B.

We recommend that the Service de l'eau:

- intensify its efforts to reduce total water consumption, taking into account the goals of the Québec Strategy for Drinking Water Conservation (which are similar to those of Montréal's Water Strategy) and other top-performing comparable public organizations in order to curb the overuse of water and the inherent operating costs;
- make a request to the Ministère des Affaires municipales et de l'Occupation du territoire that the terminology used in the various documents under the first goal of the Québec Strategy for Drinking Water Conservation be consistent, in order that the terms of reference can be better understood and to facilitate comparisons with other municipalities.

BUSINESS UNIT'S RESPONSE

4.3.1.B.

Service de l'eau

[TRANSLATION] Introducing user fees for drinking water, as mandated by the Direction générale, is the measure that will have the greatest impact on eliminating waste in the ICI (industries, companies, institutions) sector. Inspectors may be reassigned to deal with outstanding cases after the meters have been installed. (Planned completion: December 2018)

In the residential sector, awareness and enforcement efforts will be continued through La Patrouille bleue and by issuing courtesy notices to residents who violate regulations on the use of drinking water. Additional representations will be made to the boroughs to encourage them to use the by-law enforcement resources made available to them by the Service de l'eau. (Planned completion: April 2017 – Ongoing efforts)

Requests were made at the April 11, 2017 meeting of the committee established by MAMOT to develop the new version of the QSDWC. The meeting minutes outlining the requests made by the Service de l'eau will be sent to the Auditor General for information. (Planned completion: April 2017 – Completed)

4.3.2. Measure 1 – Production of a Status Report and Action Plan

4.3.2.A. Background and Findings

To be eligible for financial assistance request, Measure 1 of QSDWC required that all municipal bodies produce a status report and an action plan by April 1, 2012, that included a description of water conservation measures and the adoption of a drinking water regulations. These documents then had to be kept up to date annually.

Thus, regardless of whether or not the two goals had been achieved, actions related to this measure had to have been implemented by April 1, 2012.

4.3.2.1. Status Report and Action Plan for the Ministère des Affaires Municipales et de l'Occupation du Territoire

4.3.2.1.A. Background and Findings

The status report requested by MAMOT had to include a description of the status regarding the municipal water system infrastructure in place, the users to be served (population, industries, retail stores, institutions, etc.), water measurement systems, water volumes produced to supply other municipal bodies, or water volumes acquired from other municipal bodies, as well as the needs and prospects for investment in water infrastructure. It also had to include the status of problems and of the work required to maintain compliance by facilities, as well as the availability of water for the population.

The action plan requested by MAMOT had to include, in particular, the actions required to achieve its goals, the adoption by the municipality of drinking water regulations dealing with external use (watering, pools, car washes, etc.), the installation of new equipment and its replacement (sprinkler systems, cooling systems, meters, etc.) and measures that would be applied to reduce water consumption.¹⁵

In this regard, MAMOT provided an approved standard form that municipalities had to complete. The form included a section entitled "Status Report" and a section entitled "Action Plan." All of the elements just mentioned, both in terms of the status report and the action plan, were included in those sections. This form had to be completed each year. Our audit work revealed that since MAMOT created QSDWC in 2011, for each of the years examined, from 2011 to 2015, the form was completed and sent to MAMOT.

¹⁵ Ministère des Affaires municipales et de l'Occupation du territoire, *Québec Strategy for Drinking Water Conservation*, p. 20 and 21.

However, our work revealed that the drinking water use form for 2011 was sent to MAMOT on April 18, 2012, although the deadline was April 1, 2012. Forms for the years 2012 to 2015 were sent within the deadline set by MAMOT. However, for all these years, the executive committee gave its approval to send the forms after the date to send the form to MAMOT. According to the information and documents obtained, the drinking water use forms for all these years were approved by MAMOT.

We believe, however, that it is important that the deadlines set by MAMOT, as well as approval from the authority concerned before sending the appropriate documents to MAMOT, be met in order to avoid undue delays in receiving financial assistance.

RECOMMENDATION

4.3.2.1.B. We recommend that the Service de l'eau ensure that the drinking water use form be approved by the appropriate authority before it is sent to Ministère des Affaires municipales et de l'Occupation du territoire so that elected officials can review and correct it if necessary.

BUSINESS UNIT'S RESPONSE

4.3.2.1.B. *Service de l'eau*
 [TRANSLATION] Mark the words "Draft document" on all documents sent to MAMOT before they are approved by the authorities.
(Planned completion: May 2017)

4.3.2.2. Regulations

4.3.2.2.A. Background and Findings

Measure 1 requires that the regulations on the use of drinking water be adopted by April 1, 2012. MAMOT provides a by-law template on its website. Although some boroughs already had regulations on water use, new regulations were adopted in 2013 for both the city and the Montréal agglomeration.

Two by-laws were adopted in 2013. The first one titled *By-law concerning the use of drinking water (13-023)* was adopted by CC on June 17, 2013. It concerns overwatering by all residential and non-residential buildings, and also affects some equipment in residential areas, such as cooling and air conditioning systems, automatic sprinklers and decorative ponds. The by-law prescribes the replacement of certain non-compliant installations by January 1, 2016 (automatic watering systems, decorative ponds and water displays), while others must be replaced by January 1, 2018 (air conditioning, cooling and heating units).

The second by-law titled *By-law concerning certain uses of drinking water on urban agglomeration territory (RCG 13-011)* was adopted by the UAC on June 20, 2013. This by-law covers certain equipment in non-residential buildings that use drinking water, including air conditioning and cooling units, car washes and automatic watering systems. This by-law also requires that certain non-compliant systems (automatic sprinkler systems, decorative ponds and water displays) be replaced by January 1, 2016, while others (air conditioning, cooling and heating units, urinals and car washes) must be replaced by January 1, 2018.

By-law 13-023 falls under the jurisdiction of CC, while By-law RCG 13-011 comes under that of UAC. However, CC delegated the application of By-law 13-023 to the boroughs, while UAC delegated the application to the related municipalities. As the city is a related municipality, CC sub-delegated the application of By-law RCG 13-011 to the boroughs.

Although the By-law was adopted in June 2013, Measure 1 specified that it had to be adopted no later than April 1, 2012. Once again, in order to avoid incurring additional delays in receiving financial assistance, we feel it is important to comply with the deadlines set by MAMOT.

In addition, according to MAMOT, regulations and awareness of water use are both important. MAMOT indicates that they could even permit a significant reduction in residential water consumption since outdoor use can represent up to 50% of consumption during the warmer months. Thus, application of the regulations could be of great importance as a measure for conserving drinking water by bringing about a reduction in overconsumption of drinking water.

As part of our audit work, we wanted to investigate to what extent these two by-laws were being applied.

Our audit revealed that By-law 13-023 was being applied in the boroughs, but only for certain provisions: that is, almost exclusively to control overwatering during the summer. *La Patrouille bleue*, which carried out awareness-raising activities related to sustainable water management in the boroughs and related cities, was also involved. Since 2013, in the course of its duties, *La Patrouille bleue* carried out awareness-raising and information activities in the boroughs, but almost exclusively with regard to the provisions related to overwatering. According to the documents and information we obtained from the Service de l'eau, it undertook no awareness-raising activities regarding the equipment covered by any of the by-laws.

For example, we did not find evidence of any application of this by-law concerning equipment for residential areas, despite the fact that the by-laws require that certain appliances be upgraded or replaced by January 1, 2016. However, according to the information obtained from the people we met in the Service de l'eau and in the

boroughs, leaflets produced by the Service de l'eau were provided to the boroughs and made available at Accès Montréal offices.

Regarding By-law RCG 13-011, we did not find evidence of inspection or intervention, and this applied to all boroughs. Thus, through our audit work, we were not able to find evidence of monitoring of the buildings covered by this by-law concerning the equipment mentioned above.

Based on the information we received from the Service de l'eau, inspections in ICIs regarding meter installation are carried out by the personnel of the Service de l'eau. An inventory of buildings possessing the equipment mentioned in the by-laws could have been done at the same time since 2013, because a great deal of this equipment that uses drinking water is installed in ICIs. Preparation of an inventory of ICI buildings possessing the equipment mentioned in By-law RCG 13-011 would facilitate the boroughs' work in enforcing the By-law.

However, to promote this by-law, the Service de l'eau carried out awareness-raising work by distributing information leaflets by mail, and also mailing out a letter concerning the installation of water meters. According to the 2014-2015 Report from the 2010-2015 Sustainable Development Plan of the Montréal community, 3,000 of these leaflets had been distributed to ICIs in 2015.

Although significant efforts had been made to apply the water regulations and to educate the public about these regulations, our work revealed that it was applied almost exclusively with regard to overwatering during the summer season. MAMOT requested that the drinking water use form provide information on application of the regulations, specifically education and regular inspections.

We believe that additional efforts must be made to ensure that the water use regulations are equally applied for the equipment specified in the regulations, both with respect to residential and non-residential building equipment.

In order to ensure the application of the regulations, it is important that reliable monitoring mechanisms be put in place. At this stage of our audit work, we wanted to investigate the existing mechanisms to ensure the follow-up of the application of the regulations governing the use of drinking water.

Our work has enabled us to note that the Service de l'eau has put in place a mechanism to ensure monitoring relating to the application of the regulations. The Service de l'eau also asked the boroughs to provide it with opinions that they had received. However, as described above, these opinions essentially concern application of the regulations related to overwatering.

As far as the boroughs are concerned, our audit work has enabled us to note the existence of mechanisms to ensure monitoring of the application of the regulations. For example, the computer application called *Gestion du territoire – Permis* enables the user to create follow-up files for requests or complaints from citizens or staff. However, this mechanism has been used almost exclusively in the application of regulations to control overwatering. Thus, despite the mechanisms in place, we found that the system is seldom used by the boroughs to ensure monitoring of the application of regulations with regard to equipment and appliances, both for residential and non-residential areas.

As part of our discussions with the boroughs, we noted that, for both By-law RCG 13-011 and By-law 13-023, the equipment is not always well known to borough employees. According to the information obtained, not all concerned staff in the boroughs received information on the application of these regulations or more detailed training.

However, at the time of our audit work, the Service de l'eau was working on the production of a detailed guide for boroughs concerning the regulations on the use of drinking water. In our view, this initiative should be continued and completed.

In sum, it must be noted that the monitoring mechanisms in place must be improved and that borough staff must be better informed about these regulations in order to facilitate their application.

RECOMMENDATIONS	
4.3.2.2.B.	We recommend that the 19 boroughs put in place appropriate mechanisms to ensure the application of regulations (13-023 and RCG 13-011), including all the provisions laid down therein for both residential and non-residential areas, in order to promote the use of good practices and, consequently, the conservation of drinking water.
4.3.2.2.C.	We recommend that the Service de l'eau continue its efforts to finalize the guide for the use of drinking water regulations (13-023 and RCG 13-011) in order to facilitate their application by all the boroughs.
BUSINESS UNITS' RESPONSES	
4.3.2.2.B.	<i>The 19 boroughs</i> [TRANSLATION] On May 12, 2017, our offices had not yet received the action plans of three boroughs (L'Île-Bizard–Sainte-Geneviève,

	Montréal-Nord and Pierrefonds-Roxboro). Sixteen boroughs have sent us their action plans. Instead of presenting the individual responses of all business units to the recommendation, here is a summary or an excerpt from their action plans: Overall, the boroughs' action plans indicated that it was important to have regulations on the use of drinking water. Nearly all the action plans outlined the steps to be taken to implement the recommendation by 2017. These key corrective measures are: · Implementation of a mechanism to remind applicants for drinking water permits of the existence and importance of regulations on the use of drinking water; · Raising public awareness of regulations on the use of drinking water. Also, almost all the action plans received include the following: <i>[TRANSLATION] "It is important that the corporate departments involved work with the boroughs to create an implementation plan that will clearly identify the resources [...] from the corporate department or boroughs who will ensure that these upgrading provisions are implemented. Prior to all this, the corporate departments will provide a qualitative and quantitative overview of the equipment to be upgraded."</i> Auditor General's comments It is important to bear in mind that the powers to enforce the two regulations on the use of drinking water (13-023 and RCG 13-011) were delegated to the boroughs by city council in 2013.
4.3.2.2.C.	<i>Service de l'eau</i> <i>[TRANSLATION] Send the boroughs the support guide for enforcing the regulations on water-cooled equipment. (Planned completion: April 2017)</i>

4.3.3. Measure 2 – Production of a Report

4.3.3.A. Background and Findings

Measure 2 requires the production of a water use report, measurement of production and distribution with calibrated flow meters and, if required, a leak detection and repair program. QSDWC specifies the following with regard to the requirements of Measure 2 concerning potential water losses:

Effective April 1, 2012, in order to submit an application for financial assistance, all municipal bodies must provide a water use report based on 2011 data and updated for subsequent years.

Effective April 1, 2012, if the report shows a leakage rate in the distribution system greater than 20% of the volume of drinking water produced, or 15 m³/d/km, the municipal body must put in place a leak detection and leak repair program for its drinking water distribution system.¹⁶

In addition, MAMOT provided additional details on flow meter verification and the requirement that each flow meter be equipped with a data logger. MAMOT also stated in its *Rapport annuel de l'usage de l'eau potable* (for 2014), published in 2016, its requirements regarding the auscultation investigation of the system:

- *“Since 2015, the accuracy of any flow meter required to calculate the amount of water distributed must be checked annually. The accuracy of the flow meters required to calculate the amount of water distributed must be verified by September 1, 2016, and must be acceptable (maximum margin of error = 5%) by September 1, 2017.”*
- *“Since 2014, any flow meter and reservoir required to calculate the amount of water distributed must be equipped with a data logger.”*
- *“Since 2013, any system exceeding one of the potential water loss objectives (20% and 15 m³/d/km) must undergo a 100% auscultation investigation each year.”¹⁷*

4.3.3.1. Status Report and Action Plan for the Ministère des Affaires Municipales et de l'Occupation du Territoire

4.3.3.1.A. Background and Findings

Regarding production of the water use report, MAMOT also provides a digital form to standardize the presentation of data for all municipalities. This report is then included in the drinking water use form. It includes a profile of water consumption and a status report on potential water losses.

¹⁶ *Op. cit.*, p. 22.

¹⁷ *Op. cit.*, p. 5.

As previously mentioned, the drinking water use form, including this report, was sent to MAMOT for the years 2011 to 2015. The documents obtained show that the drinking water use form, including this report, was approved by MAMOT, for each of these years.

4.3.3.2. Measurement of Water Production and Distribution with Calibrated Flow Meters

4.3.3.2.A. Background and Findings

The city exports water to the municipality of Charlemagne, as well as to the related municipalities in the territory of the Montréal agglomeration. To determine these quantities of water, the city needs flow meters that measure the quantity of water produced and distributed; these must be located at the entry to the system of the related cities. According to information obtained from Service de l'eau personnel, a number of flow meters had already been installed for several years.

QSDWC requires that water be measured with calibrated flow meters. Put another way, these flow meters must provide a certain degree of accuracy in water measurement. In order to comply with this aspect of Measure 2, when the drinking water use form for 2013 was to be sent to MAMOT, the Service de l'eau attached an action plan to comply with the requirement for annual verification of flow meter accuracy. This verification then enabled the city to ensure that the water distribution data were valid.

Thus, MAMOT initially set a schedule for the annual verification of flow meters required for the amount of water distributed. In July 2016, it revised this schedule, stating that: *"the deadline of September 1, 2016 for verifying flow meter accuracy will be put back to a later date if a municipality completes at least five additional verifications per year as of 2016"*¹⁸.

The last drinkable water use form was in 2015 and, as a result of these revised schedules, no other documents related to flow meters were sent to MAMOT.

In our opinion, given these new requirements by MAMOT, the Service de l'eau should review its action plan for annual flow meter verification to meet the requirements and the revised schedules.

In addition, with regard to flow meters, MAMOT also requested within the framework of QSDWC that, as of 2014 *"any flow meter and reservoir required to calculate the quantity of water distributed must be equipped with a data logger"*¹⁹. Data loggers

¹⁸ MAMOT press release – *Révision des échéanciers*, July 18, 2016.

¹⁹ *Rapport annuel de l'usage de l'eau potable 2014*, p. 5.

permit recording of the amount of water distributed in the system and calculation of QSDWC's performance indicators.

According to the information obtained from Service de l'eau personnel, none of the flow meters that calculate the quantity of water distributed has a data logger. Thus, although some flow meters are connected to a telemetry system that has the ability to record data, others are not connected to this system and do not have an individual data logger.

Although the flow meter action plan sent to MAMOT with the drinking water use form for 2013 demonstrates that significant efforts were being made to ensure compliance with QSDWC, we believe that the action plan must also be reviewed to ensure that any flow meter used to calculate the amount of water distributed complies with the data logger requirement.

RECOMMENDATION	
4.3.3.2.B.	We recommend that the Service de l'eau revisit the action plan concerning flow meter verification and update it, in order to consider all of the requirements and schedules of the Ministère des Affaires municipales et de l'Occupation du territoire, and thus minimize the risk of jeopardizing the financial assistance granted by the Government of Québec, and above all to reduce the uncertainty associated with the reliability of the indicators.
BUSINESS UNIT'S RESPONSE	
4.3.3.2.B.	Service de l'eau [TRANSLATION] The action plan for upgrading and calibrating the flow meter chambers in the system was updated in February 2017. The updated action plan was sent to the Auditor General for information. (Planned completion: April 2017 – Completed)

4.3.3.3. Implementation of the Leak Repair and Detection Program

4.3.3.3.A. Background and Findings

According to the last Annual Report (for 2014) on drinking water use published in 2016 by MAMOT, QSDWC's overall goal regarding potential water losses, namely to limit losses to a maximum of 20% of the total volume of water distributed and a maximum of 15 m³/d/km, had still not been achieved. As a result, the municipalities, including Montréal, must continue their efforts to reduce water losses. Specifically, with respect to the city, Table 2 (see page 160) indicates that estimates of potential water losses had

been relatively high in relation to the goals to be achieved for the entire province of Québec since 2011. As a result, the city needed to implement a leak detection and repair program across the system, as required by QSDWC.

It is important to note that leakage data are based on estimates whose reliability remains questionable despite the fact that there is a recognized methodology for estimating losses in drinking water systems.²⁰ According to the Service de l'eau, this margin of uncertainty *"will be greatly reduced when the water consumption measurement program and the sectorization of the systems are sufficiently advanced"*²¹, or when more meters and flow meters are operational.

Since 2001, the maintenance of secondary water systems has been delegated to the boroughs. As Montréal is a related city, maintenance of the primary system, which falls under UAC's jurisdiction, has been sub-delegated to the boroughs since 2005.

For the period after 2011, which we have been examining, the Service de l'eau entered into partnership agreements with the boroughs concerning corrective maintenance activities, in particular for the repair of breakages and leaks in drinking water lines. Under these agreements, the boroughs had undertaken to participate in the detection of leaks and in the repair of breakages and leaks. In addition, according to the documents obtained, the Service de l'eau has also been participating in the systematic detection of leaks in the city's territory using a specialized team, 2013.²² As part of the water systems maintenance program, the Service de l'eau used a computer application in collaboration with the boroughs to log the number of localized leaks and the repairs carried out.

However, although several interventions have been carried out since 2011, there have been no specific directives issued by the Service de l'eau regarding oversight of the work carried out by the boroughs, in particular in assigning priorities to the types of repairs to be done and their related deadlines, taking into account the importance and scope of the tasks to be carried out.

QSDWC required that a leak detection and repair program be established. Such a program should specify certain important aspects of leak detection and repair to facilitate interventions with the boroughs and to better coordinate resources for carrying out the work, based on established priorities.

In addition, as previously mentioned, in accordance with MAMOT's requirements, since 2013 any system exceeding one or other of the potential water loss goals (20% or 15 m³/d/km) had to undergo a 100% auscultation investigation each year. Table 3

²⁰ American Water Works Association.

²¹ Ville de Montréal (Service de l'eau), *Bilan 2015 – Usage de l'eau potable*, Annual Report, June 2016, p. 9.

²² The *Analyse Réseau Soutien aux Opérations* team.

shows, for the years 2011 to 2015, the percentage of the system on which systematic leakage searches were made.

**Table 3 – Percentage of Water System
on Which Systematic Leakage Searches Made**

2011	2012	2013	2014	2015
87%	90%	80%	72%	86%

Source : The city's annual reports on drinking water use.

In the Annual Reports filed with the authorities for 2011, 2012 and 2013, it was stated that the Service de l'eau was targeting an annual screening rate of 100%. Although this requirement had been in effect since 2013 and the Service de l'eau was targeting an annual screening rate of 100%,²³ this rate was not achieved for that year, as shown in Table 3.

In our opinion, since estimates of potential water losses are high, efforts must be made to ensure that 100% of the water system undergoes an auscultation investigation annually.

RECOMMENDATION

4.3.3.3.B.

We recommend that the Service de l'eau:

- issue appropriate directives on certain important aspects of the leak detection and repair program to facilitate interventions by the boroughs under the established frameworks;
- ensure that the entire drinking water distribution system undergo a leak detection and repair program, in accordance with the requirements of the Québec Strategy for Drinking Water Conservation, with a view to minimizing water losses and reducing the risk of losing Government of Québec funding.

BUSINESS UNIT'S RESPONSE

4.3.3.3.B.

Service de l'eau

[TRANSLATION] The Service de l'eau maintains that the drinking water system monitoring strategy must allow the system to be inspected at the appropriate frequency. This frequency must be based on the risk of a break in a given water line. Therefore, inspecting 100% of water

²³ Ville de Montréal (Service de l'eau), *Bilan de l'usage de l'eau potable 2013*, Annual Report, August 2014, p. 2.

lines annually is not necessary because some of the lines in the system were installed recently and are unlikely to break. (Planned completion: Ongoing efforts)

The following actions are planned:

- 1. Issue a directive on leak repair times and follow up on the boroughs' compliance with these requirements in the annual status report on secondary water systems. (Planned completion: October 2017)*
- 2. Make submissions to MAMOT to clarify water system monitoring frequency requirements. (Planned completion: April 2017)*

4.3.4. Measure 3 – Installation of Meters

4.3.4.A. Background and Findings

As of April 1, 2014, if provincial targets of at least a 10% reduction in unit consumption and a leakage rate of less than 20% or 15 m³/d/km were not achieved compared to the base year, municipal bodies, in order to obtain all the financial assistance they could receive for water infrastructure projects, would have to install meters in targeted non-residential and mixed-use buildings, as well as assessing typical residential consumption.²⁴

This measure therefore applied when both goals were not met. As previously noted, for Québec as a whole, the goal for potential water losses was still not achieved compared to the base year. For example, the proportion of potential water losses relative to the amount of water distributed varied between 26% and 28% for the last four years covered in MAMOT's last Annual Report for all municipalities of Québec (see Table 2). However, QSDWC specified the following:

A municipal body will be exempt from cross-compliance related to the application of Measure 3 if it meets the two following conditions:

- Its report indicates a unit consumption below the first Canadian quartile;²⁵*
- Its leakage rate is less than 20% and than 15 m³/d/km.²⁶*

Since both goals (regarding leakage) were not met and the city did not fulfill the two conditions, it will have to implement this measure.

²⁴ Québec Strategy for Drinking Water Conservation, p. 25.

²⁵ The city was not in the first Canadian quartile.

²⁶ *Op. cit.*, p. 25.

4.3.4.1. Installation of Meters

4.3.4.1.A. Background and Findings

One of QSDWC's aims was the gradual installation of meters in non-residential buildings (ICI) and certain targeted mixed-use buildings. The mixed-use buildings concerned are those in which a portion is used for any commercial activity known for its heavier use of water (accommodation, beauty salon, food retail, laundry, cleaners). Any building housing this type of activity must have a water meter installed.

MAMOT had set September 1, 2017, as the deadline for completing the installation of the water meters. However, a press release dated July 18, 2016, available on its website, states that this deadline was put back to September 1, 2018. It also states that if a municipality installs more than 1,000 meters per year from 2018, this deadline would be changed to September 1, 2018.²⁷

Although QSDWC does not provide for the installation of water meters in residential areas, it requires that municipalities determine typical residential consumption in order to more accurately estimate this component, which accounts for a significant proportion (40%) of drinking water consumption, according to the 2014 Annual Report filed with the authorities.²⁸ QSDWC's gradual approach, announced in 2011, also provides for the installation of meters in a sampling of residential buildings for the purpose of establishing a record. The installation must be completed by September 1, 2018.²⁹ According to MAMOT, the municipality can use a representative sampling of the residential area, but emphasizes that the estimate is essential to specify the leakage rate in drinking water distribution systems. This estimate also helps to better target the regulations to be put in place and makes it easier to establish a possible pricing scenario.³⁰

The city had been planning to install meters in ICIs for several years. In 2007, as part of an earlier project, the city planned to install 30,500 units. However, this project was abandoned. In 2011, the city planned to implement another project related to the installation of water meters. Montréal's Water Strategy, approved in June 2012, provided for the installation of 16,200 meters over a six-year period. The reduction in the number of meters to be installed was attributable to the fact that the program was mainly limited to ICIs that consume large quantities of drinking water and thus would contribute more significantly to lowering consumption.

²⁷ MAMOT press release – *Révision des échéanciers*, July 18, 2016.

²⁸ Consumption of drinking water by sector: ICI 58%, residential 40% and municipal 2%. Ville de Montréal (Service de l'eau), *Bilan 2014 – Usage de l'eau potable*, Annual Report, June 2015, p. 8.

²⁹ MAMOT, *Rapport annuel de l'usage de l'eau potable 2014*, 2016, p. 8.

³⁰ QSDWC, p. 24.

However, this 16,200 meter installation project originally planned in Montréal's Water Strategy has since been modified. It originally targeted ICIs in the city, but was revised to include ICIs in the reconstituted municipalities for a total of 23,500 buildings with meters installed throughout the agglomeration. The project was to be implemented over 10 years (July 2012 - July 2022). According to the 2015 Annual Report filed with the authorities, these 23,500 meters were expected to be installed by July 2022. In 2015, 2,309 meters were installed, for a total of 7,032 compliant operational meters.³¹

The use of meters is important in the preparation of a more accurate assessment of water use and is closely linked to user fees. The margin of error in estimates of leakage is still relatively high, and one way to reduce this would be to use a better method of measuring consumption. The city's preferred method is sectorization.

Unless there is a major change, and if the trend of the past two years continues, the city should not have too much difficulty in installing 1,000 water meters per year, thus fulfilling MAMOT's requirement. However, it might have difficulty installing 23,500 meters by July 2022. This goal is more ambitious and could even be revisited in light of decisions that will be needed to be made by the administration regarding the introduction of user fees, which could be applied with more precision if there is a better knowledge of water consumption in both the residential and non-residential sectors. Measure 4 also aims to introduce adequate user fees for 2018. This schedule is very tight when one considers the degree of unreliability that currently characterizes the data used to establish MAMOT's two performance indicators.

RECOMMENDATION

4.3.4.1.B.

We recommend that the Direction générale, having taken into account the user fee model preferred by the authorities, ensure:

- that the schedule for the installation of water meters by the city correlate with the schedule set by the Québec Strategy Drinking for Water Conservation to establish user fees;
- that the assessment of typical consumption in the residential sector be carried out in accordance with the established schedule, with a view to obtaining a better knowledge of drinking water consumption in this sector in anticipation of the user fee option being chosen.

Furthermore, these initiatives should be aimed at reducing drinking water consumption by the various users.

³¹ *Op. cit.*, p. 14.

BUSINESS UNIT'S RESPONSE

4.3.4.1.B.

Direction générale

[TRANSLATION] In the fall of 2016, the Direction générale mandated the Service des finances and the Service de l'eau to introduce user fees for drinking water. The city intends to introduce appropriate user fees for drinking water in ICIs in 2018 or 2019, which will lead to a significant reduction in water consumption in ICIs in accordance with the objectives of the QSDWC. It has been confirmed with the Service des affaires juridiques that user fees can be introduced as soon as water meters are installed, which may help speed up the installation process.

*The city has several thousand meters in the industrial area, essentially in the borough of Saint-Laurent. Our measurements confirm the average recommended by MAMOT for water budgets. Establishing pressure regulation areas will also allow water consumption to be metered in essentially residential areas. **(Planned completion: April 2017 – Completed)***

Auditor General's comments

However, we believe that it is premature to suggest at this stage that the recommendation has already been implemented (rather it is under way) because there are still several steps to be completed before user fees for ICIs are introduced throughout the city, despite the fact that user fees can be introduced as soon as water meters are installed.

For example, the following steps still need to be completed:

- **Installing (compliant and operational) meters in target ICIs throughout the city;**
- **Introducing user fees for all target ICIs throughout the city, which includes setting rates and adopting regulations.**

For this reason, we believe it is important to ensure that the timelines set out in the recommendation are adequate, particularly in view of the comments of the Direction générale in the action plan indicating that the city intends to introduce appropriate user fees for drinking water in ICIs in 2018 or 2019.

As far as completing the assessment of typical consumption in the residential area is concerned, we also

believe that it is premature at this stage to suggest that the recommendation has already been implemented (rather it is under way), because some steps still need to be completed, including:

- Developing and implementing a representative sampling of the city for the residential area;
- Establishing typical residential consumption.

4.3.4.2. Assessment of Typical Residential Consumption

4.3.4.2.A. Background and Findings

In general, the residential sector has a relatively high level of drinking water consumption (40%), as previously seen. QSDWC provides that typical residential consumption should be assessed when water loss performance indicators are not met. According to information obtained from MAMOT, the due date is the same as for the installation of meters, i.e., September 1, 2018. Assessment of residential water use can be very useful in estimating the consumption of different types of residential users, in order to accurately determine the leakage rate of water supply systems and establish measures for conserving drinking water. A representative sampling must be performed to obtain reliable estimates.

Assessment of residential consumption requires the development of a methodology and the installation of a number of water meters or flow meters. Since January 26, 2017, MAMOT has authorized a new procedure for estimating residential consumption: sectorization using flow meters.³²

The 2010-2015 sustainable development plan included a method for identifying water consumption by sector of activity, and more specifically, by sampling. However, according to the report of the sustainable development plan, this commitment had not been met and the 2016-2020 sustainable development plan does not foresee any similar action.

In the drinking water use form for 2015 sent to MAMOT, the Service de l'eau had set the date for completing the estimation of residential consumption as December 2021, including the meter installation.

In consideration of the new option provided by MAMOT for assessing residential drinking water consumption using sectorization with the installation of meters or flow meters, and given that there are different schedules, we believe the Service de l'eau

³² MAMOT press release, January 26, 2017.

should review its schedule in light of its implementation strategy and QSDWC's requirements in this regard.

RECOMMENDATION	
4.3.4.2.B.	We recommend that the Service de l'eau review the schedule for assessing residential drinking water consumption planned for December 31, 2021, in light of the requirements of the Québec Strategy for Drinking Water Conservation, which has an earlier deadline, in order not to compromise financial assistance from the Government of Québec.
BUSINESS UNIT'S RESPONSE	
4.3.4.2.B.	Service de l'eau <i>[TRANSLATION] We have several thousand residential meters in the borough of Saint-Laurent and some others outside Saint-Laurent. Our measurements are currently below the average recommended by MAMOT for water budgets. The Service de l'eau is working on two parallel tracks, while seeking to optimize its resources: sampling of the residential area and using system sectorization data. The current management approach has been to focus available resources on measuring the ICI sector and take advantage of opportunities to install residential meters in new buildings. There is constant dialogue with MAMOT regarding residential area estimation methods. The following actions are planned:</i> <i>1. Use pressure regulation areas with few ICIs, with the night flow method, to complete sampling of the residential area;</i> <i>2. Use Réseau environnement to exchange measurement and sampling results from the residential area with other cities. A working committee is under way with MAMOT. (Planned completion: May 2018)</i>

4.3.5. Measure 4 – Establishing User Fees

4.3.5.A. Background and Findings

Establishing appropriate user fees was one of the measures provided for in QSDWC in the event that its overall goals were not achieved for Québec as a whole. It states that "if the provincial targets for reducing unit consumption and a leakage rate of less than 20% or 15 m³/d/km are not met, the non-exempt municipal bodies, in order to benefit from all the financial assistance that could be promised for water infrastructure projects, must have established appropriate user fees for water services"³³.

³³ Op. cit., p. 26.

As previously noted, MAMOT indicated that, for Québec as a whole the goal for potential water losses had still not been achieved. In addition, in its *Rapport annuel de l'usage de l'eau potable* for 2014, MAMOT indicated that appropriate fees had to be put in place if objectives were not achieved by the time of the 2016 report, with the implementation expected as of 2018.³⁴ However, QSDWC specified the following:

A municipal body will be exempt from cross-compliance related to the application of Measure 4 if it meets the following two conditions:

- *Its report indicates a unit consumption lower than the first Canadian quartile;*
- *Its leakage rate is less than 20% and 15 m³/d/km.³⁵*

Since both goals (regarding leakage) were not achieved and the city did not fulfill the two conditions, it was obliged to implement this measure.

It should be added that QSDWC indicates that "*fees apply to users of non-residential buildings that receive water from municipal distribution systems*". It then adds the following: "*Appropriate user fees for water services contribute to achieving the goal of reducing drinking water consumption and waste*" and "*can effectively incentivize users to consume water more efficiently*"³⁶.

Our audit work revealed that the 6,762 meters³⁷ installed in ICI buildings were used for billing. These meters mainly concerned buildings located in boroughs created from former suburban towns. Fees were applied in accordance with by-laws adopted by the boroughs. However, these fees differed among the boroughs. In boroughs created out of the former Ville de Montréal, there were no by-laws covering drinking water user fees. It should be noted that the regulations governing such fees in the city are not standardized.

In addition, there is also a by-law on taxes³⁸ that provides for a drinking water tax based on the municipal assessment for all boroughs. Thus, drinking water is subject to user fees and taxation.

As previously described, the new meter installation project involves installing a total of 23,500 meters throughout the agglomeration. Currently, 7,032 compliant and operational meters have been installed. The deadline for meter installation has been set for July 2022.

³⁴ *Op. cit.*, p. 5.

³⁵ *Op. cit.*, p. 26.

³⁶ *Op. cit.*, p. 25.

³⁷ Status report dated February 3, 2017.

³⁸ By-law Concerning Taxes (2017 fiscal year), no. 16-066, city council of the Ville de Montréal, adopted on December 14, 2016.

In addition, the drinking water use form sent to MAMOT included a section on water service costs. According to information obtained from city staff, there is a strong commitment to determine the full cost of water service.

We believe this is an important initiative, in order to ensure that the cost of water services to be determined as accurately as possible. We also believe it is important to have the answer quickly, since the setting up of user fees will need to be based on it.

In our view, there are still many steps that need to be taken before implementing user fees. A working committee to initiate discussion on such fees was only created in the fall of 2016, while QSDWC has scheduled the implementation of these fees for 2018. Meanwhile, the city's goal was to install 23,500 water meters by July 2022, an essential condition in precisely determining the amount of drinking water consumption in the non-residential sector. It also set an almost identical schedule for undertaking a consumption assessment through sectorizing of the residential sector. These aspects all contribute to the establishment of user fees. However, we are convinced that coordinated schedules for implementing water meters and user fees are necessary to bring these two processes to completion within the deadlines set by MAMOT and to achieve the goals of Montréal's Water Strategy, specifically regarding meter installation, since there are already regulations in place for water use fees in almost all boroughs created from the former suburban municipalities.

Furthermore, according to documents consulted and information obtained concerning the working committee set up by the city manager to examine user fees, no representative of the Service du développement économique sits on this committee. Also, implementing user fees will invariably have an economic impact on ICIs and residents. We believe that any discussion of user fees, and the issues related to the financing of water service costs, would involve some complex economic arguments. This committee must be able to draw on all the expertise necessary to submit an enlightened proposal that fulfills the city's needs and, ultimately, QSDWC's requirements. In our view, the possibility of including the Service du développement économique in this committee should be reconsidered, given the economic stakes involved.

RECOMMENDATIONS

4.3.5.B.

We recommend that the Direction générale, having taken into account the user fee model preferred by the authorities, ensure:

- that the schedule for the installation of water meters by the city correlate with the schedule set by the Québec Strategy Drinking for Water Conservation to establish user fees;
- that the assessment of typical consumption in the residential sector be carried out in accordance with the established schedule, with a view to obtaining a better knowledge of drinking water consumption in this sector in anticipation of the user fee option being chosen.

Furthermore, these initiatives should be aimed at reducing drinking water consumption by the various users.

4.3.5.C.

We recommend that the Direction générale examine the possibility of integrating the Service du développement économique into the committee responsible for analyzing the application of user fees, so that this committee may benefit from all the expertise necessary to develop a strategy for submission to the administration aimed at promoting better use of drinking water and equity among the various users.

BUSINESS UNIT'S RESPONSES

4.3.5.B.

Direction générale

[TRANSLATION] In the fall of 2016, the Direction générale mandated the Service des finances and the Service de l'eau to introduce user fees for drinking water. The city intends to introduce appropriate user fees for drinking water in ICIs in 2018 or 2019, which will lead to a significant reduction in water consumption in ICIs in accordance with the objectives of the QSDWC. It has been confirmed with the Service des affaires juridiques that user fees can be introduced as soon as water meters are installed, which may help speed up the installation process.

The city has several thousand meters in the industrial area, essentially in the borough of Saint-Laurent. Our measurements confirm the average recommended by MAMOT for water budgets. Establishing pressure regulation areas will also allow water

	consumption to be metered in essentially residential areas. (Planned completion: April 2017 – Completed) Auditor General's comments However, we believe that it is premature to suggest at this stage that the recommendation has already been implemented (rather it is under way) because there are still several steps to be completed before user fees for ICIs are introduced throughout the city, despite the fact that user fees can be introduced as soon as water meters are installed. For example, the following steps still need to be completed: · Installing (compliant and operational) meters in target ICIs throughout the city; · Introducing user fees for all target ICIs throughout the city, which includes setting rates and adopting regulations. For this reason, we believe it is important to ensure that the timelines set out in the recommendation are adequate, particularly in view of the comments of the Direction générale in the action plan indicating that the city intends to introduce appropriate user fees for drinking water in ICIs in 2018 or 2019. As far as completing the assessment of typical consumption in the residential area is concerned, we also believe that it is premature at this stage to suggest that the recommendation has already been implemented (rather it is under way) , because some steps still need to be completed, including: · Developing and implementing a representative sampling of the city for the residential area; · Establishing typical residential consumption.
4.3.5.C.	Direction générale <i>[TRANSLATION] The Service du développement économique has been involved in the working group on objectives regarding user fees for drinking water in ICIs. (Planned completion: April 2017 – Completed)</i>

4.3.6. Measure 5 – Annual Report

4.3.6.A. Background and Findings

Measure 5 requires the submission of an Annual Report on water management to CC. It reads as follows:

Beginning in 2012 and for subsequent years, all municipal bodies will be required to submit an annual report on water management to a council meeting no later than April 1 each year, in order to be able to submit a request for financial assistance. This report should include a water use totals and an action plan update. For example, the 2011 report should be completed and adopted by April 1, 2012.³⁹

Since the adoption of QSDWC, the Service de l'eau has assumed responsibility for preparing documents to fulfill QSDWC's requirements, which entails the collection of all necessary information. Thus, this measure takes the form of an accountability statement addressed to the authorities. Its aim must be to foster informed decision-making that will guide the planning and allocation of necessary resources and thus ensure compliance with QSDWC.

For example, QSDWC prescribes a form of accountability to municipalities that is effectively compulsory as it is subject to environmental criteria; thus, to apply for financial assistance of water infrastructure projects, this measure must have been implemented by April 1, 2012.

Our audit work initially consisted of investigating the accountability mechanisms put in place to produce this report for the information of the authorities. We wanted to know if the existing mechanisms were sufficient for informing the authorities of all requirements and all QSDWC-related issues. With respect to reviewing documents produced for the purpose of compliance with QSDWC, our work focused mainly on the 2015 documents and, more generally, dealt with the process of filing the Annual Report for 2011 and subsequent years.

Our audit work has shown that real efforts have been made to respond to Measure 5. The Annual Reports for the years 2011 to 2015 were submitted to the authorities. However, we found that, for all Annual Reports, submissions to CC or UAC were made after the deadlines set by QSDWC, which requires that they be submitted by April 1 of

³⁹ Québec Strategy for Drinking Water Conservation, p. 27.

each year.⁴⁰ We also found that the 2011 and 2012 reports were submitted only to CC, while the 2013, 2014 and 2015 reports were submitted to both CC and UAC.

In addition, according to the documents examined and the information obtained from Service de l'eau staff, other accountability mechanisms were put in place by the Service de l'eau to inform decision-makers about the progress of QSDWC and about Montréal's Water Strategy. These mechanisms include progress reports on specific topics such as water meters, meetings with management, PowerPoint presentations to committees, tracking tables, specific assessments and reports on *La Patrouille bleue*.

However, while the Annual Report and these documents do supply a great deal of information, our audit work has revealed that for certain QSDWC-related issues, including user fees and application of drinking water regulations, the mechanisms in place are not adequate for informing the decision-makers. For example, the 2015 Annual Report on water use filed with CC and UAC states, with respect to fees: "*maintenance of existing fee model until now*"⁴¹. We found that this Annual Report and the other documents reviewed did not include any other information regarding fees in order to be compliant with QSDWC. We noticed that, during the presentation of the Service de l'eau's 2017 budgetary forecasts to the Finance and Administration Committee on December 6, 2016, the managers who attended were not sufficiently informed.

Indeed, the managers who attended this meeting did not seem to be aware of QSDWC's Measure 4 regarding the implementation of a fee that would apply if the second indicator (leakage rate) described by MAMOT had not been achieved for Québec as a whole. The content of their responses showed that they were not familiar with any aspects of these fees, although the deadline for their implementation was approaching.⁴²

In our view, the accountability mechanisms in place did not adequately inform these decision makers on all QSDWC-related issues, particularly regarding the fees under Measure 4.

⁴⁰ 2011 Annual Report: filed with CC on June 18, 2012 (CM12 0440).
2012 Annual Report: filed with CC on August 26, 2013 (CM13 0685).
2013 Annual Report: filed with CC on August 18, 2014 (CM14 0666) and with UAC August 21, 2014 (CG14 0331).
2014 Annual Report: filed with CC on August 17, 2015 (CM15 0844) and with UAC on August 20, 2015 (CG15 0441).
2015 Annual Report: filed with CC on August 22, 2016 (CM16 0824) and with UAC on August 25, 2016 (CG16 0449).

⁴¹ 2015 Annual Report, p. 5.

⁴² The initial deadline was April 1, 2017, but it was changed to 2018, based on information obtained from MAMOT.

Since the Annual Report required under QSDWC has to be addressed to city authorities, it is important that the information contained therein be supported by a rigorous information collection process that permits the collection of all required information. In addition, in order for accountability to be optimal in terms of content quality, it must be subject to an information validation process.

First, we wanted to know if the information collection process permitted collection of all the relevant information needed to produce the Annual Report. Our audit work has revealed that, for certain actions to fulfill QSDWC's requirements, collection processes were put in place, thus permitting information collection. For example, for the search and repair of leaks, registers and tables were made with contributions from the boroughs. However, for other actions, the process in place did not permit collection of all the relevant information needed for useful accountability. As an example, in the application of the regulations, only data from three boroughs were considered, whereas we found that a total of 15 boroughs (including those three) carried out inspections or interventions to apply water use regulations. In addition, the Annual Report does not provide a status report on the application of RCG 13-011 as it relates to certain equipment in ICIs, including air conditioning and cooling units. Furthermore, information about sending leaflets to ICIs aimed at raising awareness about RCG 13-011 was not included in the 2015 Annual Report.

Second, we wanted to enquire about the existence of other mechanisms in place to ensure the reliability of information provided. A review of the documents obtained shows that a tracking chart was prepared in support of the declarations made in the 2015 drinking water use form sent to MAMOT. Information included in this form can also be found in the Annual Report. This tracking chart indicates the source of the evidence obtained. However, it has not been demonstrated to us that all the information in this chart was validated, particularly with regard to the degree of the file's progress. In our opinion, the process for ensuring reliability of the information obtained should be documented. In addition, we did not find a similar tracking chart in support of the information provided in the Annual Report. We believe that this information should also be subjected to a mechanism to ensure its reliability.

In order to ensure that the activities carried out contribute to compliance with QSDWC, evaluation mechanisms must be put in place. These would enable us to evaluate, first, whether the actions taken are achieving the necessary results aimed at fulfilling QSDWC's requirements and, second, would render it possible, where necessary, to make the adjustments needed to achieve the ultimate goals.

To this end, the Service de l'eau's annual accountability report provides an opportunity to evaluate periodically, through product indicators, the degree to which its actions are progressing toward the achievement of QSDWC's goals.

QSDWC was approved more than five years ago, in 2011. Since then, the city has carried out several activities to fulfill QSDWC's requirements. However, we have not found an overall performance assessment of these activities enabling us to be sure that the Service de l'eau has covered all the issues raised in QSDWC, including all of the recommended actions, compliance with schedules, and the adjustments needed to achieve the expected goals. This certainly raises questions about the need to develop an integrated action plan.

According to the information obtained from Service de l'eau staff, some of the actions carried out to address QSDWC's requirements were evaluated, but not all.

In addition, although the Service de l'eau often uses Montréal's Water Strategy as a reference for QSDWC's requirements, there is still no report containing a status report on the progress of the action plan of Montréal's Water Strategy for the period 2011-2015, whereas it was approved by UAC in June 2012.

We did obtain a summary progress report on the work, which refers to the five issues of Montréal's Water Strategy, to the detection and correction of leaks, and to meter installations in ICIs. However, this summary progress report does not cover all of the QSDWC issues, particularly those involving user fees.

Although developing and preparing a strategic progress report on Montréal's Water Strategy action plan is essential, it seems to us that it is equally important that an overall performance assessment of the implementation of measures to fulfill QSDWC's specific requirements be carried out periodically, before submitting the accountability report to the authorities.

RECOMMENDATIONS	
4.3.6.B.	We recommend that the Service de l'eau have mechanisms in place to ensure, on the one hand, that all the information is collected, and on the other, that it is reliable, in order to provide decision-makers with an accurate account of all the issues covered by the Québec Strategy for Drinking Water Conservation, thus enabling them to make an informed decision.
4.3.6.C.	We recommend that the Service de l'eau carry out an overall performance assessment of the implementation of measures, in order to fulfill all the requirements of the Québec Strategy for Drinking Water Conservation and to enable decision-makers to make appropriate decisions that would ensure obtaining financial assistance from the Ministère des Affaires municipales et de l'Occupation du territoire.

BUSINESS UNIT'S RESPONSES	
4.3.6.B.	Service de l'eau <i>[TRANSLATION] A table of sources of information will be appended to the 2016 water budget. (Planned completion: June 2017)</i>
4.3.6.C.	Service de l'eau <i>[TRANSLATION] A summary table of requirements, results and planning will be set up for the next reporting period. (Planned completion: June 2017)</i>

5. Conclusion

Since the issues raised by the question of sustainable water management are central to some of our major concerns in the 21st century, both locally and globally, the Government of Québec, through its Québec Strategy for Drinking Water Conservation (QSDWC), has set two goals supported by five measures aimed at incentivizing municipalities to achieve significant savings in drinking water consumption and costs.

The Government of Québec has sent a clear message to the municipalities by making the allocation of financial assistance conditional on achieving these two objectives.

For the city, this assistance amounted to \$157.4 million for investment projects related to drinking water infrastructure from 2011 to 2015.

In the wake of sustainable water management, Montréal's Water Strategy, approved in 2012, included aspects that would fulfill the requirements of QSDWC, which was adopted in 2011.

Our audit, with regard to the actions that the Service de l'eau has put in place, confirms that major efforts have made it possible to reduce the total production and average distribution of drinking water per person per day, by 20% and 26% respectively in 2015 across the agglomeration, compared with 2001. It should be noted, however, that additional efforts will have to be made as the Canadian average for drinking water distribution has declined significantly over the years. Indeed, it dropped from 622 litres per person per day in 2001 to 466 litres per person per day in 2013. The same indicator for the Montréal agglomeration shows a decrease in average production from 1,120 litres per person per day in 2001 to 823 litres per person per day in 2015. There is therefore a significant gap to be closed in these two results.

QSDWC's second goal comprises two components. For the first component, the 2015 Drinking Water Use Report indicates that the potential water loss rate obtained in 2015 is estimated at 31%, whereas QSDWC's goal was to achieve less than 20% of the

water volume distributed. For the second component, the leakage rate is estimated at 98 cubic metres per day per kilometre of water line, considerably exceeding the targeted leakage rate under QSDWC of 15 cubic metres per day per kilometre of water line. As a result of these high numbers, all of the measures provided for in QSDWC will be applied to the city.

Moreover, with regard to these figures, our audit work has highlighted the fact that the city did not include a specific action plan concerning QSDWC in the general action plan of Montréal's Water Strategy. As a result, the planning tool does not reflect all of the choices the city needs to make to fulfill the requirements of all the measures, and is accompanied by schedules that do not always accord with those set out in QSDWC. In addition, some shortcomings have been observed with respect to compliance with regulations concerning equipment in industries, companies and institutions (ICI). Also, there is the city's ambiguity in its approach to, and the extent of, water meter installation, which would have made it possible to measure with greater reliability water consumption and losses across the system. Another factor is the city's confusion regarding Measure 4 with respect to user fees.

Our work reveals that a review of the accountability reporting process is necessary, especially as it relies on information that has not been entirely documented. In addition, the issue of Measure 4 on user rates has not been sufficiently clarified in the accountability report regarding QSDWC's requirements. As a result, this accountability report has not properly explained to decision-makers from the outset how this measure would be dealt with. Finally, we did not find an overall performance assessment concerning the implementation of all the measures fulfilling QSDWC's requirements so as to allow discussion on a possible repositioning of the city.

Regarding drinking and water conservation practices in Canada's largest cities, QSDWC states the Montréal had a meter installation rate in ICIs of 23% compared to 100% in Toronto, Vancouver, Ottawa, Edmonton and Winnipeg. According to data from the 2015 Annual Report produced by the Service de l'eau, the installation rate in ICIs was 30% for the Montréal agglomeration. There continues to be a wide gap and much needs to be done to reach the Canadian average in terms of water consumption per person. Studies and data available on this subject indicate an abnormally high level of consumption in Québec, which places it among the heaviest water consuming societies, invariably resulting in high operating costs.

Much work remains to be done to begin fulfilling QSDWC's second goal and to put the required measures in place. This will depend on the will of the administration, as many of the measures require significant investments, including replacement of the primary and secondary systems, the leak detection and repair program, and water meter installation in ICIs.

It is in the city's interest to fulfill QSDWC's requirements if it wishes to avail itself of this significant financial assistance. However, there is still a risk that they will not be met, even though the Ministère des Affaires municipales et de l'Occupation du territoire decided to postpone until now the deadline for certain measures.

But beyond this matter of compliance, it is the responsible management of assets and our environmental responsibility regarding drinking water that should be of greatest concern. The administration must ensure that it makes the right choices and prioritizes the directions that are most appropriate for all Montrealers.

6. Appendix

6.1. Purposes and Evaluation Criteria

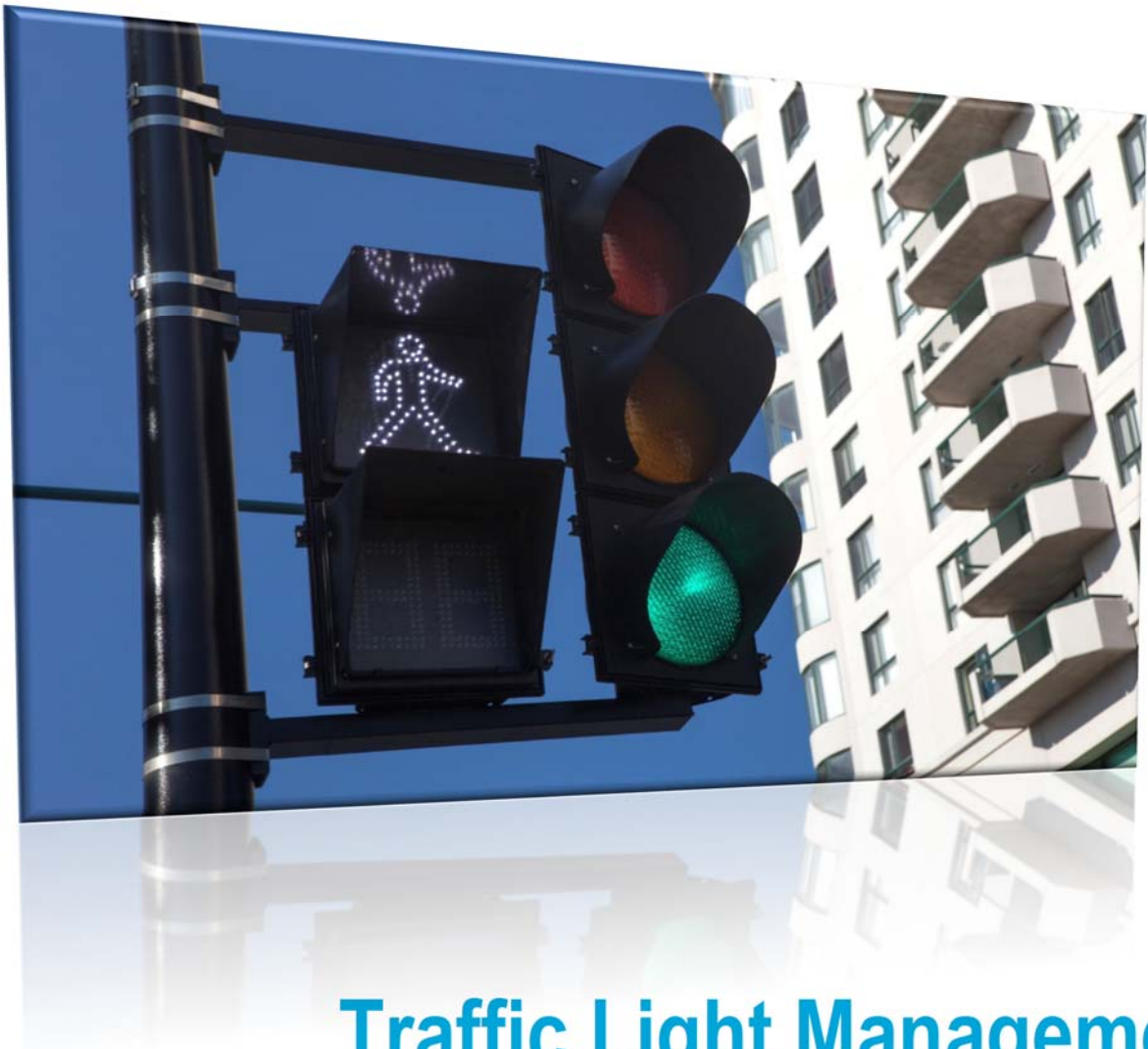
Purposes

The purpose of this audit was to ensure that the action plan adopted within the framework of Montréal's Water Strategy would enable the city to meet the goals and measures set out by MAMOT as part of the implementation of QSDWC in relation to the *Québec Water Policy*.

This audit was also aimed at ensuring the application of the current regulations concerning the use of drinking water by the boroughs.

Evaluation Criteria

- The action plan supporting Montréal's Water Strategy includes all the elements necessary to fulfill the government's requirements.
- Reliable mechanisms are in place to assess actions taken to ensure compliance with the QSDWC requirements.
- Reliable mechanisms are in place to ensure follow-up related to the application of the regulations adopted in 2013 (2 regulations: 1 UAC regulation and 1 CC regulation).
- An overall assessment of the performance of the implementation of the action plan is carried out regularly.
- Regular accountability reports, primarily to fulfill QSDWC's requirements, are made to appropriate officials and authorities.



Traffic Light Management (Service des infrastructures, de la voirie et des transports)

Summary of the Audit

Purpose

Ensure that the traffic light upgrade projects and the implementation of dynamic management are advancing in step with the priorities approved by the authorities.

Results

In addition to these results, we have formulated various recommendations for the business units.

The details of these recommendations and our conclusion are outlined in our audit report, presented in the following pages.

Note that the business units have had the opportunity to formulate their comments, which appear after the audit report recommendations.

The Service des infrastructures, de la voirie et des transports has not succeeded, as the one responsible for the governance, in setting up a consistent, articulated traffic light upgrades program to ensure it is executed within the deadlines set by the authorities. In our opinion, the management of this program needs several improvements taking into account the main findings hereunder.

In the light of their significance, we believe it is imperative that the management of the program be closely monitored by the Direction générale in order to respect the deadlines, projected costs and target objectives.

- The current inventory is incomplete and does not reflect the level of compliance of the various components of the traffic light systems.
- The costs incurred for the traffic light upgrades significantly exceed the initial estimate set out in the *Transportation Plan*, despite the fact that the intersections have not all been completed.
- There is no overall plan backed by a timeline for all the interventions required to comply with both the standards demanded by the laws and the internal standards stemming from the guidelines in the *Transportation Plan* and the priorities of the municipal administration.
- The cost monitoring mechanisms for the traffic light upgrades are not uniform within the Service des infrastructures, de la voirie et des transports.
- The upgrade program has not been evaluated in terms of the target objectives.
- The current accountability mechanisms do not give the municipal administration all the relevant information about the progress of the upgrades in terms of the timeline, costs and objectives.

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List of Acronyms

DEESM	Division de l'entretien, de l'éclairage, de la signalisation et du marquage	POU 1	First phase of upgrades
		POU 2	Second phase of upgrades
DERA	Division de l'exploitation du réseau artériel	POU 3	Third phase of upgrades
DI	Direction des infrastructures	SITE	Service des infrastructures, du transport et de l'environnement
DM	dynamic management		

5.3. Traffic Light Management (Service des infrastructures, de la voirie et des transports)

1. Background

The road network of the Ville de Montréal (the city) is comprised of nearly 2,300 intersections equipped with traffic lights (poles, arms, heads, controllers, cabling, pedestrian signals, audio signal devices, etc.).

The city's responsibility for these assets arises, in part, from the *Municipal Powers Act*¹ which states that the municipality has jurisdiction over public roads² that are not under the authority of the Government of Québec or the Government of Canada or one of their Ministries or bodies.

As concerns the traffic light network, the city is therefore responsible for installing new traffic light systems, making changes where required and removing, replacing and maintaining the equipment to ensure it works effectively.

Under the current legal framework, traffic routes are divided into two categories (arterial network and local network). The urban agglomeration council determines which traffic routes make up the arterial network across the agglomeration, through by-laws approved by the Ministre des Affaires municipales et de l'Occupation du territoire. It also has jurisdiction over the arterial network, in terms of standardization, planning and works on certain designated roads.³ The management of the arterial network is under the jurisdiction of each related municipality, including the city.

The *Charter of Ville de Montréal* states that the arterial network is the responsibility of the city council and that the local network is the responsibility of the borough councils. The Charter also allows the city council to declare its jurisdiction over all the boroughs for a period it determines. In November 2014, the city council made use of this power concerning the traffic lights on the local road network. This decision, which came into effect on January 1, 2015, for an initial duration of two years, was extended to December 31, 2018. Note that since 2002, maintenance of the arterial road network has been delegated to the boroughs under a city council by-law.

¹ Chapter C-47.1, a. 66.

² The expression "public roads" includes any highway, road, street, lane, square, bridge, footpath or bicycle path, sidewalk or other road that is not in the private domain.

³ Boulevard Notre-Dame, Bonaventure Expressway (phase 1), Rue Sherbrooke (east of 36e Avenue), Boulevard Cavendish (Cavendish/Royalmount), Boulevard Jacques-Bizard (to Highway 40), Boulevard Pierrefonds, Highway 440 service road.

As the city is responsible for managing and maintaining the public roads, it must meet the standards set out in the *Highway Safety Code*.⁴ With regard to traffic lights, these are road signage manufacturing and installation standards established by the Ministère des Transports, de la Mobilité durable et de l'Électrification des transports (the Ministry) and recorded in *Tome V – Signalisation routière*. The application of some of these standards is mandatory (e.g., the order of lights in the signal head).

In the 2000s, the Service de l'environnement, de la voirie et des réseaux⁵ reported that the controllers⁶ in the traffic light systems had exceeded their useful life, causing frequent breakdowns. Since some replacement parts were no longer available, the people in charge at the time said that the solution was to replace the controllers with more reliable, high-performance controllers, to upgrade the traffic lights to the needs of pedestrians and drivers.

In 2004, the city began the first phase of the traffic light upgrading process, to replace the controllers and meet requirements on part of the inventory. The first phase was carried out during the development of a transportation plan for the Island of Montréal.

That plan, which was adopted by the urban agglomeration council in June 2008, announced guidelines⁷ in several areas, such as public transit, walking, cycling, the road network, parking, movement and quality of life. More than a hundred projects were planned in connection with the intervention targets. Some of the intervention targets required the traffic lights to be upgraded, including:

- Prioritize pedestrians by improving walking conditions:
 - Requires improved safety for trips by foot, in part by installing pedestrian countdown timers;
- Make public transit the cornerstone of the city's development:
 - Introduces preferential measures for the city buses on 240 kilometres of roads within ten years⁸, which requires the installation of transit priority signals in many intersections;
- Develop cycling infrastructure and set up new measures to foster the increased use of bicycles all across the city:
 - Aims to double the network in five to seven years, which would require adapting traffic lights for cyclists;

⁴ Chapter C-24.2.

⁵ This department was renamed several times in the following years. In 2004, it became the Service de l'environnement, de la voirie et des réseaux, and in 2005, it was renamed the Service des infrastructures, du transport et de l'environnement (SITE). Then, in 2015, it became the Service des infrastructures, de la voirie et des transports, as we know it today.

⁶ Specialized traffic light management device.

⁷ Most of the projects were planned for the first ten years, but some had a 20-year horizon.

⁸ This objective was increased in 2015 to 375 kilometres of arteries by 2017.

- Show leadership in travel safety across the territory and adopt a “zero accident” vision:
 - Aims to reduce accidents by 40% within ten years. Upgrading the traffic lights is one way to achieve this.

When the *Transportation Plan* was adopted, it mentioned that after the first phase ended in 2008, a second phase would begin, extending to 2010. The projected cost announced in the *Transportation Plan* was in the order of \$32 million. Dynamic traffic light management⁹ was also planned on four strategic arteries¹⁰, requiring the traffic lights to be upgraded in advance. The projected cost was \$10 million. The costs already incurred for Phase 1 (before the adoption of the *Transportation Plan*) were \$22 million.

In 2013, the authorities reiterated their commitment to accelerating the installation of pedestrian countdown signals and the number of audio signals. The municipal administration also stepped up its commitment to installing preferential measures for the city buses, extending it from 240 kilometres to 375 kilometres of roads by 2017. A third phase was also launched, in 2015, for intersections in the local network.

Since the traffic light upgrades were meant to comply with legal obligations and help meet several objectives, and since they required major investments, we believe that it is timely, eight years after the *Transportation Plan* was adopted, to evaluate the extent to which the upgrades have been completed across the network.

Moreover, since the upgrade program¹¹ has been on the Direction générale’s Bureau des projets et programmes d’immobilisations (BPPI) priority program table since 2015 and is slated to be reviewed by the governance committees in spring 2017 and then submitted to the Comité de coordination des projets d’envergure (CCPE)¹², we believe that the observations and recommendations from this audit report will be useful for their work.

2. Purpose and Scope of the Audit

The purpose of the audit was to ensure that the traffic light upgrade projects and the implementation of dynamic management are advancing in step with the priorities approved by the authorities. To this end, we examined the target upgrade standards, the state of the traffic light system inventory, the tracking of completion timelines and

⁹ Adaptive management of traffic lights based on traffic density, involving the development of numerous traffic light coordination plans.

¹⁰ Boulevards Pie-IX, Henri-Bourassa and Crémazie and Rue Sherbrooke.

¹¹ The program is called “Feux de circulation et équipement de gestion de la circulation”.

¹² The committee is made up of members of the executive committee, appointed by the mayor, and senior management representatives.

projected costs, the data demonstrating the achievement of the objectives and the accountability data.

Our audit focused on the years from 2008 to 2016. For some aspects, data prior to 2008 were also considered. Our work was carried out mainly from September 6 to December 23, 2016, but we also took into consideration information given to us until March 2017.

Our work was conducted in the Service des infrastructures, de la voirie et des transports, specifically in the Division de l'exploitation du réseau artériel (DERA) (Direction des transports) and the Division de la réalisation des travaux (Direction des infrastructures [DI]). We also met with representatives from the four following boroughs during our preliminary study, to hear their point of view on particular aspects of traffic light management:

- Anjou borough (Direction des travaux publics);
- Montréal-Nord borough (Direction des travaux publics);
- Outremont borough (Direction des travaux publics);
- Rosemont–La Petite-Patrie borough (Division de l'entretien, de l'éclairage, de la signalisation et du marquage [Direction des travaux publics]).

Our audit work consisted of interviewing the staff, examining various documents and conducting surveys that we deemed appropriate to obtain convincing information. This audit is based on an examination of the evaluation criteria presented in Appendix 6.1.

3. Main Findings

The audit work revealed that improvements are required because:

- The current inventory is incomplete and does not reflect the level of compliance of the various components of the traffic light systems;
- The costs incurred for the traffic light upgrades significantly exceed the initial estimate set out in the *Transportation Plan*, despite the fact that the intersections have not all been completed;
- There is no overall plan backed by a timeline for all the interventions required to comply with both the standards demanded by the laws and the internal standards stemming from the guidelines in the *Transportation Plan* and the priorities of the municipal administration;
- The cost monitoring mechanisms for the traffic light upgrades are not uniform within the Service des infrastructures, de la voirie et des transports;
- The upgrade program has not been evaluated in terms of the target objectives;
- The current accountability mechanisms do not give the municipal administration all the relevant information about the progress of the upgrades in terms of the timeline, costs and objectives.

4. Audit Results

The Direction des transports was created in 2007, as part of the Service des infrastructures, transport et environnement (which became the Service des infrastructures, de la voirie et des transports in 2015). Its mission is to manage all activities related to the transportation infrastructure and networks, particularly public transit and the arterial network. It is also responsible for maintaining travel conditions that meet the mobility needs of people and goods. Its mandate includes implementing the *Transportation Plan* adopted by the urban agglomeration council in June 2008.

Within that directorate, the DERA, also created in 2007, has the mission to manage the movement of people and goods through the operation and development of integrated transportation systems, using information and communications technology, with a view to sustainable development¹³ and based on the community's needs. To fulfil this mission, since its creation, the DERA has operated the arterial road network and the local network downtown. Its responsibilities include the modernization, upgrading, programming, specific coordination and dynamic management (DM) of the traffic lights, as well as the application of priority measures for public transit, including the introduction of reserved bus lanes. Since January 1, 2015, its management responsibilities have also extended to the local road network of the entire city, since the city council declared its jurisdiction over it.

Although our audit focuses on the period from 2008 to 2016, the period following the urban agglomeration council's adoption of the *Transportation Plan*, the first phase of upgrades (POU 1) began in 2004, and the achievements of the entire upgrading program must be considered for the purposes of this report. To facilitate understanding, Appendix 6.3 presents the business units that were or are responsible for managing the traffic lights on the arterial and local networks from the beginning of the first upgrades. In light of the changes in the legislative framework and the municipal reorganizations that occurred during that period, we also show the area that was under the city's responsibility.

In the next sections, we will begin by examining what the traffic light upgrade process consists of. Then we will look at the information available for managing the traffic light inventory and the level of compliance with the standards. We will also discuss the changes in the upgrade process since the adoption of the *Transportation Plan*, as well as accountability.

¹³ Intranet Site – Direction des transports.

4.1. Traffic Light Upgrades

4.1.A. Background and Findings

The standards governing a field of expertise are established by a recognized dedicated organization. The application of some standards is mandatory or even legally mandatory, while others are left to the discretion of the people in charge. These same people may also establish internal standards to achieve a specific objective.

In the case of the traffic light systems, installation and maintenance are governed by standards developed by the Ministry with respect to light signalling, some of which are mandatory. The standards are outlined in a volume titled *Tome V – Signalisation routière* and they provide a road signalling reference tool for people in the Ministry as well as the municipalities and organizations responsible for public roads and bicycle paths.

Between 2008 and 2016, eight updates to *Tome V* were distributed to the managers at the Service des infrastructures, de la voirie et des transports. When an update entails significant amendments to the light signalling devices already installed on the road network (e.g., pedestrian signals), these must be modified or replaced by compliant equipment by a given deadline. To this end, *Tome V – Signalisation routière* provides a full list of deadlines to be met. Furthermore, if the municipalities have to install new light signalling devices, they must comply with the most recent edition of *Tome V – Signalisation routière*.

In addition to *Tome V – Signalisation routière*, traffic light installation and maintenance are also governed by the *Canadian Electrical Code*, which is recognized by the Québec Construction Code, Chapter V, Electricity. The people we met during our auditing work had mixed opinions about whether the city is subject to this code, however. We are of the opinion that an interpretation should be requested from the Régie du bâtiment du Québec to officially clarify the situation.

If a municipality failed to comply with traffic light standards that are actually legal obligations, it would be breaking the law. It might be in a vulnerable position if an accident were to occur.

In the case of the city, the primary purpose of the upgrades is compliance with the legal provisions, but a further purpose is to make changes to the traffic light systems or even install new devices to achieve other objectives.

As we explained in the introduction, the city road network is comprised of nearly 2,300 intersections equipped with traffic light systems. The first phase of upgrades (POU 1 and DM) began in 2004, targeting 800 intersections. Then the second phase of upgrades (POU 2) began in 2008, on another 1,200 intersections. A further 300

intersections will be targeted in the third phase of upgrades (POU 3). For the first two phases, the tendering documents to grant the professional services contracts specified that the traffic light upgrades entailed replacing some obsolete components and adding new components to comply with the recognized standards. Since this is a program that began several years ago, we want to point out that the standards have continued to evolve over time. First, some intersections updated during POU 1 or POU 2 are no longer compliant due to new standards for certain devices. Second, during POU 2, the authorities added new specifications to the tendering documents to reflect the priorities of the municipal administration.

Table 1 on the next page presents the main standards that were considered by the DERA when the professional service contracts were attributed for POU 1 and POU 2.

**Table 1 – Main Standards Taken into Consideration
for Traffic Light Upgrades
(2004 to 2016)**

Standards	POU 1 (2004 to 2008) ^[a]		POU 2 (2008 to 2016) ^[a]	
	Minimum requirement of the Ministry	City requirement	Minimum requirement of the Ministry or the <i>Canadian Electrical Code</i>	City requirement
<u>Traffic light characteristics</u> · Shape and size of the lenses · Backboard · Disposition of optical units · Height and space between lights, etc.	X X X X		X X X X	
<u>Traffic light programming</u> · Limit value of parameters (maximum and minimum duration)	X		X	
<u>Pedestrian signals</u> · Characteristics (e.g., shapes, sizes and disposition of lenses, visibility, display of intervals, call buttons, numeric countdown) · Justification	X	X ^[b]	X	X ^[b] X
<u>Audio signals</u> · Characteristics, call buttons · Justification	X		X	X
<u>Replacement of mechanical controllers by electronic controllers</u>		X		X
<u>Bicycle traffic lights</u> · Characteristics · Traffic light adaptation	X		X	X
<u>Transit priority lights</u> · Characteristics of transit priority lights · Justification	X		X	X ^[b] X
<u>Replacement of incandescent lights by light-emitting diodes (LEDs)</u>		X	X	
<u>Replacement of urban furniture with standard urban furniture of the city</u>				X ^[c]
<u>Certification of signal poles, arms and controllers</u>			X ^[d]	

^[a] Period during which the contracts to do the upgrades were mainly carried out.

^[b] Ministry's standards applied differently.

^[c] For example, lights with vertical heads, poles in black steel.

^[d] Standard taken into account since 2015.

As we mentioned above, the standards required by the Ministry or the *Canadian Electrical Code* are applicable to the city. Failure to comply with them is against the law. When new standards require major changes, the Ministry grants a grace period

to allow municipalities to plan the work required to comply with them. Failure to meet these deadlines is a failure to uphold the law. During the period under examination (2008 to 2016), grace periods were granted for three aspects of signal lights: audio signals, light signals and pedestrian signals. Table 2 shows the deadlines that were established by the Ministry during this period.

Table 2 – Deadlines to Upgrade Light Signalling Devices to the Standards Required by the Ministère des Transports, de la Mobilité durable et de l'Électrification des transports

Light signalling device	Publication date of modification	Initial deadline	Date of revision in Tome V – Signalisation routière	Last modified deadline
Audio signals Melody type, call buttons, location of speakers, etc.	02-2003	31-12-2010	12-2007 12-2008	31-12-2013
Audio signals Melody type based on direction of the crossing	12-2016	31-12-2018	12-2010 12-2012	31-12-2018
Light signals Order of lanterns, display of clearance time for right turns, etc.	06-1999	31-12-2010	01-2014 12-2014	31-12-2010
Pedestrian signals Addition of a numeric countdown and the flashing hand activated during the clearance interval	12-2007	31-12-2010	12-2015 12-2016	31-12-2017

As noted, two of the four deadlines were postponed during this period. At the time this audit report was produced, the municipalities had benefited from two postponements. The replacement of regular pedestrian signals with countdown signals should have been completed by December 31, 2017. The addition of a melody type based on the crossing should also have been completed by December 31, 2018.

The DERA chooses to apply some Ministry requirements differently and considers them to be internal standards. To make these choices official, the DERA must submit a review request to the Ministry for approval. In November 2016, the DERA submitted a few review requests to the Association québécoise des transports (AQTr) but did not submit others. We believe that any failure to uphold the Ministry's requirements should be officially communicated for approval.

Other internal standards were integrated into the upgrade phases:

- The addition of pedestrian countdown signals where required. As mentioned above, the Ministry's mandatory standards require regular pedestrian signals to be

replaced with countdown signals. Although the urban agglomeration council made the announcement in the *Transportation Plan*, at the end of 2013 the executive committee mandated the Service des infrastructures, du transport et de l'environnement (SITE) to step up the installation of pedestrian signals in all intersections with traffic lights along streets with heavy vehicular and pedestrian traffic. This is, therefore, an internal standard to extend the installation of pedestrian countdown signals to more intersections than required by the Ministry. It should be noted that the Ministry's deadline, December 31, 2017, applies only to existing pedestrian signals;

- The addition of audio signals first announced by the urban agglomeration council in the *Transportation Plan*. As it did for the pedestrian signals, the executive committee mandated the SITE, at the end of 2013, to step up the installation of these signals where required;
- The replacement of mechanical or obsolete electronic controllers with the new generation of electronic controllers. In addition to remedying the obsolescence of some controllers, their replacement will allow for greater programming capacity and flexibility (e.g., daily programs and light cycle duration, compatibility with pedestrian countdown signals and transit priority measures);
- The adaptation of traffic lights for cyclists, stemming from one of the guidelines in the *Transportation Plan*, which aims to double to bicycle path network within seven years;
- The installation of transit priority signals as part of the preferential measures for buses. Initially, the urban agglomeration council announced the development of 240 kilometres of reserved lanes in the *Transportation Plan*. In 2015, the municipal administration increased this figure to 375 kilometres by the end of 2017;
- The replacement of urban furniture (e.g., signal poles, light heads) for standardization among the boroughs.

Internal standards justify the installation of pedestrian signals, audio signals, bicycle traffic lights and transit priority lights. In this regard, the DERA produced the following guides to complement the Ministry standards:

- *Feux pour piétons à décompte numérique (DT-2001)*, which states the criteria justifying the addition of pedestrian countdown signals where there are existing traffic lights and where there are no traffic lights;
- *Signaux sonores DT-2002*, which provides more detailed information for the standardized installation of audio signals at intersections equipped with traffic lights;
- *Guide de conception des feux en présence d'aménagements cyclables (DT-2005)*, which standardizes practices for traffic light design where there are cycling facilities;
- *Mesures préférentielles pour autobus (MPB) (DT-2003)*, which governs the installation projects for transit priority measures, to ensure they are appropriately integrated into the city's traffic light networks and comply with the *Transportation Plan*.

Although the justification for installing these devices stems from the priorities of the municipal administration, it is important to note that the characteristics of the equipment is nevertheless subject to the mandatory standards set out in *Tome V – Signalisation routière*. Unlike the legal requirements, not all internal standards taken into account by the DERA have an official deadline for application. These internal standards are important, however, since they stem from guidelines outlined in the *Transportation Plan* or from the priorities of the municipal administration, and we believe that deadlines should be established to ensure they are met.

RECOMMENDATIONS

4.1.B.	We recommend that the Service des infrastructures, de la voirie et des transports obtain an official interpretation from the Régie du bâtiment du Québec on whether the traffic light systems are subject to the requirements of the <i>Canadian Electrical Code</i> , to support informed decision-making.
4.1.C.	We recommend that the Service des infrastructures, de la voirie et des transports submit all requests for exemptions from legal requirements to the Ministère des Transports, de la Mobilité durable et de l'Électrification des transports for official approval.
4.1.D.	We recommend that the Service des infrastructures, de la voirie et des transports set deadlines for the application of the internal standards arising from the guidelines outlined in the <i>Transportation Plan</i> or from the priorities of the municipal administration, to ensure realistic plans can be made for the completion of the upgrades.

BUSINESS UNIT'S RESPONSE

4.1.B.	<i>Service des infrastructures, de la voirie et des transports</i> On May 15, 2017, the Direction générale submitted its action plan for the recommendation it was targeted by and informed us that the Service des infrastructures, de la voirie et des transports action plan was under development and would be submitted as soon as possible.
4.1.C.	
4.1.D.	

4.2. Traffic Light Inventory

4.2.A. Background and Findings

Traffic light management must rely on sound knowledge of the inventory of all components for all intersections (e.g., controllers, signal poles, light heads, pedestrian signals, audio signals, detection devices). The upgrade process must be based on the components' compliance with the standards in effect (legal and internal). In this audit,

we wanted to evaluate the extent of the DERA's inventory, in terms of intersections equipped with traffic lights and data qualifying the level of compliance with the standards.

Number of Intersections Equipped with Traffic Lights

As we mentioned at the beginning of this report, the responsibility for the traffic light inventory changed between the beginning of POU 1 (2004) and the end of 2016. At the beginning of POU 1, the SITE was responsible for traffic lights located on the city's arterial network, and the boroughs were responsible for those on the local network. In 2006, with the creation of the agglomeration powers, the SITE became responsible for the arterial network of the entire Island of Montréal. This responsibility continued until the end of 2008. Beginning January 1, 2009, the SITE once again became responsible for only the city's arterial network. Then in November 2014, the city council gave itself jurisdiction over the traffic lights on the local road network also, under section 85.5 of the *Charter of Ville de Montréal*. According to the city council's resolution, this jurisdiction extends from January 1, 2015, to December 31, 2018. Furthermore, in December 2014, the city council adopted the By-law to Amend By-law 02-003¹⁴ to identify the city's administrative arterial network. Even though the arterial network expanded from 24% to 52% of the municipal road network, the DERA has been responsible for the traffic lights on the entire road network since January 1, 2015.

At our request, the DERA produced an inventory file from an Access database known as "Feux 2013." This file, produced on February 15, 2016, shows the distribution of intersections equipped with traffic lights, presented in Table 3.

**Table 3 – Distribution of Intersections Equipped
with Traffic Lights, According to the DERA
on February 15, 2016**

Network	Number of intersections equipped with traffic lights
Arterial network	1,722
Local network ^[a]	575
Total	2,297

^[a] Distributed among the 19 boroughs.

For the purposes of our work, we checked whether these data were complete. According to the information obtained, this file does not include the most recent

¹⁴ By-law Concerning the Arterial and Local Road Systems adopted by the city council on December 20, 2001.

amendments made to By-law 02-003 to identify the administrative arterial road network, in December 2014. Although the DERA has had jurisdiction since January 1, 2015, on both the arterial and local networks, the data at its disposition are not current. Since the city council's jurisdiction over the local network may not be permanent, we believe that the DERA's inventory data should take into consideration the amendments made to By-law 02-003.

Also, for three boroughs selected for this audit¹⁵, we compared the intersections equipped with traffic lights in the DERA's inventory list with the information given to us by the boroughs (map showing traffic lights). This comparison revealed gaps related to the addition or removal of traffic lights. The DERA's data appear to be from reports filed by a consultant in 2008, during POU 2. After that exercise, the DERA appears to have taken into account the traffic light additions and removals on the arterial network, because these decisions were made by the city council. Until January 1, 2015, however, for additions or removals on the local network, the DERA was not informed because these were under the responsibility of the borough councils. This situation should have changed in January 2015, when the city council announced the decision to give itself jurisdiction over the local network. Immediately after that decision, the chair of the executive committee informed the boroughs in a memo that requests for changes to existing traffic lights and the installation of new traffic lights would have to be addressed to the director of the SITE. It was not until more than a year later, however (August 2016), that the city council delegated the power to the executive committee to add, remove or change traffic lights and that the executive committee delegated those same powers to the appropriate Level B official at the Direction des transports (September 2016). Although right now these responsibilities are clearly established, we have observed that the data on the number of intersections in the local network are not up to date, because they do not account for additions and removals on that network between the consultant's inventory (2008) and January 1, 2015. The situation should have been remedied in January 2015, after the memo from the executive committee chair, but we have no evidence of this. As we do not know the extent of this situation for all the boroughs, we believe that the DERA should validate the information it has with the boroughs' information, to ensure its inventory information is complete and accurate.

Report Data

The Access database at the DERA's disposal provides data about every intersection, such as:

- the intersection number;
- the names of the streets or arteries that form the intersection;
- the street or artery category (collector street, local street, principal artery, secondary artery);
- the name of the borough where the intersection is located;

¹⁵ Anjou, Montréal-Nord and Outremont boroughs.

- the network the intersection belongs to (arterial or local);
- the electronic programming plan number;
- the intersection's initial commissioning date;
- the most recent commissioning date (the date on which an intersection equipped with traffic lights came into operation in compliance with the programming plan established under the specifications);
- information about the controller (type, make, model, serial number, relay number);
- network number (old, new and future).

Although the database does provide these data, it was not designed to provide information on all the components of the traffic lights and the repair/upgrade history. As such, it cannot be used to determine the level of compliance of each component (e.g., pedestrian signals, light heads). This means that the DERA and other users cannot determine how many intersections meet the Ministry's standards or the internal standards arising from the guidelines in the *Transportation Plan* or the municipal administration's priorities. In short, the current database does not provide an overview of traffic light compliance. This makes it difficult to evaluate the cost required for the mandatory upgrades or the upgrades arising from the guidelines in the *Transportation Plan* or the municipal administration's priorities.

It should be noted that the creation and implementation of a database that could be used to manage the traffic light inventory were, in fact, specified in the POU 1 professional services tender documents (2004). At the time, the information needs cited by the service included data for each intersection about the components of the traffic lights, a vehicle count and a repair/upgrade history. According to the information we obtained, this database was developed but never implemented because it did not meet the needs of the people in charge of safety and counting.

At the time of our audit work, we were informed that in 2014, the DERA hired a consulting firm to examine consolidation solutions for the traffic light data. In 2016, another contract was given to the same firm to develop a database. According to the information obtained, the new database was supposed to be able to generate a compliance sheet for every intersection equipped with traffic lights. The information about the components would come from the various plans produced to carry out the work on the traffic lights (electronic programming plans, base and conduit plans, lighting signal urban furniture plans). According to the information obtained, the DERA's intention seems to be to produce compliance plans only for future work. Although it is an excellent idea to create such files, we believe that measures should be taken to ensure that data are available for all intersections equipped with traffic lights, in order to establish the level of compliance with the standards.

RECOMMENDATIONS	
4.2.B.	We recommend that the Service des infrastructures, de la voirie et des transports take the necessary steps to ensure that the traffic light inventory shows whether each intersection belongs to the arterial or local network, in compliance with the amendments made to By-law 02-003 in December 2014, so the users have relevant information for decision-making.
4.2.C.	We recommend that the Service des infrastructures, de la voirie et des transports validate the list of intersections equipped with traffic lights with the boroughs, in order to establish a complete inventory.
4.2.D.	We recommend that the Service des infrastructures, de la voirie et des transports put mechanisms in place to keep the data on component compliance up to date for all intersections equipped with traffic lights, in order to establish the level of compliance with the legal standards and with the standards stemming from the guidelines in the <i>Transportation Plan</i> and the city's priorities.
BUSINESS UNIT'S RESPONSE	
4.2.B.	<i>Service des infrastructures, de la voirie et des transports</i> On May 15, 2017, the Direction générale submitted its action plan for the recommendation it was targeted by and informed us that the Service des infrastructures, de la voirie et des transports action plan was under development and would be submitted as soon as possible.
4.2.C.	
4.2.D.	

4.3. Progress on Traffic Light Upgrade Work Since the Adoption of the *Transportation Plan*

Although the systems in place do not give the DERA access to an up-to-date portrait of compliance with the legal and internal standards, upgrades have been carried out since 2004. Annual investments of \$75.7 million have been authorized in the Three-Year Capital Works Program from 2008 to 2016, and real expenditures of \$74.1 million were incurred for the period from January 1, 2008, to November 7, 2016.

In our audit, we examined the progress of the traffic light upgrade work since the adoption of the *Transportation Plan*, in terms of deliverables, timeline monitoring and projected costs, but before we begin the next sections, we will briefly describe the traffic light upgrade process.

The upgrade of an intersection's traffic lights is either initiated by the DERA, part of a project managed by another business unit (e.g., development of the bicycle path network) or part of work undertaken to meet a specific need for a borough (e.g., a request for a protected left turn in a particular intersection due to a high number of accidents).

First, when an intersection equipped with traffic lights is identified for an upgrade (legal requirements or internal standards), the DERA prepares the required plans. When these plans are definitive, they are signed and sealed¹⁶ by the engineer in charge. The plans are as follows:

- Electronic programming (PE): Programming plan for traffic light controllers containing all information, parameters, data and special operating instructions (e.g., different times of the day, presence of different devices, such as pedestrian signals, transit priority lights, audio signals);
- Bases and conduits (BC): Shows the location of the traffic light bases and the route of the electrical conduits;
- Pavement marking (MA): Shows the uses of the traffic lanes and the traffic movements;
- Light signalling (SL): Shows the cabling, signal posts, arms, etc., of the target intersection.

When this preparatory work (e.g., plans) is commenced for the intersections, it is entered in an "order book." This is an Excel file maintained for monitoring and follow-up purposes, until the work is completed. Several times a year, interventions are targeted for calls for tender, to grant contracts to entrepreneurs. The plans and specifications are prepared by the DERA. Calls for tender were prepared by the Direction des travaux publics¹⁷ until 2012 and, beginning in 2013, by the Direction des transports.

After the work contracts are granted to entrepreneurs, the contracts are managed in-house or externally. Since 2013, contract management has been under the responsibility of the Direction des transports, but prior to the switch, the Direction des travaux publics was in charge.

Depending on the content of the plan, the upgrades may require, for example, the installation of a new controller or a programming change in the existing controller. The controllers are programmed by either the Division de l'entretien, de l'éclairage, de la signalisation et du marquage (DEESM)¹⁸ or by a contractor, depending on the intersection. When the work is finished, the traffic lights at that intersection are ready to be put into operation in compliance with the electronic programming plans. This

¹⁶ Engineer's obligation to sign and seal the plans and specifications under their responsibility.

¹⁷ Became the Direction des infrastructures in 2013.

¹⁸ It is under the responsibility of the Rosemont–La Petite-Patrie borough's Direction des travaux publics and is primarily involved in the boroughs of the former Ville de Montréal.

operation is called the “commissioning”. It is a very important step, involving a lot of stakeholders (e.g., the contractor, the project manager, the DEESM, Hydro-Québec, the Commission des services électriques de Montréal and the Service de police de la Ville de Montréal [SPVM]), and it determines whether the upgrade functions as intended in the electronic programming plans.

Since the DERA receives services from the DEESM for traffic light interventions, there is a service agreement between the two administrative units. A copy of the first agreement, which lasted a year from February 1, 2014, to February 1, 2015, was given to us. It was renewable annually unless otherwise decided. We were not able to find a copy signed by both parties. A second agreement was produced and signed between the parties, however, in October 2016 (for the period from August 1, 2016, to July 31, 2017).

As mentioned above, when the intersections are upgraded as part of an integrated plan (e.g., sewers and gutters, roadworks or geometric reconfiguration) under the responsibility of another business unit, the traffic light plans are drawn up by the DERA, but the DI manages the contract.

4.3.1. Portrait of Upgraded Intersections

4.3.1.A. Background and Findings

Although the DERA does not have information regarding the level of compliance for the traffic lights, we wanted to establish a portrait of the number of intersections that have been upgraded.

In response to our request, the DERA gave us an Excel file that lists each intersection by the phase during which the upgrade work was planned, that is, POU 1, DM, POU 2 and POU 3. The data for POU 1 and DM are from a tracking file kept by a consultant between 2004 and 2011. For POU 2 and POU 3, there is an upgrade tracking file that was kept by the DERA.

Although the managers say they do not know the proportion of intersections that have been upgraded to the standards, an analysis of these files reveals that 72% of intersections have undergone upgrades. This nuance is due to the fact that partial upgrades may have been carried out at some intersections and that new standards have been added since the initial upgrade work, requiring further upgrades for full compliance. Table 4 presents the situation for each phase.

**Table 4 – Intersections Equipped with Traffic Lights
that were Upgraded Between 2004 and 2016**

No. of intersections	POU 1 (2004-2008) ^[a]	DM (2004-2015) ^[a]	POU 2 (2008-2016) ^[a]	Total
Planned, according to tender documents	631 (territory of former Ville de Montréal)	170 (territory of former Ville de Montréal)	1,200 (entire Island of Montréal)	2,001
Plans and specifications entrusted to a consultant	651	173	1,078 (Ville de Montréal territory)	1,902
Upgrades (based on information available in tracking file)	649	61	658	1,368
Proportion upgraded	99%	35%	61%	72%

^[a] Period during which the contracts for the upgrades were mainly carried out.

First Phase of Upgrades (POU 1)

According to the information we obtained, the upgrades were carried out based on the standards in effect at the time, and 99% of the intersections were upgraded. It should be noted, however, that some components are not compliant with current standards, and further upgrades will be required. For example, pedestrian countdown signals were not a mandatory standard when the POU 1 work was carried out. It was only in 2007 that the municipalities were given a first deadline concerning pedestrian signals (December 31, 2010). This deadline was subsequently postponed to 2017. According to the information we obtained, the interventions required to upgrade the target intersections will be carried out after POU 2.

Dynamic Management (DM)

The intersections targeted for DM must first be upgraded to standard. Computerized equipment must then be installed to allow for adaptive management of the traffic lights, based on vehicular demand. DM was launched in 2004, with a goal of 217 intersections. On the basis of budget availability at the time, a professional services contract was issued for 170 intersections on four thoroughfares, Pie-IX, Henri-Bourassa, Crémazie and Sherbrooke, along with a contract for the work. The work was meant to be complete by March 2007.

The *Transportation Plan* adopted in 2008 reiterated the intention to install DM on these four thoroughfares. Based on the tracking file received from the DERA, 61 intersections have been updated so far. These intersections include 27 on Pie-IX upgraded to allow for full DM in 2008, and 34 intersections on Henri-Bourassa

upgraded to allow for partial DM in 2012, since only the section in the Ahuntsic-Cartierville borough was completed. Although the five-year report on the implementation of the *Transportation Plan* (2008-2012) states that DM was completed on these two thoroughfares, we have been informed that it is no longer functional in either case.

As for the other thoroughfares (Henri-Bourassa [section in the Rivière-des-Prairies–Pointe-aux-Trembles borough], Crémazie and Sherbrooke), the five-year report on the implementation of the *Transportation Plan* (2008-2012) states that the implementation will continue in 2013 and 2014. According to the tracking file from the DERA, however, DM has yet to be completed. Although the file refers to 85 interventions on intersections along these thoroughfares, according to the information we obtained, further interventions are still required to complete the upgrades. Moreover, there are still 27 intersections to be upgraded on which no interventions have taken place.

Second Phase of Upgrades (POU 2)

The tracking file showed the progress with regard to the signature of electronic programming plans and commissioning, as well as a work completion date. According to the information available, the level of progress is as follows:

- For 658 intersections (61%): Upgrades have been carried out. They are classified as [TRANSLATION] “fully commissioned” and have apparently been put into operation in compliance with the plans;
- For 217 other intersections (20%): Electronic programming plans have been signed and sealed by an engineer. These plans have apparently been entered in the order book, awaiting the other plans (BC, MA, SL) so the contract can be planned and issued;
- For 203 other intersections (19%): Electronic programming plans have not yet been developed or are in the process of being signed and sealed.

For our work, we wanted to ascertain the reliability of the data. On the basis of surveys conducted, we observed that although most of the intersections classified as [TRANSLATION] “fully commissioned” were supported by evidence, other intersections require further upgrades. These are intersections equipped with traffic lights in the boroughs of the former suburban cities. Before January 1, 2015, some boroughs upgraded the traffic lights in their local networks to comply with the Ministry’s mandatory standards, but further work will be required to comply with the internal standards.

Third Phase of Upgrades (POU 3)

The tracking file says that the intersections for this phase are mainly in the local networks. No professional services contract had been issued at the time of our audit

work. Upgrades have apparently been carried out internally, however, through ad hoc interventions.

4.3.2. Timeline Monitoring

The planning of traffic light interventions should include upgrade activities related to the legal requirements (*Tome V – Signalisation routière, Canadian Electrical Code*) and the internal standards stemming from the guidelines outlined in the *Transportation Plan* (e.g., audio signals, transit priority signals) or the priorities of the municipal administration.

The planning is disrupted by the integration of the upgrades with integrated projects from other business units or ad hoc requests from the boroughs.

Furthermore, the traffic light plan must take into account the capacity and availability of several internal stakeholders (the DEESM, the DI, the Commission des services électriques de Montréal, the Société de transport de Montréal [STM], the Service de police de la Ville de Montréal [SPVM]) and external stakeholders (professionals and contractors, Hydro-Québec) that are involved in the work.

The number and diversity of interventions and the stakeholders' restrictions contribute to the difficulty of establishing specific, detailed timelines that can be followed to meet final deadlines. Establishing such timelines is becoming increasingly important if the city is to comply with the legal requirements and meet the expectations set out in the 2008 *Transportation Plan* and the priorities of the municipal administration, however.

Our audit work determined that timelines had been established and that they were being tracked to ensure that the upgrades were carried out as planned.

4.3.2.1. Overall Timeline

4.3.2.1.A. Background and Findings

First, the overall timeline was announced in the *Transportation Plan* adopted in 2008. The upgrades were programmed in two phases. The first phase, which involved 800 intersections including the replacement of traffic light controllers, was already under way and expected to be finished by the end of 2008 at the latest. The second phase, which involved upgrades at 1,400 intersections, was planned for 2008 to 2010.

The *Transportation Plan* also planned for DM on four strategic thoroughfares – Pie-IX, Henri-Bourassa, Crémazie and Sherbrooke – a project that began at the same time as POU 1. Over a five-year horizon, a total investment of \$42.4 million was planned,

as shown in Table 5, suggesting that by the end of 2013, the upgrades and DM would be complete.

Table 5 – Investments Announced in the 2008 Transportation Plan

Target objectives	2008-2013
Adapt traffic lights to pedestrians' needs	\$0.6M
Introduce countdown signals at intersections	\$1.8M
Upgrade traffic lights	\$30.0M
Implement DM for traffic lights	\$10.0M
Total	\$42.4M

For the plan and specification preparations and the oversight of the upgrade work, three professional services contracts were signed with three engineering consortia. The professional services were not for 1,400 intersections but 1,200. According to the information in the decision-making summaries at the time these contracts were granted, the initial work schedule began in November 2008 and ended in December 2012, for a period of four years. When the list of intersections was communicated to the firms, a total of 1,078 intersections were divided among them. The upgrade project consisted essentially of making the traffic lights compliant with *Tome V – Signalisation routière*.

According to the information in the decision-making summaries, during this period, the firms encountered a number of difficulties completing the expected deliverables. A new activity for pedestrian countdown signals was therefore added to the professional contracts. The *Transportation Plan* specified that the standard pedestrian signals would be replaced by pedestrian countdown signals and that countdown signals would be added where required, but since the Ministry's requirements did not mention the justification criteria for adding these signals, the DERA had to develop an internal standard. It was communicated to the consultants in spring 2010 to be taken into consideration in the development of the plans and specifications, which increased the workload.

In spring 2012, an extension was requested for the professional services contracts. The city council authorized additional expenses to the same consortia¹⁹ to complete the plans and specifications and, in some cases, to redo them. The decision-making summaries referred to an initial completion schedule, setting the beginning of the work in December 2012 and the end in December 2014, or two additional years. It should

¹⁹ Some of the engineering firms in the consortia also changed.

be noted that work oversight was removed from the existing contracts, since new decision-making files were to be presented as the needs arose.

In these same decision-making summaries, the DERA announced that the deadline set by the legislator was now December 31, 2017, and that all the requirements enacted by it would be met when the upgrades were completed. It was beginning in this period that the upgrades no longer related exclusively to the legal obligations but also to the application of the internal standards to meet the objectives stemming from the *Transportation Plan*.

As for the plans and specifications, we have found no evidence that a timeline has been established to enforce the completion dates approved by the authorities. According to the information we obtained from the people we met with, the plans and specifications were completed gradually, based on emerging needs. Also, when the plans were received, they were constantly being reviewed, because amendments and additions were made based on new internal standards stemming from the priorities. As mentioned in the previous section, the DERA did not receive the plans for all the intersections initially targeted in POU 2.

Concerning the traffic light upgrades and DM project announced in the *Transportation Plan*, which were to be carried out over a period of five years, with a completion date around 2013 (based on adoption in 2008), we found no evidence of a plan providing the number of intersections to be completed each year (year, location on network) in order to meet the initial timeline or even the deferred 2017 completion date for the pedestrian countdown signal upgrades.

Our audit work reveals that the work contracts granted on the basis of the plans and specifications produced between 2008 and 2016 were actually for around 750 intersections of the 1,200 mentioned in the professional services tender documents. Based on the information in the decision-making summaries for the original timelines, for all contracts granted, we established that the theoretical overall timeline ran from 2011 to 2018. There were no contracts for the other 450 intersections at the time of our audit. We found no evidence that a timeline had been prepared to meet the expected completion dates, but it can be foreseen that the completion date of December 31, 2017, will not be met.

Furthermore, as concerns the DM project announced in the *Transportation Plan*, upgrades on some intersections have yet to be carried out, first to comply with the legal and internal standards, but also to ultimately allow for DM on the four originally planned thoroughfares.

Moreover, although this section deals with POU 2, there are intersections from POU 1 that do not meet the legal requirements concerning the replacement of regular pedestrian signals with pedestrian countdown signals. According to the Ministry's

requirements, the deadline for complying with this standard is December 31, 2017. The people in charge do not currently know the number of non-compliant intersections.

Finally, the announcement of the upgrade program in the 2008 *Transportation Plan* was for intersections equipped with traffic lights in the arterial network. As we have already mentioned, the boroughs were responsible for upgrades on the local roadwork network until the city council took responsibility for this network on January 1, 2015. As the organization in charge, the DERA had, at that point, to verify the compliance with the legal requirements and internal standards of the 300 intersections in question. According to the information we obtained, this exercise was not planned in the first two upgrade phases, but will be part of a third phase beginning in 2017, POU 3.

Our work revealed the following:

- Since the beginning of the program, we found no evidence demonstrating a real intention to meet the various deadlines imposed by the Ministry (December 2010, December 2012, December 2013, December 2017);
- The deadline set by the legislator (December 31, 2017) will be here in a few months, and the completion schedule for some of the contracts granted continues until 2018;
- The deadline (December 31, 2017) applies specifically to the replacement of the regular pedestrian signals with pedestrian countdown signals and not to all intersections;
- Work contracts have yet to be issued for a significant portion of the intersections;
- Other internal standards have to be applied to achieve the objectives and guidelines arising, in part, from the *Transportation Plan* (some with deadlines and others without).

Consequently, we believe that the DERA should establish a status report concerning the nature of the upgrade work to be completed for all intersections, in order to comply with the legal requirements and meet the guidelines of the *Transportation Plan* or the priorities of the municipal administration. Solid knowledge of what remains to be done should make it possible to establish a realistic timeline for compliance, with either the Ministry's requirements or the internal standards. We also believe that the Direction des transports should have the new deadlines approved by the municipal administration, since major investments are likely to be associated with these additional delays.

Furthermore, the Direction des transports should officially inform the Ministry that it is unlikely that the city will be able to meet the deadline of December 31, 2017, and submit to it a timeline, approved by the Direction générale, for compliance with the standards for pedestrian signals.

RECOMMENDATIONS	
4.3.2.1.B.	We recommend that the Service des infrastructures, de la voirie et des transports prepare a status report about the traffic light upgrade work required to meet the legal requirements and internal standards and to implement dynamic management, in order to determine the investments required to comply with the law, the guidelines set out in the <i>Transportation Plan</i> and the priorities of the municipal administration.
4.3.2.1.C.	We recommend, in light of the requirements of the <i>Transportation Plan</i> and the guidelines retained by the municipal administration, that the Direction générale establish an overall timeline that takes into account all the interventions required to comply with the legal requirements and internal standards for traffic lights and to implement dynamic management in order to improve the travel and safety of the residents.
4.3.2.1.D.	We recommend that the Service des infrastructures, de la voirie et des transports official inform the Ministère des Transports, de la Mobilité durable et de l'Électrification des transports that it is unlikely that the city will be able to meet the deadline of December 31, 2017, for the installation of pedestrian countdown signals and submit to it a realistic timeline for complying with the <i>Highway Safety Code</i> .
BUSINESS UNITS' RESPONSES	
4.3.2.1.B.	Service des infrastructures, de la voirie et des transports On May 15, 2017, the Direction générale submitted its action plan for the recommendation it was targeted by and informed us that the Service des infrastructures, de la voirie et des transports action plan was under development and would be submitted as soon as possible.
4.3.2.1.C.	Direction générale [TRANSLATION] The overall timeline for interventions is intrinsically linked to the resources available and the work they can perform. · The Direction générale will first ask the Service des infrastructures, de la voirie et des transports for a timeline of the actions that can be taken in the short term with the current resources. (Planned completion: June 2017) · In 2018, the Service de la performance organisationnelle will analyze how the work teams involved in traffic light management operate. It will then produce a report. (Planned completion: December 2018)

4.3.2.1.D.

Service des infrastructures, de la voirie et des transports

On May 15, 2017, the Direction générale submitted its action plan for the recommendation it was targeted by and informed us that the Service des infrastructures, de la voirie et des transports action plan was under development and would be submitted as soon as possible.

4.3.2.2. Annual Upgrade Program

4.3.2.2.A. Background and Findings

Despite the lack of an overall plan and a detailed, documented timeline to complete the POU 2 work and other interventions, in 2012 the DERA implemented an annual intervention plan for intersections. This program is for upgrades to the *Tome V – Signalisation routière* standards and the internal standards (e.g., audio signals and transit priority signals).

When work is required, the coordinator, who is responsible for the general tracking of traffic light work, receives the various plans required. The target intersections are then entered in the annual order book. For each intersection entered, it shows whether the work is to upgrade to mandatory standards, transit priority measures, audio signals or other. This order book lists the intersections targeted for traffic light work and those for which contracts have been issued. It also serves as a completion tracking tool. It shows the intersection numbers, the streets, the dates the plans were submitted, the type of intervention (e.g., MAN, new light, change of controller, pedestrian signal, audio signal, transit priority light or pre-emption systems), the contract numbers and the planned commissioning dates, which mark the projected end of the intervention and the effective operation of the traffic light.

In 2013, the DERA set the objective of bringing 165 intersections up to the mandatory standards each year. With this objective, it was estimated that all the intersections in POU 2 would be completed in 2017. It was on this basis that the annual program was established. The POU 2 upgrade objective was not met for three years, however (see Table 6), which generates a risk of not meeting the December 31, 2017 deadline. As we can see, priority was placed on other interventions to meet internal standards stemming from the municipal administration's priorities (such as audio signals and transit priority signals).

In 2015 and 2016, an overall traffic light commissioning objective was agreed with the DEESM (300 intersections per year), based on its execution capacity. This overall objective targeted the intersections to be upgraded (POU 2) and other targets that the DERA deemed to be a priority. We have determined that every week, the DERA tracked the number of traffic light commissionings. The overall objective was only attained in 2015, however.

**Table 6 – Intersection Commissioning Objectives
Tracked by the DERA (2013 to 2016)**

Type of intervention	2013		2014		2015		2016	
	Objective	Achievement	Objective	Achievement	Objective	Achievement	Objective	Achievement
Upgrade (POU 2)	165	153	165	116	165	172	130	111
Audio signals	n/a	5	50	25	50	69	50	19
Transit priority signals	n/a	–	50	23	n/a	11	120	136
Integrated projects	n/a	27	n/a	80	84	52	N/A	N/A
Other	–	–	–	–	–	98	–	53
Total interventions^[a]		185		244		402		319
Total intersections	165	185	265	244	299	327	300	279

^[a] More than one intervention may be carried out on the same intersection.

Note: n/a = not available.
N/A = not applicable.

Furthermore, beginning in 2015, intersections were prioritized in the annual program on the basis of the following criteria:

- Project under way;
- Project combining several targets or interventions (audio signal and transit priority upgrades);
- Audio signal project;
- Upgrade project including transit priority lights under analysis;
- Project including transit priority lights under analysis.

The mandatory upgrade objective for 2017 was reduced to 130 intersections, instead of 165.

In a further effort to explain the difficulty achieving the commissioning objectives, we used surveys to assess whether they were completed in accordance with the timelines shown in the decision-making summaries. We conducted this analysis from the perspective that an overall timeline should have been kept up to date since the beginning of POU 2. To do this, we selected 11 contracts granted between 2011 and 2015. We compared the initial completion period, shown in the decision-making summaries recommending the attribution of the contract, and the intersection commissioning dates, shown in the file used to establish the program. Table 7 presents the results concerning the processing times of the selected contracts. These contracts were for from 4 to 30 intersections to be upgraded, for a total of 136 intersections. For the purposes of our analysis, the processing time for an intersection was estimated

from the last month projected at the time of the initial plan in the decision-making summary and the commissioning date entered in the tracking file.

**Table 7 – Processing Time for Commissioning
in Comparison with Calendar in Decision-Making Summaries
(Selected Contracts Between 2011 and 2015)**

Year	No. of contracts	No. of intersections	Processing time				
			Deadline met	1 year	2 years	3 years	Not done
2011	1	5	–	–	5	–	–
2012	4	38	–	21	12	5	–
Subtotal	5	43	–	21	17	5	–
2013	4	53	16	31	4	–	2
2014	1	10	8	2	–	–	–
2015	1	30	10	13	–	–	7
Subtotal	6	93	34	46	4	–	9
Total	11	136	34	67	21	5	9
			Percentage completion (%)				
2011			–	–	100%	–	–
2012			–	55%	32%	13%	–
Subtotal			–	49%	39%	12%	–
2013			30%	58%	8%	–	4%
2014			80%	20%	–	–	–
2015			33%	44%	–	–	23%
Subtotal			37%	49%	4%	–	10%
Total			25%	49%	15%	4%	7%

Our work reveals that beginning in 2013, the DERA upgraded 37% of the intersections within the time expected in the decision-making summaries, 49% the next year and 4% the second year. For 10% of the intersections, we found no evidence that the upgrade was carried out. Overall, this is an improvement in comparison to 2011 and 2012, where no intersections were completed within the time expected in the decision-making summaries. In our opinion, these delays increase the risk of not meeting the deadlines imposed by the government or those related to the internal standards. Several causes may explain these delays. For example, contracts that begin later than the timeline shown in the decision-making summaries, failure to meet upgrade deadlines and unavailability of workers for commissioning.

Prior to 2013, the DERA was responsible for preparing the plans and specifications, while the responsibility for carrying out the work belonged to the DI. Beginning in 2013, the DERA was responsible for the entire process related to traffic light interventions,

from design (plans and specifications) to contract execution, as well as overseeing the work, except for projects integrated with infrastructure work under the responsibility of the DI.

Although all the contracts granted in 2013, 2014 and 2015 covered an 18-month execution calendar and involved a large number of intersections (ranging from 30 to 50), which gave the DERA some flexibility in its annual program, we found that the DERA significantly increased the number of intersections upgraded within the initial completion time shown in the decision-making summaries for contract attribution. Based on our surveys, however, 63% of the intersections were not completed on time.

We believe that the DERA should evaluate the type of delays that occur between the initial execution period, shown in the decision-making summaries for contract attribution, and the actual intersection commissioning dates, to determine the reasons for the delays and make the appropriate changes.

RECOMMENDATIONS	
4.3.2.2.B.	We recommend that the Service des infrastructures, de la voirie et des transports take the means required to upgrade a sufficient number of intersections in order to meet the established annual commissioning objective and meet the deadlines imposed by the law or stipulated by the municipal administration.
4.3.2.2.C.	We recommend that the Service des infrastructures, de la voirie et des transports evaluate the type of delays between the initial execution calendar shown in the decision-making summaries for contract attribution and the actual traffic light commissioning date and take the measures required to reduce these delays in order to meet the overall timeline of the upgrade program.
BUSINESS UNIT'S RESPONSE	
4.3.2.2.B.	<i>Service des infrastructures, de la voirie et des transports</i>
4.3.2.2.C.	On May 15, 2017, the Direction générale submitted its action plan for the recommendation it was targeted by and informed us that the Service des infrastructures, de la voirie et des transports action plan was under development and would be submitted as soon as possible.

4.3.3. Cost of Traffic Lights Upgrades

When planning a program that takes place over several years, such as an upgrade program, the people in charge should determine, from the outset, the scope of the work and the timelines, in addition to estimating the costs. It is on the basis of these

estimates that the authorities should give their approval for the program. Whether the upgrades are imposed by the law or based on internal standards to achieve an objective of the municipal administration, the estimated costs must be taken into consideration to determine whether the city has the budgetary capacity to complete the project within the proposed timeline. In both cases, these cost estimates should support the decisions, from the outset, and be closely tracked throughout the project.

An exercise should also compare the costs incurred at a given date, corresponding to the units completed, not only with the cost estimates but also with the contract (real costs) to identify any overspending at the right time and make the appropriate changes.

Our audit work sought to ensure that cost estimates were provided and tracked throughout the upgrade program. We first examined the overall cost estimate for the upgrade program, then the estimates for the cost of contract execution and finally the cost tracking.

4.3.3.1. Overall Cost Estimate – Upgrade Program

4.3.3.1.A. Background and Findings

To determine the accuracy of the overall cost estimate for the upgrade program, we compared the initial estimate with the costs incurred to date.

At the time that the *2008 Transportation Plan* was adopted by the urban agglomeration council, the Direction des transports announced the upgrade of 1,400 intersections equipped with traffic lights, at a cost of \$42.4 million over five years, distributed as follows:

· POU 2 traffic light upgrade:	\$30.0M
· Adaptation of traffic lights to pedestrian needs:	\$0.6M
· Introduction of countdown signals at intersections:	\$1.8M
· Implementation of DM:	<u>\$10.0M</u>
	\$42.4M

During our audit work, we asked for documentation of the cost estimates supporting the announcements in the *Transportation Plan*. According to the information we obtained, this documentation was not available. We believe that the documentation of cost estimates should be kept to justify the decisions made by the authorities and for verification purposes.

For comparison purposes, we reconciled this estimate with the value of the contracts granted since the *Transportation Plan*. Our work reveals that a total amount of \$65.1 million was spent on POU 2 and the DM for professional services and work contracts, from 2008 to 2016 (see Table 8).

**Table 8 – Contracts Granted Under the Upgrade Program
(2008 to 2016)**

Type of expenses authorized at the time of contract attribution	Amount
Professional services: preparation of plans and specifications and work oversight	\$15.2M
Execution of upgrade work (traffic lights and civil engineering works – including provision of equipment and components)	\$44.7M
Execution of upgrade work integrated in infrastructure network repair work	\$5.2M
Total	\$65.1M

Note: According to the information in the decision-making summaries supporting the contracts, a sum of \$19.8 million is for upgrade work and the acquisition of traffic light equipment that will take place in 2017 and 2018.

Specifically concerning the execution of the work, there are 63 contracts for a total of 748 intersections. If we compare this number with the intersections that were initially supposed to be upgraded at the time the *Transportation Plan* was adopted (1,400 intersections), we can see that, to date, there are no contracts for just under half of the intersections.

We also compared the value of the contracts with the real POU 2 expenditures recorded in the books on November 7, 2016, since the adoption of the *Transportation Plan* in 2008. They are equal to \$74.1 million, as shown in Table 9.

**Table 9 – Upgrade Program (Project 59002)
Real Expenditures (January 1, 2008, to November 7, 2016)**

Expense categories	Amount
Plans and specifications, work oversight and other	\$15.3M
Work execution (traffic lights and civil engineering works)	\$17.7M
Acquisition of equipment and components (internal and external purchases of equipment and specialized services)	\$21.3M
Work executed by third parties (refundable)	\$3.8M
	\$42.8M
Subtotal	\$58.1M
Work executed internally (capitalizable)	\$16.0M
Total	\$74.1M

Source: Data extracted from SIMON accounting system.

As we can see, the preparation of plans and specifications and the work oversight cost \$15.3 million, while the real expenditures related to the execution of the work, the acquisition of the equipment and components and the expenditures by third parties come to \$42.8 million, for a total of \$58.1 million. For accounting purposes, the cost of the capitalizable salaries of the work force assigned to the upgrade program (\$16.0 million) is added to this figure.

In conclusion, the comparison of the original estimate (\$42.4 million) with the real costs incurred (\$74.1 million) on November 7, 2016, reveals that the work cost more than projected in the *Transportation Plan*, especially because not all the intersections were upgraded as planned. It can be expected that yet other costs will be added to the upgrade program.

Part of the difference can clearly be explained by the fact that internal standards were added between 2008 and 2016 (e.g., the addition of audio signals and pedestrian countdown signals, the changed traffic light furniture and equipment). Indeed, an examination of the decision-making summaries for the attribution of contracts to entrepreneurs reveals that the nature of the work had changed. Adding these standards resulted in additional costs. We saw no evidence that cost estimates were produced when the internal standards were added by the Direction des transports. We believe that the municipal administration should have been informed of the financial impact of these decisions, for all the planned works. To this end, Recommendation 4.3.2.1.B. advocates preparing a status report on the upgrade work to comply with both the legal requirements and the internal standards, in order to assess the investments required.

4.3.3.2. Cost Estimate – Work Execution

Detailed cost estimates serve as a reference for analyzing bids received and recommending contract attribution to the lowest compliant bidder.

Since 2013, when the DERA took responsibility for the entire process related to traffic light interventions, it has prepared the tenders and cost estimates. Previously, and for the POU 2 projects, including traffic light work integrated with infrastructure works, the tenders and cost estimates for the intersections involved were under the responsibility of the DI.

To analyze the preparation of cost estimates, compare the estimates with the proposal retained and track the costs, we selected seven contracts attributed between 2012 and 2016, which are presented in Table 10.

**Table 10 – Sample of Seven Contracts Granted
Between 2012 and 2016 that Include
Traffic Light Upgrade Work**

Year	Reference no.	Managed by	No. of intersections	Amount of contract granted		
				Price	Contingencies	Total
2012	219201	DI	11	\$172,972	\$25,946	\$198,918
2013	219501	DI	7	\$449,895	\$67,484	\$517,379
2014	SP2014-2	DERA	10	\$1,103,751	\$110,375	\$1,214,126
2015	282001 ^[a] (integrated project)	DI	2	\$217,138	\$29,451	\$246,589
2015	282901 ^[b] (integrated project)	DI	3	\$221,923	\$25,473	\$247,396
2016	SP2016-02	DERA	40	\$6,504,141	\$1,300,828	\$7,804,969
2016	SP2016-03	DERA	50	\$1,538,033	\$307,607	\$1,845,640

^[a] Part of a roadworks, lighting and traffic light contract (price: \$2,746,572; contingencies: \$292,033; total: \$3,038,605).

^[b] Part of a roadworks, lighting and traffic light contract (price: \$11,937,963; contingencies: \$1,229,409; total: \$13,167,372).

4.3.3.2.1 Preparation of Detailed Cost Estimates

4.3.3.2.1.A. Background and Findings

The reliability of the detailed cost estimates depends on a combination of two basic parameters: the quantities established and the unit prices associated with them. Reliable estimates are especially necessary when the quantities and work to be completed will be included in tender documents.

Based on the “order book”, the DERA groups several intersections in a lot to issue a tender for the work. From 2008 to 2012, the lots ranged between 4 and 16 intersections. Since 2013, the number of intersections has increased to 30, 40 or 50 intersections. Regardless of the number intersections subject to the tender, the DERA proceeds in every case with an estimate on the basis of the needs of each of these intersections. An overall, detailed estimate is therefore prepared and used to document the quantities and work to be done before issuing the tender. For intersections where the upgrades are part of integrated projects, it is the DI that prepares the cost estimates for the entire project. As mentioned earlier, for the traffic light portion of these projects, the DI relies on the plans produced by the DERA.

Our audit work first sought to determine whether these cost estimates exist. It also sought to ensure that the quantities were established based on the plans and that the determination of the unit prices was documented.

An examination of the decision-making summaries supporting all the contracts issued allowed us to verify the existence of internally prepared reference cost estimates (quantities, unit prices and total cost).

For the period covered by our audit, we observed that the cost estimates became more explicit over time. From simple spreadsheets (2012 and 2013) where the work to be done is briefly described, with quantities and unit prices for each component, beginning in 2014 the estimates became increasingly explicit in terms of the information communicated, clearly identifying the needs in terms of the following categories:

- Cables (detailed by type, size, etc.);
- Furniture (boxes, extensions, poles and arms);
- Equipment (electrical service boxes);
- Work coordination:
 - Identification of the worker mobilization period;
 - Quantification of materials provided by the city to be transported or returned to the city;
- Electrical work:
 - Quantities and description of electrical work to be done, based on components;
- Civil engineering work:
 - Quantities and description of civil engineering work to be done based on the structures (concrete bases and pedestals, access shafts, conduits and surfaces).

These estimates generally contain information about the specific quantities of the traffic light components to be replaced or installed, and the quantities related to the civil engineering work, such as concrete bases for each intersection. Our surveys revealed that (for the contracts in 2012, 2013 and 2015) the quantities established generally relied on the plans²⁰ for each intersection. For the three contracts issued in 2014 and 2016, however (10, 40 and 50 intersections), the quantities were established on the basis of hypotheses, because the plans were not ready for all the targeted intersections. We understand that this method was used to speed up the completion of the work. We believe, though, that this situation entails a risk that some quantities will be overestimated and others underestimated. This requires rigorous monitoring of the work and the contracts. We will deal with this topic in section 4.3.3.2.3.

To determine the reliability of the unit prices in the establishment of the estimates, we compared those used by the DERA and the DI for certain items at the time the estimates were prepared, for the seven projects in our sample. The unit prices are shown in Table 11.

²⁰ Base and conduit plan: Shows the location of the traffic light bases and the route of the electrical conduits; geometric plan of the intersection, pavement marking plan, electronic programming plan and light signalling plan.

**Table 11 – Unit Prices Used in Cost Estimates
(Selection of 7 Contracts Between 2012 and 2016)**

Unit that prepared the estimate	DI	DI	DI	DI	DERA	DERA	DERA
Year contract issued	2012	2013	2015	2015	2014	2016	2016
Description of work	Estimated unit price						
Concrete base	\$1,200.00	\$1,200.00	\$1,590.17	\$1,676.19	\$1,200.00	\$1,200.00	N/A
Removal of an arm (4 to 5 m)	\$250.00	\$250.00	\$132.00	\$95.41	\$125.00	\$125.00	\$125.00
Installation of controller	\$1,500.00	\$1,500.00	\$1,348.97	\$1,348.97	\$800.00	\$800.00	\$800.00
Installation of traffic light head on an arm	\$300.00	\$300.00	\$210.61	\$67.51	\$125.00	\$200.00	\$200.00
Transport of materials from the city	\$300.00	\$300.00	\$473.79	\$449.21	\$450.00	\$450.00	\$450.00

A careful examination of the changes in unit prices used for the selected items reveals differences based on whether they were established by the DERA or the DI. The unit prices used by the DERA (2014 and 2016) are standard prices that were not adjusted or indexed by year, while those used by the DI (2012, 2013 and 2015) seem to be adjusted prices. To evaluate the size of the gap in the unit prices used by the two business units, we compared the average unit prices established by the DERA (2014 and 2016) with the average unit prices established by the DI (integrated projects, 2015). On the basis of the five items selected, we saw significant differences, as shown in Table 12.

**Table 12 – Differences Between the Average Unit Price Estimates
Established by the DERA and the DI**

Description of work	Average unit price		Difference	
	DERA 2014 and 2016	DI 2015	\$	%
Concrete base	\$1,200.00	\$1,633.18	\$(433.18)	–36%
Removal of an arm (4 to 5 m)	\$125.00	\$113.71	\$11.29	9%
Installation of controller	\$800.00	\$1,348.97	\$(548.97)	–69%
Installation of traffic light head on an arm	\$175.00	\$139.06	\$35.94	21%
Transport of materials from the city	\$450.00	\$461.50	\$(11.50)	–3%

This means that the cost estimates used as a reference to evaluate the bids received for the traffic light upgrade work are not standard within the same service (SITE). We believe that a single methodology for determining the unit prices should be established in order to standardize methods between the two business units (DERA and DI).

RECOMMENDATIONS

4.3.3.2.1.B.	We recommend that the Division de l'exploitation du réseau artériel update the unit prices used to produce the estimates, if appropriate, in order to reflect market prices and prepare relevant analysis reports when evaluating bids received.
4.3.3.2.1.C.	We recommend that the Service des infrastructures, de la voirie et des transports ensure that a single method is used to determine unit prices when preparing cost estimates for traffic light upgrades, to improve the reliability of the data.

BUSINESS UNIT'S RESPONSE

4.3.3.2.1.B.	<i>Service des infrastructures, de la voirie et des transports</i>
4.3.3.2.1.C.	On May 15, 2017, the Direction générale submitted its action plan for the recommendation it was targeted by and informed us that the Service des infrastructures, de la voirie et des transports action plan was under development and would be submitted as soon as possible.

4.3.3.2.2 Comparison of Cost Estimates with Retained Proposal

4.3.3.2.2.A. Background and Findings

The detailed estimates should be a reliable reference for assessing whether the bids received are reasonable. Reliable cost estimates should therefore represent the market. Otherwise, mechanisms should be in place to identify differences and provide convincing explanations to reassure the authorities when a contract is granted.

During our audit work, we tried to determine whether, when the tenders were issued, the service transmitted the necessary documents to give the bidders a good understanding of the needs and required quantities. We also assessed the reliability of the detailed estimates used to judge whether the bids received were reasonable. To do this, we compared the amount of the detailed estimates with the lowest bid received and we ensured that major differences were explained in the preparation of the decision-making documents before the contract was granted.

It should be noted that the threshold at which the differences between the detailed estimates and the lowest bids have to be analyzed was specified in a guide prepared by the Service du greffe concerning the content and presentation of decision-making files (October 2015). This guide stipulates that business units must present and [TRANSLATION] *“thoroughly explain any difference of more than 10% between the bid of the successful bidder and the last estimate carried out”*.

Concerning the tender documents, we noted that the service had provided and distributed the required documents for contracts granted from 2012 to 2015 to give the bidders a good understanding of the needs and quantities. This documentation included intersection maps, standardized traffic light specifications and bills of quantities. For the contracts granted in 2016, however, on a larger number of intersections (40 and 50), the service distributed the standardized traffic light specifications and the bills of quantities. The quantities in the detailed estimate were established based on hypotheses because the plans were not ready. The lack of plans in the tender documents prevented the bidders from gaining an accurate understanding of the needs in order to submit a bid. It should be noted that the plans are given in lots to the contractor based on the progress of the contracts. It is only at this time that the contractor knows the exact quantities for the targeted intersections. This method requires thorough tracking of the work carried out. We will deal with this topic in the next section.

The detailed estimates and the lowest retained bids are compared in Table 13. The estimates for the contracts granted from 2014 to 2016 were prepared by the DERA. Those for the contracts granted in 2012, 2013 and 2015 were prepared by the DI's Division de la gestion de projets et de l'économie de la construction.

**Table 13 – Comparison of Detailed Estimate and Lowest Retained Bid
(7 Selected Contracts)**

Year contract issued	Contract number and unit in charge	No. of intersections	Amounts		Over- or under-evaluation of cost estimate (%)
			Cost estimate	Retained bid	
2012	219201 DI	11	Contract: \$185,187 Contingencies: <u>\$27,778</u> \$212,965 Incidental charges: <u>\$178,000</u> \$390,965	\$172,972 <u>\$25,946</u> \$198,918	6.6%
2013	219501 DI	7	Contract: \$489,494 Contingencies: <u>\$73,424</u> \$562,918 Incidental charges: <u>\$251,000</u> \$813,918	\$449,895 <u>\$67,484</u> \$517,379	8.1%
2014	SP2014-2 DERA	10	Contract: \$999,897 Contingencies: <u>\$99,990</u> \$1,099,887 Incidental charges: <u>\$506,594</u> \$1,606,481	\$1,103,751 <u>\$110,375</u> \$1,214,126	(10.4%)
2015	282001 ^[a] (integrated project) DI	2	Contract: ^[b] \$189,784 Contingencies: <u>\$21,597</u> \$211,381 Incidental charges: <u>\$100,000</u> \$311,381	\$217,138 <u>\$29,451</u> \$246,589	(16.7%)
2015	282901 ^[a] (integrated project) DI	3	Contract: ^[c] \$245,655 Contingencies: <u>\$33,565</u> \$279,220 Incidental charges: <u>\$283,515</u> \$562,735	\$221,923 <u>\$25,473</u> \$247,396	11.4%
2016	SP2016-02 DERA	40	Contract: \$5,199,152 Contingencies: <u>\$1,039,830</u> \$6,238,982 Incidental charges: <u>\$3,902,485</u> \$10,141,467	\$6,504,141 <u>\$1,300,828</u> \$7,804,969	(25.1%)
2016	SP2016-03 DERA	50	Contract: \$1,409,421 Contingencies: <u>\$281,884</u> \$1,691,305 Incidental charges: <u>\$461,409</u> \$2,152,714	\$1,538,033 <u>\$307,607</u> \$1,845,640	(9.1%)

^[a] Estimates specific to the traffic light upgrades, including civil engineering work at intersections.

^[b] Part of a roadworks, lighting and traffic light contract (price: \$2,746,572; contingencies: \$292,033; total: \$3,038,605). Internal estimate (price: \$3,360,086.98; contingencies \$355,428.06; total: \$3,715,515.04).

^[c] Part of a roadworks, lighting and traffic light contract (price: \$11,937,963; contingencies: \$1,229,409; total: \$13,167,372). Internal estimate (price: \$12,062,858.00; contingencies \$1,254,028.51; total: \$13,316,886.51).

Our work revealed that the estimates produced by the DERA (2014 and 2016) were lower than the retained bids. We also observed that the DERA provided explanations of the differences in just one decision-making summary for contract attribution, project SP2016-02 (25.1%). According to the guidelines stated in the guide for the preparation of decision-making files, the DERA should have also explained the difference in contract SP2014-2, as it was 10% higher. The estimates produced by the DI in 2012 and 2013 were higher than the retained bids. In these two cases, the Division de la gestion de projets et de l'économie de la construction made a favourable comment in the decision-making summaries.

For the two integrated projects (2015), the DI granted the contracts for the lowest compliant bid for infrastructure work that included traffic lights. The guidelines stated in the guide for the preparation of decision-making files ask the business units to do a comparative analysis between the detailed estimates and the bid retained before attributing the contracts. In both these cases, however, the analyses revealed an over-evaluation of the estimate, by 18.1% for contract 282001 and by 1.1% for contract 282901. We noticed that the Division de la gestion de projets et de l'économie de la construction documented the difference when it was more than 10%, but the explanation provided was not related to the traffic lights, as they represented a small proportion of the work to be carried out (7%).

RECOMMENDATION

4.3.3.2.2.B. We recommend that the Service des infrastructures, de la voirie et des transports thoroughly explain, when preparing decision-making summaries for contract attribution, any difference higher than the established acceptable threshold (10%) between the winning bid and the last estimate carried out, in compliance with the guidelines issued by the Service du greffe, to improve the authorities' decision-making.

BUSINESS UNIT'S RESPONSE

4.3.3.2.2.B. ***Service des infrastructures, de la voirie et des transports***
On May 15, 2017, the Direction générale submitted its action plan for the recommendation it was targeted by and informed us that the Service des infrastructures, de la voirie et des transports action plan was under development and would be submitted as soon as possible.

4.3.3.2.3 Tracking of Work Completion Costs in Second Upgrade Phase (POU 2)

4.3.3.2.3.A. Background and Findings

Tracking is required to ensure that the costs invoiced are for the intersections described in the contract and that they correspond to the services provided. It must also ensure that the costs are in line with the amount initially authorized, so as to detect any overspending in a timely fashion.

Engineers serving as project managers are entrusted with the task of tracking the upgrades of intersections equipped with traffic lights.

For contracts managed by the DERA, this tracking consists of ensuring proper functioning in terms of services rendered, costs and timeline. The project managers rely on work site oversight conducted by either internal resources or external engineering firms. For each intersection, the work must be carried out in compliance with the plans produced by the professionals and accepted by the DERA and the costs submitted by the contractor retained, for both the electrical work and the civil engineering work.

When the upgrade work is part of a contract managed by the DI, all the work, including the work on the traffic lights, is managed by a project manager who reports to the DI. The work oversight for the traffic lights is also the responsibility of the DI. Since 2013, a DERA engineer designated as a respondent with the DI monitors the compliance of the upgrade work with the plans produced.

Every DERA project manager builds a file for each intersection, containing the various plans, pre-work surveys in the form of photographs, materials and equipment forms, the cost estimate, the bid of the retained contractor, all intervention requests communicated to the contractor and any other documents transmitted.

First, as concerns the tracking of the work carried out, for each intersection targeted by a contract, the project manager gives the contractor the order to begin the upgrade work. The DERA provides ongoing oversight of the work (in-house or externally). When the civil engineering and electrical work has been completed, all the stakeholders involved²¹ are called together, at the request of the project manager, to officially commission the traffic lights. The commissioning confirms that the traffic lights work in accordance with the programming set out in the electronic programming plan (e.g., length of pedestrian signal, length of traffic light for each lane).

²¹ A representative of the contractor, the engineer assigned by the DERA (manager of the contractor's contract), the site overseer (external firm or the city), the DEESM representative who programmed the controller and representatives of the Service de police de la Ville de Montréal to manage the traffic when the traffic lights are interrupted for the commissioning.

Throughout the contract, the project manager is also responsible for monitoring the costs, using progressive payments that show the contract expenditures, at a given date, including contingencies. The monitoring “process” consists of reconciling the quantities invoiced with those shown in the bid form. It relies on the attestation of quantities by the site overseers. The project manager also exercises control over change requests that generate contingencies. At the end of this step, the project manager recommends the approval of the progressive payments to the DERA or DI, as the case may be.

The project manager is also responsible for monitoring the incidental charges that were authorized by the authorities at the time the contract was granted. For each contract, this involves an estimate that combines a variety of expenses that can be foreseen for the payment of technical work (laboratory, marking and signalling) and for the acquisition of the traffic light furniture from the Centre de distribution Louvain and the controllers from the DEESM. During the execution of the work, it is, in part, from internal purchase requests that the project manager exercises control over these incidental charges.

During our audit, we tried to determine whether the number of intersections planned in the contracts had been completed and whether the budget was met. To do this, we looked for evidence in the oversight reports that the planned intersections were commissioned as expected. We also examined the documentation concerning the progressive payments (invoices, authorizations, charts of costs invoiced compared to costs planned in the contractor’s bid) for the contracts in our sample. Finally, we looked for evidence of cost monitoring of the incidental charges, particularly related to the acquisition of traffic light furniture and controllers.

The expenses authorized by the city council and the results of the amounts used are presented in Table 14, for each of the contracts examined.

**Table 14 – Authorized Expenses and Amounts Used as of October 31, 2016
(7 Selected Contracts)**

Year	Unit in charge	Contract no. No. of intersections Status	Amount authorized Amount used Difference	Cost of contract	Cost of contingencies	Incidental charges – traffic light furniture
2012	DI	Contract: 219201	Amount authorized:	\$172,972	\$25,946	\$165,000
		No. of intersections: 11	Amount used:	\$124,816	\$7,094	\$69,008
		Status: work completed	Difference:	\$48,156	\$18,852	\$95,992
2013	DI	Contract: 219501	Amount authorized:	\$449,895	\$67,484	\$245,000
		No. of intersections: 7	Amount used:	\$348,745	\$–	\$104,783
		Status: work completed	Difference:	\$101,150	\$67,484	\$140,217
2014	DERA	Contract: SP2014-2	Amount authorized:	\$1,103,751	\$110,375	\$359,685
		No. of intersections: 10	Amount used:	\$1,034,816	\$66,525	\$125,043
		Status: work completed	Difference:	\$68,935	\$43,850	\$234,642
2015	DI	Contract: 282001 (integrated project)	Amount authorized:	\$217,138	\$29,451	\$88,777
		No. of intersections: 2	Amount used:	\$158,687	\$21	\$–
		Status: under way	Difference:	\$58,451	\$29,430	\$88,777
2015	DI	Contract: 282901 (integrated project)	Amount authorized:	\$221,923	\$25,473	\$106,756
		No. of intersections: 3	Amount used:	\$218,809	\$–	\$–
		Status: under way	Difference:	\$3,114	\$25,473	\$106,756
2016	DERA	Contract: SP2016-02	Amount authorized:	\$6,504,141	\$1,300,828	\$3,121,988
		No. of intersections: 40	Amount used:	\$–	\$–	\$–
		Status: beginning in 2017	Difference:	\$6,504,141	\$1,300,828	\$3,121,988
2016	DERA	Contract: SP2016-03	Amount authorized:	\$1,538,033	\$307,607	\$369,128
		No. of intersections: 50	Amount used:	\$145,312	\$1,008	\$116,320
		Status: under way	Difference:	\$1,392,721	\$306,599	\$252,808

First, the level of advancement on the seven contracts examined is as follows: one was completed (219501); two (219201 and SP2014-2) had the work finished, but there was no evidence of provisional or final acceptance; three were under way (282001, 282901 and SP2016-03) and one will begin in 2017 (SP2016-02).

In general, for contracts in which invoices were issued, with progressive payments produced and supporting documents, we observed that they were verified by the project manager and had the required approvals recommending payment. On the other hand, in some cases, we noted that the documentation supporting the progressive payments was incomplete with regard to contingencies. We also noted that contingencies were recorded with the contract costs and not in the appropriate budget envelope. In our opinion, this practice does not allow the services rendered to be properly controlled.

As for the contract that was completed (219501), our examination revealed that all the work planned for the seven intersections was completed, and we found the evidence that the commissioning was carried out. Concerning cost tracking, our work shows that \$101,150 of the amount provided in the contract (22%) was not spent, that the amount provided for contingencies was not used and that the amount for incidental charges (acquisition of traffic light furniture and controllers) had a positive balance of \$140,217 (that is, 57% of the budget). With regard to the cost of the contract, this suggests that the initially estimated quantities had been over-evaluated. Concerning incidental charges, from the information we obtained, although expenses for the acquisition of the traffic light furniture and the controllers were necessary to complete the contract, they were recorded in a general account, not in the account specifically linked to the contract. The effect of this is that it is impossible to know the real, accurate incidental charges of the contract and there is no way to reconcile them with the amounts authorized by the authorities.

For the two contracts that were finished but had not received provisional or final acceptance (219201 and SP2014-2), we determined from the progressive payment documents that for the first contract, only 5 of the 11 intersections had been completed. The commissioning dates recorded in the site reports did not match those in the annual programming calendar, however. In the second case (SP2014-2), we were assured that six of the ten intersections had been completed, based on documentation to support the progressive payments, which was incomplete (no provisional or final acceptances). Based on the commissioning dates in the annual programming, however, and through an examination of the work site reports, all ten intersections had been completed. Since the information in the progressive payments and the annual program did not match, we believe that a reconciliation is required with the number of commissionings carried out (work site reports) and the number given in the tracking file (annual programming).

For the cost tracking on the same two contracts (219201 and SP2014-2), our work shows a positive balance on the amounts planned for contingencies and incidental charges related to traffic light furniture and controllers. In the first case, although the work was not carried out on over half of the initially planned intersections, the remaining balance of the contract is only 28% (\$48,156). This leads us to question the reliability of the initial estimate. For the second contract, it is the surplus on the incidental charges that raises questions, due to the use of the equivalent of 35% of the planned amount (\$125,043).

Finally, for the three contracts under way, the two managed by the DI (282001 and 282901) will be carried out in 2017. For contract SP2016-03, we have evidence that 10 of the 50 intersections were commissioned in 2016. As for the cost tracking in this contract, we noted that the remaining balance for incidental charges, for the acquisition of traffic light furniture and controllers, is 68% (\$252,808) of the authorized amount, after the upgrades were made to 10 intersections (20% of the total planned), which

raises the possibility of cost overruns to complete the remaining 40 intersections in the contract.

Our work also revealed a significant difference in the tools used by the DERA project managers to track the per-intersection costs. The tools they use are entirely up to their discretion. For one, all expenses, in all expense categories (contract, contingencies and incidental charges), are shown for each intersection, which quickly and easily provides total expenses for the interventions carried out, as well as the status of the intersection at any given date. For another, this method was not used. We believe that it would benefit the DERA to institute a standard-tracking system that is used by everyone and that interfaces with the annual programming.

In conclusion, all the contracts examined in our sample showed surpluses in the contract amounts and the authorized incidental charges, but we learned that the work was not always carried out on the original number of intersections planned. As we mentioned in section 4.3.3.2.1, "Preparation of Detailed Cost Estimates", establishing standard quantities requires careful monitoring. We were not convinced, however, that all the contracts were monitored with the same level of care. Due to these findings, we believe that every contract should be subject to accountability concerning the number of intersections upgraded and the use of the amounts authorized.

RECOMMENDATIONS	
4.3.3.2.3.B.	We recommend that the Service des infrastructures, de la voirie et des transports ensure that the documentation supporting the progressive payments and traffic light upgrade contract invoices is complete, in order to allow for a thorough control of costs and services rendered for the intersections in question.
4.3.3.2.3.C.	We recommend that the Service des infrastructures, de la voirie et des transports ensure that the contingencies invoiced by the contractors are recorded in the contingencies budget envelope provided, in order to accurately track the costs related to the contracts.
4.3.3.2.3.D.	We recommend that the Service des infrastructures, de la voirie et des transports ensure that incidental charges for the traffic light upgrade contracts are charged to the specific SIMON accounts created for this purpose by the authorities, in order to have accurate figures for the costs related to the target intersections.

4.3.3.2.3.E.	We recommend that the Service des infrastructures, de la voirie et des transports put standard tools in place to track the costs of the traffic light upgrade contracts, in order to periodically account for the real costs of the intersections targeted by these contracts in comparison with the expenses authorized by the authorities.
BUSINESS UNIT'S RESPONSE	
4.3.3.2.3.B.	<i>Service des infrastructures, de la voirie et des transports</i>
4.3.3.2.3.C.	On May 15, 2017, the Direction générale submitted its action plan for the recommendation it was targeted by and informed us that the Service des infrastructures, de la voirie et des transports action plan was under development and would be submitted as soon as possible.
4.3.3.2.3.D.	
4.3.3.2.3.E.	

4.3.4. Evaluation of the Upgrade Program in Light of the Objectives

4.3.4.A. Background and Findings

As we mentioned above, the traffic light upgrade program contributes to the achievement of many objectives set out either in the *Transportation Plan* or in commitments made by the municipal administration. These objectives are as follows:

- Compliance with legal requirements;
- 40% reduction in the number of accidents, over ten years, from the beginning of the *Transportation Plan*, with the ultimate goal of the “zero accident” vision;
- Reduction of electricity bill generated by the traffic lights;
- Improved traffic flow;
- Prioritization of public transit and improved efficiency and punctuality of the service.

Since significant sums were invested in the upgrade program, we verified whether analyses had been carried out to assess the achievement of the objectives.

Compliance with Legal Requirements

Although significant sums were invested to comply with the standards beginning with POU 1, at the time of our work, the DERA was not able to demonstrate the level of compliance with the legal requirements for traffic lights. This is true for the legal requirements of *Tome V – Signalisation routière* and, in terms of electrical compliance, the *Canadian Electrical Code*. Consequently, the DERA was unable to demonstrate the achievement of this objective.

Reduction in the Number of Accidents

In the *2008 Transportation Plan*, the municipal administration undertook a process to improve travel safety within the territory. One of the commitments was to reduce the number of accidents by 40% over the ten years following the adoption of the plan (2008 to 2017), with the city's ultimate goal being the "zero accident" vision. This objective was to be evaluated through tracking and in the five-year review of the plan.

The *Transportation Plan* referred to the fact that safety measures were already in place and would be maintained. These measures include upgrades to the traffic lights, the installation of pedestrian countdown signals, the safety program around schools and parks, the intersection safety program, prohibiting right turns on red lights, the lighting improvement program and a significant increase in police presence related to travel safety. Although it is difficult to make a direct connection between the reduction in the number of accidents and the upgrades, it is nevertheless logical to believe that the extensive work done on intersections with traffic lights could have reduced the number of accidents.

To be able to achieve such a goal, accident data must first be measured and evaluated and then improvements have to be made to problematic intersections. This need had already been defined in the tender documents for the professional services contracts for POU 1 and POU 2. In both these cases, a compilation and analysis exercise was planned.

For POU 1 (in 2003), the Direction des transports planned for the creation of an accident database. In its technical specifications, it also required the engineering firms to undertake a safety study for each of the 50 intersections on the list of most accident-prone intersections, submitted by the city. According to the information we obtained, the safety study was produced and recommendations were implemented to correct the situations revealed.

In the case of POU 2, based on the information given to us, we determined that accident data were compiled for 2,439 intersections on the Island of Montréal (2,214 intersections in the city and 225 in the related municipalities). The goal was to target the most dangerous intersections. Each intersection was placed in one of four categories. For most of them, there was a simplified diagnostic, and the exercise identified 70 unsafe intersections for a more detailed diagnostic. During the mandate, however, the analysis of these detailed diagnostics was not deemed useful, as it was not based on recent data (2005-2007). The compilation carried out in the professional services contract was therefore not used to choose intersections to target for accident reduction.

At the time of our audit work, the accident reports drawn up by the police and recorded in a Société de l'assurance automobile du Québec (SAAQ) database were transferred

by the Direction des transports' Division sécurité et aménagement du réseau artériel to a database of the city, but the accident analysis was not systematic. Accidents are only analyzed for geometric redevelopment projects or at the request of a borough, the DERA or another business unit. We believe that while this method may meet specific or occasional needs, it does not provide a safety portrait for all the intersections.

Initially, however, the *2008 Transportation Plan* called for the creation of a travel safety office, which would be the municipal authority that dealt with all issues related to travel safety in the agglomeration territory. It was meant to be a permanent discussion table to develop, implement and monitor strategies to reduce the number of deaths and injuries on the roads, in conjunction with its partners. According to the *Transportation Plan*, the responsibilities of the office would include developing and managing accident data management tools, producing diagnostics, proposing programs and projects, designing analysis and assessment tools, preparing a three-year action plan and assessing the effectiveness of the measures. In 2013, the executive committee gave its agreement in principle to create this office. It was created in 2014, under the responsibility of the Division sécurité et aménagement du réseau artériel, with a budget from the agglomeration, but it was not able to fully carry out the intended mandate.

Although most of the intersections deemed unsafe were apparently upgraded, which should have reduced the number of accidents at these intersections, the DERA is unable to demonstrate this, since the accident data were not analyzed to this end after POU 2. In a recent statement from the city council, however (September 2016), the municipal administration referred to a 26% reduction in accidents involving injuries in eight years (2008 to 2015) and a 53% reduction in fatal accidents over this same period, for the entire territory.

The DERA is unable to demonstrate how the upgrades may have contributed to achieving this objective.

Reduction in Electricity Bill

The decision-making summaries to attribute the first professional services contracts under POU 2 mentioned that electricity savings would be achieved at intersections where the incandescent bulbs were replaced by light-emitting diodes (LED). At the 2011 rates, the savings totalled \$580 per year for each intersection. As the DERA is unable, with reasonable effort, to determine how many intersections underwent this intervention, it is hard to assess whether these savings were achieved. Consequently, the DERA is unable to demonstrate the impact of the traffic light upgrades on the achievement of this objective.

Improved Traffic Flow

During our audit, we did not obtain any reports demonstrating improved traffic flow thanks to the upgrades. Consequently, the DERA is unable to demonstrate the degree to which the traffic light upgrades contributed to the achievement of this objective.

Prioritization of Public Transit and Improved Efficiency and Punctuality of the Service

In our audit, we took note of statements from the Société de transport de Montréal (STM) and from the city about changes in transit priority measures. We did not, however, receive any reports that establish a connection between the upgrades and the achievement of this objective.

We conclude that no analysis was conducted to determine how the upgrade program contributed to the achievement of these objectives. In some cases, as the objectives were not given in a measurable form, it was harder to assess whether and to what extent they were achieved.

We believe that the achievement of the objectives should be demonstrated, to justify the money invested in the upgrade program, in its broadest sense, and also to evaluate whether the decisions to endorse the internal standards were appropriate.

RECOMMENDATION	
4.3.4.B.	We recommend that the Service des infrastructures, de la voirie et des transports develop tools that can assess the achievement of the objectives targeted by the traffic light upgrade program to demonstrate the appropriateness of the investments made, justify pursuing the deployment of the internal standards and make any required changes.
BUSINESS UNIT'S RESPONSE	
4.3.4.B.	<i>Service des infrastructures, de la voirie et des transports</i> On May 15, 2017, the Direction générale submitted its action plan for the recommendation it was targeted by and informed us that the Service des infrastructures, de la voirie et des transports action plan was under development and would be submitted as soon as possible.

4.4. Accountability Reporting

4.4.A. Background and Findings

When a department implements guidelines approved by the authorities, it must monitor their progress, evaluate them periodically and report the results. Doing this requires tools that can be used for the periodic production of management reports containing the relevant information, which must then be analyzed to justify any differences from the established objectives. Accountability mechanisms must be in place within the structure to keep managers at different levels and the authorities informed, so that well-founded decisions can be made at the right time. These decisions are likely to affect planning and the allocation of the resources required to achieve the objectives.

In our audit, we looked into the mechanisms in place to report on the developments in the upgrade program and on the level of traffic light compliance with the standards.

First, we obtained reports on the various aspects of the process:

- Statement of the number of plans received from professionals during the year, for the various upgrade phases (POU 1, POU 2, POU 3). This report also shows the number of plans not produced in each upgrade phase. Based on the information we obtained, it is given to the manager in charge twice a year, on request;
- Change in the number of intersections commissioned in relation to the objective agreed with the DEESM (300 intersections per year). This report differentiates the number of intersections to upgrade (POU 2) from those that are the subject of other priority targets of the DERA. It is produced on a weekly basis and submitted monthly to the manager in charge;
- Changes in the Three-Year Capital Works Program project budget, including the upgrade budget envelope. Based on the information obtained, this report is produced monthly for the manager in charge.

In the case of the plan report, the data are not reconciled with the annual objective set for the purpose of tracking deadlines and the number of plans. Furthermore, for the first two reports, the data provided are not reconciled with the corresponding costs. So although the head of the division receives budget change reports for the Three-Year Capital Works Program projects under his responsibility, he does not receive reports that specify the costs related to the mandatory upgrades and the other measures put forward. Likewise, there is no report demonstrating the level of upgrades on the entire traffic light inventory at a given date.

In turn, at the time of performance evaluation, the manager in charge reports to the director about the achievement of the established annual objectives:

- Number of updates;
- Number of electronic programming plans completed;

- Number of traffic lights with final programming implemented;
- Number of pedestrian countdown signals;
- Number of audio signals;
- Number of intersections equipped with transit priority measures;
- Number of kilometres equipped with transit priority measures;
- Number of intersections studied.

Although the objective of this evaluation is related to compensation, the results are reconciled with the measurable objectives established at the beginning of the year, although they are not reconciled with a plan demonstrating that the deadlines and costs have been respected.

We expected that the DERA would periodically inform the department's management team about the progress on the upgrade program, in relation to the projections, deliverable, deadlines and costs incurred. When there were differences, we also expected that explanations would be offered and that corrective measures would be put in place. But we did not find any periodic reports dealing with these issues.

After examining the budget documents presented to the Committee on Finance and Administration, we found that the accountability dealt with almost the same aspects of the upgrades (for the current year and the next year):

- Number of traffic lights upgraded;
- Number of new pedestrian countdown signals installed;
- Number of audio traffic lights installed;
- Number of intersections with transit priority measures.

Until 2016, the activities carried out were not reconciled with the objectives set. Moreover, the schedule and real costs for the upgrades are not provided for either the year or the entire program. Although the upgrade program is only one of many others under the responsibility of the Direction des transports, the elected officials are unable to find information that allows them to determine what the upgrades cost the city.

Finally, although the city took on the responsibility for the traffic lights on the local network on January 1, 2015, originally for a two-year period but now extended to December 31, 2018, we have not found any report dealing with the consequences of this decision on the upgrade interventions (impact on cost and schedule). The timeline imposed by the government is the same for the traffic lights on the local network. Approximately 300 intersections are affected by this situation. Although some boroughs did upgrade work when they were responsible for the lights, so far compliance statements have not been drawn up by the DERA to assess whether these traffic lights comply with the standards required by the Ministry or with the internal standards. These intersections are the subject of POU 3. As such, for these traffic lights, the city is not in compliance with the deadline set by the Ministry. To date, the

Direction générale and the authorities have not been officially informed about this matter.

In conclusion, the accountability mechanisms in place do not provide sufficient information to give the various managers and authorities an overview of the results achieved by the upgrade program in comparison with the plan, in terms of the number of intersections upgraded, costs, deadlines met and difficulties encountered, with regard to any of the standards. We believe it is appropriate to inform the Direction générale and the authorities about the impact on this situation on the safety of the citizens. We also believe that it is important to inform the municipal administration about the progress of the DM project, which is far behind schedule.

RECOMMENDATION

4.4.B.

We recommend that the Service des infrastructures, de la voirie et des transports periodically report to the Direction générale and the authorities about the status of the traffic light upgrade program, to allow for informed decision-making concerning the expected results. This accountability reporting should cover:

- the number of intersections upgraded, differentiating the legal requirements from the internal standards arising from the *Transportation Plan* and the priorities of the municipal administration;
- the costs incurred to meet the legal requirements and the internal standards arising from the *Transportation Plan* and the priorities of the municipal administration;
- whether the deadlines for each standard category were met;
- the consequences arising from the failure to meet certain standards or deadlines;
- corrective measures proposed to rectify the situation;
- achievement of objectives targeted by the *Transportation Plan* and the city's priorities.

BUSINESS UNIT'S RESPONSE

4.4.B.

Service des infrastructures, de la voirie et des transports

On May 15, 2017, the Direction générale submitted its action plan for the recommendation it was targeted by and informed us that the Service des infrastructures, de la voirie et des transports action plan was under development and would be submitted as soon as possible.

5. Conclusion

The urban agglomeration council's adoption of a multisectoral transportation plan in 2008 clearly demonstrated its intention to deal with issues such as the safety of foot travel, traffic light upgrades, the dynamic management (DM) of traffic lights on targeted thoroughfares, the introduction of transit priority measures and the increased use of bicycles on a cycling network extended to the entire Island of Montréal.

With regard to the traffic light upgrades, the Service des infrastructures, de la voirie et des transports, which is responsible for governing this program, has not succeeded in setting up a consistent, articulated program to ensure it is executed within the deadlines set by the authorities.

Despite the fact that, since 2008, contracts of a considerable value have been issued to engineering firms and contractors, many plans and specifications have been prepared and revised, a host of interventions has been conducted on the traffic light systems and major purchases of traffic light components have been made, the Service des infrastructures, de la voirie et des transports is unable to confirm, for all intersections equipped with traffic lights in the city's territory, the level of compliance with the standards required by the law²² and by internal standards. This is the ultimate finding of this audit, which is confirmed, in particular, by:

- An intersection inventory that is incomplete in terms of numbers, territorial distribution, the specific components of the traffic light system and their compliance with the standards. Despite three different professional services contracts issued for its development, there is still no up-to-date, consolidated database, which means the proportion of intersections that meet the various standards is uncertain;
- A lack of general and detailed planning concerning both the number of intersections to be upgraded and the type of interventions required to ultimately meet the established deadlines. So far, the intersection upgrades had been punctuated by a stream of partial upgrades;
- Non-standard cost monitoring in the department in charge, while creditable tools exist that it could adapt, make more effective and extend to all project managers. Under the current work method, determining the cost of work by intervention and by intersection is a mission that would be hard to achieve;
- Annual programming that reveals major delays in the completion of the work in comparison with the information provided in the decision-making summaries;
- The lack of periodic evaluations of the upgrades in terms of the objectives targeted in the *Transportation Plan* with regard to accident reduction and compliance with standards, despite the fact that the form of the *Transportation Plan* lends itself well to a program made up of subprograms for each major aspect, with short-, medium- and long-term objectives. This would have allowed for the periodic evaluation of

²² The *Highway Safety Code* and the *Canadian Electrical Code*.

the results to measure the achievement of the *Transportation Plan* objectives throughout its implementation period;

- Partial accountability concerning the number of interventions on the intersections, but failure to account for other important aspects of sound management, such as costs, timelines, level of compliance with standards and degree of completion of objectives expected by the authorities since the adoption of the *Transportation Plan*.

Consequently, the initial deadlines and budgets in the *Transportation Plan* were not upheld. In 2008, the preliminary estimates in the *Transportation Plan* projected \$42.4 million to upgrade 1,400 intersections equipped with traffic lights. In fact, however, the value of the contracts issued to engineering firms and contractors, as of December 23, 2016, was \$65.1 million, and relates to interventions on not quite 750 intersections. Considering the cost of internal labour, \$16.0 million must be added, for a total of \$81.1 million for the second phase of upgrades (POU 2). Given that the initially planned upgrades have not been completed at all intersections equipped with traffic lights, that DM has not been implemented and that significant expenses are still required to comply with either the legal requirements or the internal standards stemming from the orientations of the *Transportation Plan* or the priorities of the municipal administration, the city will definitely not be able to meet the deadline imposed by the law (December 31, 2017). It should be mentioned, however, that over the years, new legal requirements were added and that the city added new internal standards to reflect the priorities of the municipal administration. It is practically impossible, at present, to differentiate between the costs incurred by these internal standards and those related to the mandatory standards of the Ministère des Transports, de la Mobilité durable et de l'Électrification des transports.

We believe it is imperative for the management of the traffic light upgrade program to be closely monitored by the Direction générale in order to respect the deadlines, projected costs and target objectives.

6. Appendices

6.1. Objectives and Evaluation Criteria

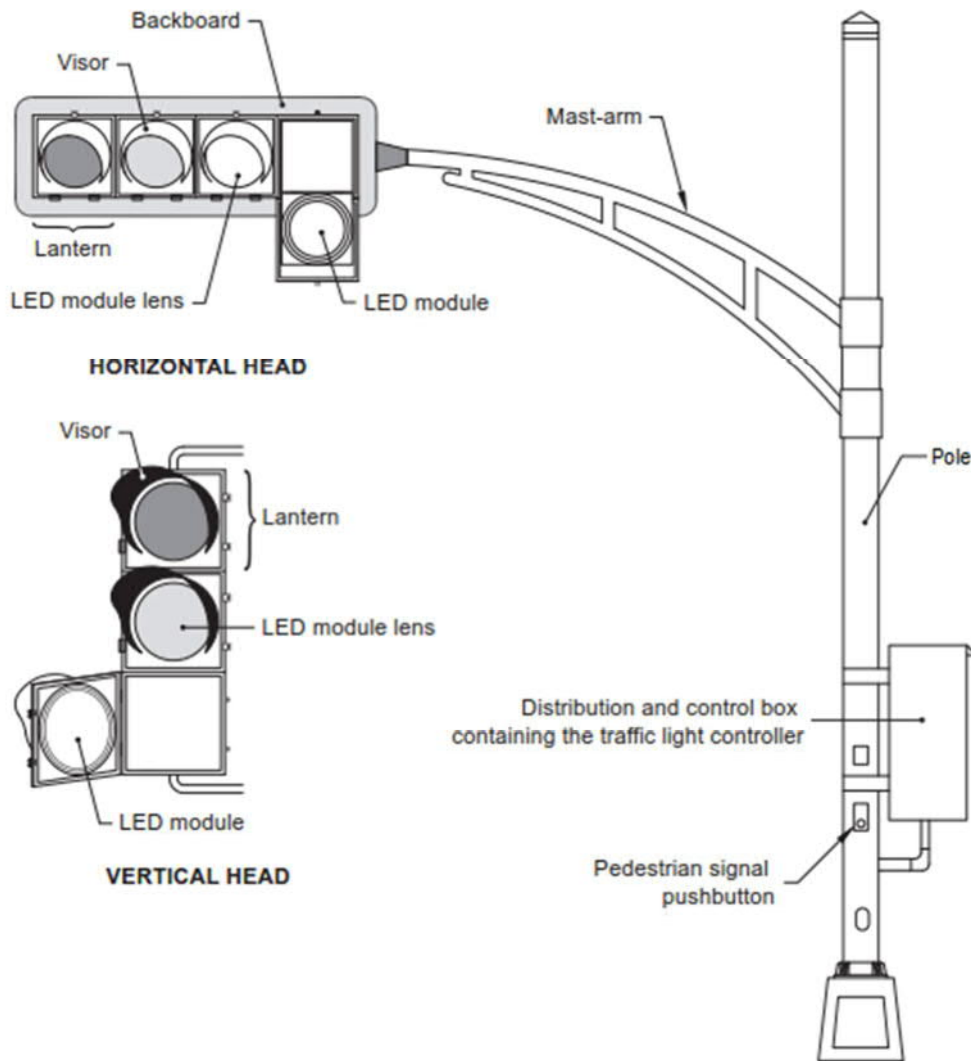
Objective

Ensure that the traffic light upgrade project and the DM implementation project advance in keeping with the priorities approved by the authorities.

Evaluation Criteria

- Traffic light management is supported by keeping a complete, up-to-date inventory.
- The roles and responsibilities of the business units involved in traffic light management are clearly defined with regard to the traffic light upgrade project and the introduction of DM.
- Timelines have been developed and are being monitored.
- Cost estimates have been produced and are being used to track the project costs.
- Periodic accountability mechanisms keep the managers in charge informed (management team of the Service des infrastructures, de la voirie et des transports, Direction générale, city council and urban agglomeration council).
- Analyses are carried out to demonstrate the reduction of negative consequences on traffic and citizen safety.

6.2. Traffic Light Type



Source: Ministère des Transports, de la Mobilité durable et de l'Électrification des transports, *Tome V – Signalisation routière*, chapter 8, page 4.

6.3. Responsibility for Traffic Light Management (Arterial Network and Local Network) – (2002 to 2016)

Responsibility	2002 to 2004	2005	2006	2007 to 2008	2009 to 2014	2015 and 2016
Arterial network	Service de l'environnement, de la voirie et des réseaux → Division de la circulation	Service des infrastructures, transport et environnement → Direction de l'ingénierie de la voirie → Division de l'ingénierie de la voirie	Service des infrastructures, transport et environnement → Direction de l'ingénierie de la voirie → Division de la circulation	Service des infrastructures, transport et environnement → Direction des transports → Division de l'exploitation du réseau artériel	Service des infrastructures, des transports et de l'environnement → Direction des transports → Division de l'exploitation du réseau artériel	Service des infrastructures, de la voirie et des transports → Direction des transports → Division de l'exploitation du réseau artériel
Local network	Boroughs	Boroughs	Boroughs	Boroughs	Boroughs	Service des infrastructures, de la voirie et des transports → Direction des transports → Division de l'exploitation du réseau artériel ^[a]
Traffic lights managed by the Ville de Montréal	Ville de Montréal	Ville de Montréal	Island of Montréal	Island of Montréal	Ville de Montréal	Ville de Montréal ^[b]
Maintenance · Arterial network · Local network	Boroughs ^[c] Boroughs	Boroughs ^[c] Boroughs	Boroughs ^[d] Boroughs	Boroughs ^[d] Boroughs	Boroughs ^[e] Boroughs	Boroughs ^[e] Boroughs ^[e]

^[a] City council decision to declare itself responsible for the local network (until December 31, 2018).

^[b] Review of arterial network, beginning January 1, 2015. The proportion rose from 26% to 52%.

^[c] Delegated by By-law 02-002, approved by the city council on December 18, 2001.

^[d] Delegated by city council subdelegation By-law 05-091.

^[e] Delegated by By-law 08-055, approved by the city council on December 15, 2008.



Éco-Quartier Program and Eco-Centres

Summary of the Audit

Purposes

- Ensure that the awarding of contracts to delegated organizations for the management of eco-centres and the transport of waste to recycling or recovery sites is being carried out in an objective, transparent and fair manner.
- Ensure that the amounts allocated by the city to delegated organizations for the management of the Éco-quartier program and the management of eco-centres are subject to a regular reporting process enabling evaluation of the results obtained.

Results

In addition to these results, we have formulated various recommendations for the business units.

The details of these recommendations and our conclusion are outlined in our audit report, presented in the following pages.

Note that the business units have had the opportunity to formulate their comments, which appear after the audit report recommendations.

The audit points out shortcomings with regards to the compliance with the contract awarding process for the management of eco-centres and for the transport of waste. Doubts have been raised whether the principles of fairness and transparency that should govern the procedures for soliciting contracts and inviting competition from suppliers were tainted in the contract awarding process for the management of eco-centres. In the circumstances, we considered it appropriate to forward the file to the Bureau de l'inspecteur général of the city, so that it may pursue any investigations it deems appropriate.

As for Éco-quartier program, which comes under the responsibility of the audited boroughs, the audit points out shortcomings regarding accountability.

In our opinion, several improvements should be made taking into account the main findings hereunder.

- The mandatory publication of information in the Système électronique d'appel d'offres of the Government of Québec is not always carried out in accordance with the rules established in section 477.5 of the *Cities and Towns Act*.
- The examination of tenders for the management of eco-centres raises questions about the fairness of the contract awarding process.
- The financial contributions allocated by the boroughs to the Éco-quartier program are not being subjected to a documented evaluation of the degree to which the activities carried out help achieve the city's strategic sustainable development targets.

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List of Acronyms

CTA	<i>Cities and Towns Act</i>	NPO	Non-profit Organization
MAMOT	Ministère des Affaires municipales et de l'Occupation du territoire	SEAO	Système électronique d'appel d'offres

5.4. Éco-Quartier Program and Eco-Centres

1. Background

The Éco-quartier program was created in 1995 by the Ville de Montréal (the city) when it was setting up its program for the selective collection of recyclable materials from the streets.

Implemented in most of the boroughs (15 of the 19 boroughs)¹, the mission of the Éco-quartier program was to promote and implant eco-conscious habits among Montrealers in order to improve their living environment through targeted and citizen-driven environmental actions. There were four key components to the Éco-quartier program:

- **Cleanliness:** improvement of lanes, clean-up drives with residents, dog cleanliness awareness, etc.
- **Ecological waste management:** distribution of recycling bins; introduction of selective collection in dwellings, businesses and institutions; 4R awareness (reduce at source, reuse, recycle and recover); creation of community composting sites, etc.
- **Beautification:** distribution and planting of flowers, creation of murals, etc.
- **Nature in the city:** promotion of biodiversity, urban agriculture, planting trees and shrubs, greening vacant spaces; revitalizing river banks; creating green lanes, etc

As a result of the municipal amalgamation in 2002, responsibility for the Éco-quartier program was transferred to the boroughs. Since that time, management of the program and its financial support have been handled exclusively by the city's boroughs. The boroughs are able to fulfill their responsibilities in this regard through financial contributions made to community non-profit organizations (NPOs), which are the sponsors of the Éco-quartier program. These organizations receive a mandate from the boroughs that may vary from one to three years. For the years 2013 to 2016, the financial contributions allocated to the Éco-quartier program totalled \$13.4 million, representing an expenditure ranging from \$0.2 million to \$2.1 million, depending on the borough concerned (see Appendix 6.2).

It is important to distinguish the éco-quartiers from the eco-centres that exist within the territory of Montréal: the latter are sites made available to all residents, where they can bring waste materials to be recovered and re-used. This includes recyclable materials, metals, electronic products, tires, appliances, construction, renovation and demolition

¹ According to the information obtained, four other boroughs of the city (Anjou, LaSalle, Outremont and Le Plateau-Mont-Royal) assumed program management.

(CRD)² and household hazardous waste (HHW).³ Each year, there are more than 250,000 visits, and just over 87,000 tonnes of waste are deposited.⁴

Unlike éco-quartiers, which come under local jurisdiction, eco-centres fall under the jurisdiction of the agglomeration.⁵ The *Act respecting the exercise of certain powers in certain urban agglomerations*⁶ stipulates that the disposal and recovery of waste are agglomeration powers. However, the city's Service de l'environnement assumes this responsibility for all the related cities making up the Montréal agglomeration.

On August 27, 2009,⁷ the Montréal agglomeration adopted the *Plan directeur de gestion des matières résiduelles de l'agglomération de Montréal 2010-2014*⁸, which is part of the *Environmental Quality Act*⁹ and of the objectives set out in the *Politique québécoise de gestion des matières résiduelles* of the Government of Québec.

In addition, on June 22, 2016, the urban agglomeration council adopted the *Sustainable Montréal 2016-2020* development plan,¹⁰ which succeeded the *Plan de développement durable de la collectivité montréalaise 2010-2015*.¹¹ The *Sustainable Montréal 2016-2020* plan provides the framework for sustainable development for the next five years for the agglomeration as a whole. In particular, it aims to meet governmental recovery objectives for recyclable material (70%) and organic materials (60%) by 2020.

In this context, it appears that the Éco-quartier program and the eco-centres constitute means that are recommended by the boroughs and by the Service de l'environnement of reaching residents and thus helping to achieve the recovery objectives of the waste management master plan and, concurrently, the sustainable development plan.

² They include: wood, gypsum, metals, asphalt, concrete and stone.

³ These are household products that may pose a health or environmental hazard when used, stored or disposed of inappropriately (e.g., paint, solvents, batteries, motor oil).

⁴ According to data for the years 2013 to 2015 compiled by the Service de l'environnement for all eco-centres in operation.

⁵ The agglomeration powers concern the powers relating to the services provided to all the citizens of the island of Montréal and are exercised by the urban agglomeration council. As for the city's local powers, they are shared between the city council and the borough councils.

⁶ CQLR, chapter E-20-20.001, sections 16, 17 and 19, paragraph 6.

⁷ Resolution CG09 0346.

⁸ This refers to the most current version available to date. Produced by the Direction de l'environnement et du développement durable of the Ville de Montréal.

⁹ CQLR, chapter Q-2, section 53.4.

¹⁰ Resolution CG16 0437. Produced by the Direction de l'environnement et du développement durable of the Ville de Montréal.

¹¹ Produced by the Direction de l'environnement et du développement durable of the Ville de Montréal.

2. Purposes and Scope of the Audit

The purpose of the audit was to ensure that the awarding of contracts to delegated organizations for the management of eco-centres and the transport of waste to recycling or recovery sites is being carried out in an objective, transparent and fair manner.

In addition, the audit aimed to ensure that the amounts allocated by the city to delegated organizations for the management of the Éco-quartier program and the management of eco-centres are subject to a regular reporting process enabling evaluation of the results obtained.

Our audit work mainly focused on the years 2013 to 2016. However, for some aspects, data prior to these years were also considered. The audit took place during the period from June 2016 to February 2017.

With regard to the Éco-quartier program in particular, our audit work was carried out in the following boroughs:

- Ahuntsic-Cartierville (Division relations avec les citoyens et communication);
- Mercier–Hochelaga-Maisonneuve (Direction des travaux publics);
- Rosemont–La Petite-Patrie (Division des communications);
- Villeray–Saint-Michel–Parc-Extension (Direction des travaux publics).

With regard to the eco-centres, our audit work was mainly been carried out with the Service de l'environnement (Division planification et opérations – gestion des matières résiduelles). However, for certain aspects related to the awarding of contracts, the Service de l'approvisionnement (Division de l'acquisition de biens et services) was also audited.

Our audit work consisted of conducting interviews with staff, examining various documents and conducting surveys that we considered appropriate in obtaining evidence. This audit is based on a review of the evaluation criteria presented in Appendix 6.1.

3. Main Findings

The audit work carried out revealed that improvements need to be made due to the following:

- The mandatory publication of information in the Système électronique d'appel d'offres (SEAO) of the Government of Québec is not always carried out in accordance with the rules established in section 477.5 of the *Cities and Towns Act* (CTA);¹²
- The examination of tenders for the management of eco-centres raises questions about the fairness of the contract awarding process;
- The financial contributions allocated by the boroughs to the Éco-quartier program are not being subjected to a documented evaluation of the degree to which the activities carried out help achieve the city's strategic sustainable development targets.

4. Audit Results

Let us first note that there are currently seven eco-centres operating in Montréal (see Appendix 6.3), namely:

1. Acadie Eco-centre located in the Ahuntsic-Cartierville borough;
2. Côte-des-Neiges Eco-centre located in the Côte-des-Neiges–Notre-Dame-de-Grâce borough;
3. LaSalle Eco-centre located in the LaSalle borough;
4. Rivière-des-Prairies Eco-centre located in the Rivière-des-Prairies–Pointe-aux-Trembles borough;
5. La Petite-Patrie Eco-centre located in the Rosemont–La Petite-Patrie borough;
6. Saint-Michel Eco-centre located in the Villeray–Saint-Michel–Parc-Extension borough;
7. Saint-Laurent Eco-centre located in the Saint-Laurent borough (open since June 28, 2016).

Until November 15, 2015, the Eadie Eco-centre, located in Le Sud-Ouest borough, was also active. It has since been permanently closed due to the construction of the new Turcotte interchange.

It should be noted that the materials received by eco-centres must be sorted and then transported by containers to final disposal or treatment sites where the materials may be recycled, composted or sold. Through various contracts, the Service de l'environnement assigns to organizations or specialized firms the management of eco-centre operations, as well as the supply of containers and the transport of wastes recovered from them.

¹² CQLR, chapter C-19.

By their nature, these contracts fall under the category of "Provision of goods and services other than professional services." In accordance with the provisions of section 573 of the CTA, for this type of contract in a tender (public or by invitation), the general rule is to award the contract to the lowest compliant bidder. However, for this type of contract, the CTA permits the option of evaluating bids using a bid weighting and evaluation system based on qualitative criteria (e.g., company experience, quality of customer service) for which each is awarded a certain number of points out of 100. Under these circumstances, an "envelope" weighting and evaluation system may be used for which the price must be given one of the highest weightings among the evaluation criteria. Or, a two-envelope evaluation system (weighting and evaluation),¹³ may be used, in which case the price contained in the second envelope is revealed only if the bidder obtains the pass mark of 70% following a qualitative evaluation of its bid. In either case, the evaluation of the bids requires that the grid containing the evaluation criteria be approved in advance and that a selection committee be created in compliance with certain requirements and formally approved.¹⁴ The contract must ultimately be awarded to the bidder with the highest score.

That being said, in order to validate the compliance of the process leading to the awarding of these contracts for the management of eco-centres and for the supply of containers and the transport of residual materials, we first identified all the contracts awarded for the period from 2009 to 2016. Although the scope of our work mainly concerned the years 2013 to 2016, we had to extend our examination back to 2009 in order to take into account the fact that some of the contracts included in the audited period began prior to 2013.

4.1. Compliance with the Contract Awarding Process for the Management of Eco-Centres and for the Supply of Containers and the Transport of Waste

Both for operations related to the management of eco-centres and the supply of containers and the transport of waste materials, calls for tenders are generally launched to award as many contracts as there are eco-centres in operation. In this way, interested bidders can submit an offer of service for one or more eco-centres. For example, in the case of eco-centre management, our sample consists of five calls for tenders (4 public and 1 by invitation), resulting in the awarding of 22 contracts for the period 2010-2016 (see Appendix 6.5). Regarding contracts to supply containers and transport waste, seven tenders (6 public and 1 by invitation) were counted for the period 2009 to 2016, for a total of 24 contracts (see Appendix 6.6).

In the light of the information presented in Appendices 6.5 and 6.6, it is clear that these contracts awarded by the Service de l'environnement represent a significant part of

¹³ The use of this system is mandatory for the evaluation of professional services.

¹⁴ Currently, this responsibility is assumed by the Service de l'approvisionnement.

the operational budgets devoted to the operation of the eco-centres. In particular, the last call for tenders to award eight contracts for the management of eco-centres from 2015 to 2019 involves an expenditure of \$10.5 million (taxes and contingencies included). Regarding the last call for tenders for the services of a firm to supply containers and to transport waste from 2016 to 2019, seven contracts were awarded for a total value of \$9.4 million (taxes and contingencies included).

For all these contracts related to the calls for tenders that were issued, our audit work initially consisted of ensuring that the awarding process had been carried out in accordance with the legislative provisions of section 573 of the CTA. The following aspects were specifically examined:

- Conformity between the awarding method selected, taking into account the value of the contract (e.g., by private contract, by invitation to tender or by public tender) and the appropriateness of the evaluation of the bids received, according to the specific characteristics of the chosen evaluation method (lowest compliant bidder or use of a system of evaluation and weighting of bids in one or two envelopes);
- Evidence of publication in SEAO approved by the Government of Québec and in newspapers, where applicable;
- Punctual receipt of bids (e.g., minimum of 15 days in the case of a public call for tenders);
- Compliance with the rules governing the determination and approval of the evaluation criteria used, as well as with those concerning the make-up of a selection committee (including approval of said committee), if applicable;
- Compliance with the awarding of the contract, either to the lowest compliant bidder or to the bidder awarded the highest score, as the case may be.

We have also validated that the obligations relating to the publication in SEAO of certain contract information have been met in accordance with the CTA. Since April 1, 2011, new legislative provisions have been introduced in the CTA in sections 477.4 to 477.6. These provisions relate mainly to the obligation of all municipal bodies to publish in SEAO a list of all contracts concluded with an expenditure of at least \$25,000.¹⁵ This list must be updated at least once a month and must contain, for each contract, the following information:

- Price of the contract awarded and name of the successful bidder with whom it was concluded;
- Purpose of the contract;
- For contracts entered into following a call for tenders process: the name of each bidder, the amount of each bid and, where applicable, identification of each bid that was lower than the bid accepted and was considered non-compliant;
- In the case of a contract involving an expenditure of \$100,000 or more: the price of the contract as previously estimated by the successful bidder (registered at the time of publication of the result of the contract award);

¹⁵ Work contracts were excluded.

- Total amount of the expenditure actually incurred (this amount must include, where applicable, contingent expenditures and expenditure on duly authorized additional work).

Concurrently, for each of the contracts examined, we sought to corroborate the following aspects:

- Existence of documentation of a detailed cost estimate (signed and dated) showing evidence of approval by a designated official prior to the evaluation of the bids received;
- Completeness of the information disclosed used in the decision-making summary approving the awarding of the contract with regard to, among other things, the number of contractors, the number of bidders, and, if applicable, an explanation of the difference between the bid accepted and the estimated cost of the contract.

That said, for all contracts reviewed, our audit work revealed that the contract awarding process was generally conducted in accordance with the provisions of section 573 of the CTA. In addition, the decision-making summaries disclosed the expected information.

4.1.1. Publication in SEAO and Estimates of Detailed Costs

4.1.1.A. Background and Findings

For calls for tenders whose contracts were awarded after April 1, 2011, we did identify some non-compliance under section 477.5 of the CTA concerning certain information that had to be published in SEAO. As a result, the following shortcomings were noted (see Appendix 6.7):

- Results of an invitation to tender were not published in SEAO.
- Publication of the cost estimate for a contract is mandatory for all contracts of \$100,000 or more. It should be noted that this cost estimate must be entered and displayed in SEAO only at the time of publication of the result of the contract award. We found that cost estimates were not published for four of the seven public tenders. In addition, in cases where the cost estimate was published (three out of seven), we found that for two of these three cases it did not correspond to the amount indicated in the decision-making record. For these reasons, six of the seven calls for tenders examined are considered non-compliant with respect to the publication of the cost estimate in SEAO.
- The opening result, which includes the name of each bidder and the bid price, must be entered in SEAO for both invited tenders and public tenders. This was not done for three of the nine calls for tenders subject to this requirement. In addition, a publication time-lag of more than one month was observed for four of the seven calls for tenders for which this information had been published, thus rendering them non-compliant under the regulation in section 477.5 of the CTA requiring that

it be updated in SEAO at least once a month. Therefore, seven of the nine tenders examined are considered non-compliant.

- The result of the contract award, which includes the name of the selected supplier and the contract amount, was not been published for four of the nine calls for tenders subject to the regulation, and for four others out of the nine a reasonable deadline for publication was not met. Thus, the publication of the award result is compliant for only one of the nine audited calls for tenders.
- The amount of the expenditure actually made must be published as soon as possible in SEAO. This amount was published in accordance with the law for only one of the calls for tenders examined, while the contracts related to two other calls for tenders have not yet been completed. The rate of non-compliance with this obligation is therefore six out of seven calls for tenders.
- The responsibility for publication in SEAO depends on the type of contract (e.g., goods and services or professional services), the nature of the call for tenders (e.g., by invitation or public) and the stage in the process (e.g., publication of the call for tenders in SEAO, the opening result, the award result, cost estimate and amount of expenditure actually made at the end of the contract). It should be noted that the audited calls for tenders were for contracts for goods and services other than professional contracts. Thus, in the case of an invitation to tender, the applicant (in this case the Service de l'environnement) is generally responsible for publishing in SEAO the various stages involved in this type of contract. However, in the case of public tenders, the publication process in SEAO involves shared responsibilities. In particular, the Service de l'approvisionnement¹⁶ is responsible for the stages related to the publication of the calls for tenders in SEAO and in newspapers, as well as for publishing the result of the opening of bids. For its part, the Service de l'environnement is responsible for publishing the award result, the amount of the cost estimate and the amount of the expenditure actually incurred at the end of the contract.

Therefore, we are of the opinion that internal mechanisms should be established to ensure that the information to be published in SEAO is tracked with respect to all contracts that are subject to the application of the legislative provisions.

In this regard, it should be noted that there is an administrative framework in the city entitled *Publication des contrats dans SEAO (directive)*.¹⁷ The purpose of this framework, which is to set out the standards for publishing contract information in SEAO, was updated and approved by the city's Direction générale on October 20, 2016

With respect to contract cost estimates, it should be noted that for any contract involving an expenditure of \$100,000 or more, section 477.4 of the CTA requires that

¹⁶ This department is under the Direction générale adjointe aux services institutionnels.

¹⁷ Administrative framework issued by the Service de l'approvisionnement (number C-RM-APP-D-16-003).

all municipalities estimate the contract price before the opening of bids or before the awarding of the contract, if no call for tenders has been issued. However, the preparation and documentation of a detailed cost estimate (supporting hypotheses) prior to the awarding of a contract is first and foremost a good management practice. This is an important step in permitting evaluation of the reasonableness of the bids received and ultimately in making an informed decision on whether or not to award a contract. To this end, our audit work enabled us to observe the following facts concerning the 12 calls for tenders examined:

- For three calls for tenders, a detailed cost estimate was presented. In one case, it was presented as a confidential attachment to the decision-making summary to authorize the call for tenders. For another, it appears in the decision-making summary that awards the contract following the bid opening. In the third case, it is a detailed estimate presented in a document given to us by the manager responsible for eco-centres. We were not able to determine in any of these cases who had prepared the estimate, the date of its preparation, or even of its approval.
- For eight calls for tenders, the only information available for this purpose appeared in the decision-making summary concerning the awarding of the contract following the bid opening. The overall cost estimate per eco-centre (or for all eco-centres) was presented for comparison with the bids received and to explain discrepancies. The detailed documentation of the cost estimate, which had to be signed, dated and approved in advance, has not been documented.
- Finally, for call for tenders, we do not find in the decision-making summary or in the file prepared by the Service de l'environnement that a cost estimate had been prepared. According to the information obtained from the section head responsible for the management of eco-centres, for all the calls for tenders examined, the information that we found concerning the cost estimates was the only one in existence.

In the circumstances, we believe that the necessary efforts must be made to ensure that detailed cost estimates are rigorously documented, dated and signed by the person assigned to this task and are kept, following approval by a higher-ranked person.

RECOMMENDATIONS

4.1.1.B.

We recommend that the Service de l'approvisionnement and the Service de l'environnement make the necessary arrangements to ensure the implementation of the existing administrative framework for the publication of information in the Système électronique d'appel d'offres to ensure that full and accurate information is published in a timely manner with respect to the contracts awarded, in accordance with the law.

4.1.1.C.

We recommend that the Service de l'environnement reiterate to the staff responsible the importance of documenting, dating, signing, approving and keeping detailed cost estimates so that they may be referred to easily, but also so that they can be used to support the decision on whether or not to award contracts.

BUSINESS UNITS' RESPONSES

4.1.1.B.

Service de l'approvisionnement

[TRANSLATION] In 2016, the Service de l'approvisionnement undertook necessary measures to ensure the reliability and updating of the information entered into the SEAO. They include:

- Restructuring of the "Ville de Montréal" organization in the SEAO to provide an overview of the data of all business units;
- Preparation of a guide to the compilation of expenditures. The document was forwarded to the business units on February 17, 2016. It sets out useful steps in the extraction and transmission of expenditures for publication at the end of the contract. A memorandum on this subject was also sent to heads of departments and boroughs;
- A second memorandum was sent on March 9, 2016 to all heads of departments and boroughs reminding them of the importance and obligation of publishing contracts in the SEAO;
- The Service de l'approvisionnement training team developed a course on the publication in the SEAO of tender results and ends of contracts. The course specifies the relevant information to be entered when the awards and ends of contracts for mandated calls for tenders are published. The training manual is available to everyone on the Service de l'approvisionnement's intranet site.

The Service de l'approvisionnement is currently working on updating the data for non-mandated calls for tenders from 2011 to 2016. To this end, a process, procedure and matrix (RACI) have been set out to identify the roles and responsibilities of those in the department for inputting data. A first phase of the updating process has already been completed.

Continuing the updates for non-mandated calls for tenders from 2011 to 2016. It should be mentioned that of the nine tenders issued by the Service de l'environnement, as set out in Appendix 6.7 of the audit report, four are covered by this update. The practice of double entry of data for mandated tenders was established only in mid-2014. (Planned completion: June 2017)

Service de l'environnement

[TRANSLATION] The inputting of publications in the SEAO was delegated by the Service de l'approvisionnement to the departments

	and boroughs on May 27, 2014. Four of the nine tenders conducted after that date, as shown in Appendix 6.7 of the audit report, fall under the responsibility of the Service de l'environnement (AOP 14-14069, AOP 15-14968, AOP 16-15121, DA 1570350001). For tenders from 2011 to 2014, the updating in the SEAO will be done by the Service de l'approvisionnement. Data from all tenders from 2014 to 2016 is currently being validated and the necessary corrections will be made in the SEAO. The roles and responsibilities of those in the Service de l'environnement for inputting tendering data will be reviewed, and employees involved in the Service de l'environnement will be given training on the publication of information in the SEAO. The training will be produced by the Service de l'approvisionnement and updated in August 2016 (Procédure: Publication des résultats d'adjudication et de fin de contrat par le requérant dans le SEAO). In addition, an internal control procedure regarding the necessary steps to be taken when information is entered in the SEAO will be introduced to support the training. (Planned completion: June 2017).
4.1.1.C.	Service de l'environnement [TRANSLATION] Following the Auditor General's recommendations, a procedure will be developed to ensure that the responsible manager systematically approves in writing all estimates produced, dated and signed by the professional concerned. (Planned completion: May 2017)

4.1.2. Evaluation of Bids

4.1.2.A. Background and Findings

On another matter, all the contracts related to the calls for tenders in our sample were also examined with a view to validating that the awarding of these contracts was done by means of an objective, transparent and fair process.

In this regard and in light of the review, we observed that from 2009 to 2016 a large proportion¹⁸ of the contracts for supplying containers and transporting waste had been awarded to transport company "1" (see Appendix 6.6). However, we found no evidence that would lead us to believe that the internal processes resulting in the awarding of contracts might have favoured one bidder over another. These contracts

¹⁸ These contracts awarded to transport company "1" represent 62.5% of the population examined, or 15 of the 24 contracts.

were awarded to the bidder that submitted the lowest compliant bid according to the general evaluation method applicable to this type of contract.

Regarding the contracts awarded for the management of the eco-centres (see Appendices 6.4 and 6.5), the analysis carried out revealed the following findings:

- In examining the history presented in Appendix 6.4 of this report, we note that organizations "A" and "B" are those to which the management of eco-centres has been entrusted on a more recurrent basis in recent years. In particular, from 2003 to 2007 (five years), organization "B" was almost exclusively the successful bidder for four of the six eco-centres that were active at the time: Acadie, Côte-des-Neiges, Rivière-des-Prairies and Saint-Michel. Organization "A" then managed only the Eadie eco-centre. Subsequently, from 2008 to 2010, organization "B" managed two of the six eco-centres: Côte-des-Neiges and Rivière-des-Prairies. Organization "A" managed three of the six: Acadie, Eadie and La Petite-Patrie.

However, we saw that since 2011 organization "A" won virtually¹⁹ all the contracts awarded by the Service de l'environnement to manage all eco-centres. Of the five calls for tenders in our sample, excluding the call for tenders cancelled²⁰ in early 2011 for which organization "A" was the successful bidder, the value of the contracts won by organization "A" represented close to \$16 million (see Table 1).

**Table 1 – Summary of Contracts Won by Organization "A"
Since 2011 for the Management of All Eco-Centres**

Year of contract	Call for tenders no.	Duration of contract	No. of eco-centres involved in call for tenders	No. of contracts awarded to organization "A"	Expenditure approved (taxes and contingencies included, if applicable)
2011	AOP 10-11441	9 months	6	6	\$552,200
2011-2014	AOP 11-11557	36 months	7	7	\$4,885,561
2015-2019	AOP 14-14069	56 months	8	8	\$10,450,158
Total					\$15,887,919

- We note that a few months before the last call for tenders (AOP 14-14069) for the management of eco-centres was published in SEAO (November 12, 2014), a letter dated March 17, 2014 and signed by the city manager was forwarded to the deputy

¹⁹ One other call for tenders (AOI-11640) for the management of the LaSalle eco-centre was won by another organization for a period of three months: organization "C."

²⁰ Call for tenders AOP 10-11437.

minister of the Ministère des Affaires municipales et de l'Occupation du territoire (MAMOT). The letter in question asked MAMOT to exempt the city from proceeding by way of a public call for tenders to enable it to conclude a contract by private agreement with organization "A" (an NPO) for the management of the eco-centres for a period of five years. It was then stated in the letter (quote): [TRANSLATION] *"This private contract would ensure the stability of low-cost management operations of eco-centres. It would also help to maintain the quality of service to the public by promoting the social economy."*

However, in a letter dated September 24, 2014, MAMOT denied the requested exemption and directed the city to proceed in accordance with the usual rules applicable to the awarding of this type of contract. It should be noted that the CTA (section 573.3, clause 1, paragraph 2.1) allows a private contract to be awarded to an NPO except for services related to the collection, transport, transshipment, recycling or recovery of waste. In view of this section of the CTA, contracts for the management of eco-centres are not eligible for CTA exemption.

- As with contracts for supplying containers and transporting waste, these eco-centre management contracts in excess of \$100,000 are covered by the CTA's general regulation on the awarding of contracts, requiring that they be awarded to the lowest compliant bidder following a public call for tenders. We note that during the period under review (2010-2016), the preferred method for evaluating bids varies (see Appendix 6.5) and leans more toward the concepts of qualitative evaluation of bids. In 2014, following MAMOT's refusal to allow the city to award a private contract to organization "A," the Service de l'environnement opted for a two-envelope weighting and evaluation system. This permits the attribution of even more importance to qualitative evaluation, since the price, under the rules governing this method of evaluation, is not considered in the qualitative evaluation of bids at the first stage of the process.

Although the qualitative evaluation of bids is permitted by the CTA for this type of contract, such a choice nevertheless raises questions as to the real reasons that motivated the Service de l'environnement to change its method of evaluating the bids received.

- Was it to establish the bidder's qualification without having to consider the price at the first stage?
 - Would it have been easier, therefore, to remove a bidder?
- As mentioned above, when a bid evaluation and weighting system is used (one or two envelopes), a selection committee, whose work is coordinated by a secretary, must be set up in order to analyze and evaluate the bids received based on the criteria used in the evaluation grid. It should be noted that under section 573 of the CTA and the *Guide de référence des systèmes de pondération et d'évaluation, des comités de sélection et des comités techniques* (the Reference Guide)

developed by the city's Service de l'approvisionnement, there are rules governing the selection of members sitting on the selection committee. In particular, one of the criteria for inclusion stipulates that: [TRANSLATION] *"The project manager cannot be a member of the committee, even as an observer."*

However, we question the objectivity of the selection committees that were formed to evaluate the bids received with respect to calls for tenders AOP 10-11437, AOP 11-11577 and the latest one, AOP 14-14069 (see Appendix 6.5). In examining the supporting documents, in particular email exchanges between the Service de l'approvisionnement and the Service de l'environnement regarding proposals of members for the selection committee and obtaining their approval, we note the following:

- Approval of the selection committee was obtained for each of the call for tenders examined, in accordance with the provisions in force at the time the tenders were launched;
- The section head responsible for managing eco-centres, who is also the main stakeholder of the organization that had been selected for several years to handle the management, has consistently been a member of all the selection committees (3) that we have examined;
- Some of the evidence documented and the information gathered during the interviews tend to show that the section head responsible for the management of eco-centres himself proposed the members of the selection committee. In particular, when the selection committee for the last call for tenders (AOP 14-14069) was created, the selection committee's approval (which came from the Service de l'approvisionnement) was communicated directly to the section head responsible for the management of eco-centres. When asked about this, he mentioned that he had himself taken the steps to recruit the members of the selection committee for call for tenders AOP 14-14069. In this regard, the Service de l'approvisionnement's Reference Guide states: [TRANSLATION] *"The project manager must nominate the members of the selection committee."*
- In an interview, the section head responsible for eco-centre management mentioned that he was involved in the development of the call for tenders documents.

Under the circumstances, it appears to us with some conviction that the involvement of the section head in question in the tendering process leading to the award of contracts for the management of eco-centres is very closely related to the responsibilities normally assigned to a project manager. In addition, we believe that, as the primary stakeholder responsible for ensuring the proper conduct of eco-centre operations, this section head, at least in terms of optics, was putting himself in a conflict-of-interest position on the selection committees.

We reviewed the Service de l'approvisionnement's Reference Guide to identify any kind of definition of the "project manager's" duties, but did not find any particular

specifications. In addition, two Service de l'approvisionnement managers were contacted to confirm that there was no definition of the "project manager's" duties. According to the information we obtained from the department, the project manager would be the person who communicates the tendering information to the Service de l'approvisionnement without any further explicit reference.

That being said, it is well known that the way in which one or two envelope bids are evaluated is largely based on the principle that the objectivity of the selection committee set up to conduct the analysis of the bids has been preserved. In this sense, in order to avoid any confusion or misinterpretation, we believe that the Reference Guide distributed by the Service de l'approvisionnement and made available to all the business units of the city should clearly define the duties of "project manager," including:

- Specifying the roles and responsibilities of the project manager (who does what);
- Explicitly describing the tasks performed by a project manager;
- Ensuring that a manager directly responsible for the activity covered by the contract to be awarded may not be a member of the selection committee concerned.

- These findings concerning the make-up of the selection committees for the calls for tenders for eco-centre management that we examined are also reinforced by those we made following analysis of the scores awarded to the bidders by members of the selection committees under the evaluation criteria. For example, we observed the following:

- Although call for tenders AOP 10-11437 was cancelled²¹ following evaluation of the bids received, it attracted our attention in particular. The evaluation method used was a one-envelope weighting and evaluation system, and as prescribed, one of the criteria was price, which was given a weighting of 50 points out of 100. There were four other bidders, but organization "B" offered the lowest price, \$412,840, with the price of the second lowest bidder being \$839,339. However, organization "A" was the successful bidder with a price of \$945,994, including taxes and contingencies (see Appendix 6.5). This raises the following questions:

- Ø How did organization "B" fail to obtain the highest score, while organization "A" submitted a price 229% higher than "B," especially since we found that a small difference in scores of 1% separated the two (68.50% vs 67.50%)?

²¹ Resolution CE11 0130. The decision-making summary that supports the decision not to proceed with the call for tenders justifies that the price bid by organization "A" (\$945,994) was 12% higher than the internal cost estimate and that budget cuts required a revision of the specifications for the management of eco-centres.

- Ø Was organization "B" rated more severely than the other bidders for criteria other than price?
- Ø What explains the fact that organization "B" received the lowest score (6.25 points out of 25) of all the bidders for the evaluation criterion of "understanding the mandate," when prior to 2011 it had been the most successful bidder along with organization "A" (see Appendix 6.4)?
- In the subsequent call for tenders (AOP 11-11577), which also used a one-envelope weighting and evaluation system for bids, organization "A" won all seven contracts for the management of each active eco-centre. In this call for tenders, organization "B" bid only on the two eco-centres where it had been the successful bidder from 2003 to 2011: Côte-des-Neiges and Rivière-des-Prairies (see Appendix 6.4). Thus, we have to ask:
 - Ø How is it that, for the criteria of "Eco-centre Management Activities," "Customer Service" and "Human Resource Management," which carry a large overall score (15 points each for a total of 45 points, while price counts for 50 points), it was awarded the lowest scores of all the bidders, i.e., 26.6 points out of 45??
- In the last call for tenders (AOP 14-14069), which used a two-envelope system for weighting and evaluating bids, there were four bidders: organizations "A," "B," "C," and "D." In the end, organization "A" obtained the highest score and won all eight contracts (see Appendix 6.5). This raises the following questions:
 - Ø How is it that, in the first stage of the qualitative analysis process, organizations "B" and "C," which submitted generally competitive prices, were eliminated?
 - Ø How does one explain why organization "D," which has historically submitted too-high prices and which has not yet been awarded a contract to manage a city eco-centre, obtained the passing mark needed to move to the second stage, where price is taken into consideration as part of an established formula?
- Furthermore, we note that the tender documents examined provide a clause according to which the successful bidder can dispose of the metal (ferrous and non-ferrous)²² supplied to the eco-centre and keep the revenue. As a result of this feature, all bidders that are notified are given the opportunity to adjust the price of their bids accordingly, on condition that they are also given an approximation of the quantities of metals historically supplied to the eco-centres. It was only after the 2014 call for tenders (AOP 14-14069) that an appendix was attached to the call for tender documents in order to give bidders an indication of the quantities of ferrous and non-ferrous metals collected by each eco-centre in the two years

²² Definition: ferrous metals are made of steel and cast iron, while non-ferrous metals consist of aluminum, copper, lead, nickel, zinc and others (including plumbing, electricity and hardware materials).

preceding the call for tenders. Previously, this information had not been disclosed in the call for tender documents. As a result, only the successful bidder was in a position to assess more precisely what these revenues could represent and thus propose a lower price in full knowledge of the facts. According to information we obtained from the section head responsible for the management of eco-centres, this information concerning the revenues from metal is compiled within the Service de l'environnement based on copies of metal sales invoices transmitted regularly by the successful bidder. For the years 2013 to 2015, this would represent annual revenues ranging from \$200,000 to \$320,000.²³ However, in light of the information obtained, it appears that the comprehensiveness of these declared revenues has not been validated in any way by the Service de l'environnement. Therefore, we ask:

- Could it be that the revenues from the sale of metals were higher than those declared by the successful bidder?
 - Would the fairness of the process be compromised if this proved to be the case?
- Also, it is surprising to us that, for most of the calls for tenders examined in relation to the management of eco-centres, it has not always been possible to find documentation of detailed cost estimates, when the contracts to be awarded represented considerable sums. In addition, since this mandatory disclosure of the cost estimate under section 477.5 of the CTA was never made, it deprives bidders in subsequent calls for tenders of information that would have influenced their proposal. Therefore, we ask:
- How is it that for most of the calls for tenders examined there are significant discrepancies between the successful bidder and the second lowest bidder?
- Finally, regarding the last call for tenders (AOP 14-14069) for the management of eco-centres, in which the total value of the eight related contracts was \$10.5 million, we also sought to find out whether urban agglomeration council's Commission permanente sur l'examen des contrats had intervened in advance to analyze the awarding process. To this end, it should be borne in mind that, in order to be examined by the Committee, a contract must satisfy one or other of the following two criteria:
- It is a contract with a value over \$10 million
 - It is a contract:
 - Ø of one of the following types:
 - § Goods and services over \$2 million²⁴
 - § Professional services over \$1 million
 - § Execution of work over \$2 million

²³ According to the information contained in the waste monitoring report produced by the Section opérations under the Division planification et opérations – gestion des matières résiduelles of the Service de l'environnement.

²⁴ Our emphasis.

- Ø that meets one of the following conditions:
 - § A single compliant bidder was received following a call for tenders
 - § No call for tenders was launched, the supplier being considered unique under the second part of the first paragraph of section 573.3 of the CTA
 - § Contract is awarded to a consortium
 - § Successful bidder is awarded its third consecutive contract for a recurring contract
 - § There is a price difference of over 20% between the successful bidder and the second lowest compliant bidder, or the second highest total score if an evaluation grid is used.
 - § There is a difference of over 20% between the internal estimate made during the call for tenders process and the successful applicant's bid.
 - § A real estate transaction by private agreement at an amount other than the fair market value.

However, in accordance with the criteria established for the purposes of examination by the Committee, we note that the said contracts for “goods and services other than professional services” constituting the call for tenders AOP 14-14069 did not qualify for this analysis. Individually, each of the contracts for the call for tenders was less than \$2 million.

Under these circumstances, and considering the size of the contracts awarded to organization “A” since 2011 to manage the city's eco-centres (see Table 1 above), we consider that it would be very relevant if one of the Committee's review criteria provided for the possibility that the same successful bidder could be awarded all the contracts under a single call for tenders and that the total value of the contracts exceeds a certain threshold (e.g., \$10 million).

In conclusion, all these questions remain unanswered. We therefore are forwarding the file to the Bureau de l'inspecteur général to dispel or confirm any doubts we may have about the sensitive aspects of this process and so that, if applicable, appropriate decisions may be made, taking into account the results obtained.

RECOMMENDATIONS

4.1.2.B.

We recommend that the Service de l'approvisionnement take the necessary steps to ensure that the *Guide de référence des systèmes de pondération et d'évaluation, des comités de sélection et des comités techniques* clearly define the duties of “project manager,” so as to avoid confusion or interpretation when setting up a selection committee.

4.1.2.C.	We recommend that Direction générale make the necessary presentations to the authorities to review the examination criteria by the urban agglomeration council's Commission permanente sur l'examen des contrats so as to cover situations where only one of the bidders is awarded all the contracts under a call for tenders and the sum of these contracts exceeds a threshold set for analysis (e.g., \$10 million).

BUSINESS UNITS' RESPONSES

4.1.2.B.	<i>Service de l'approvisionnement</i> <i>[TRANSLATION] Add the definition of "project manager" to the document Guide de référence des systèmes de pondération et d'évaluation, des comités de sélection et des comités techniques and, if necessary, amend the relevant sections of the document that refer to the required make-up of a selection committee.</i> <i>Elements to be defined explicitly:</i> · Roles and responsibilities of the project manager (who does what); · Tasks performed by a project manager. <i>Objectives:</i> · Ensure that no manager who is directly responsible for the activity covered by the contract to be awarded sits on the selection committee concerned; · Exclude from a selection committee any employee who appears to meet the definition of project manager, even if they do not hold that title; · Make the necessary changes in the Demande d'approbation d'un comité de sélection form and in the validation tool, if required. <i>(Planned completion: May 2017)</i>
4.1.2.C.	<i>Direction générale</i> <i>[TRANSLATION] The executive committee has already indicated, in response to a recommendation aimed at changing the mandate of the Commission permanente sur l'examen des contrats, that it did not envisage such an amendment. (Planned completion: no planned action)</i> Auditor General's comments We maintain the relevance of submitting this recommendation to the authorities who will assess how to follow-up on our recommendation. In our view, the scope of the changes we are suggesting in relation to the review criteria of the Commission permanente sur

	l'examen des contrats is in no way comparable to that proposed by the Commission sur l'inspecteur général regarding analysis of the monitoring of disbursements and the use of contract contingencies that it has studied.

4.2. Accountability Reporting

The *Sustainable Montréal 2016-2020* development plan, which succeeded the *Plan de développement durable de la collectivité montréalaise 2010-2015*, mobilized the city, its partner organizations and the local governments in sharing objectives, directions and actions to promote sustainable development. Like the *Plan directeur de gestion des matières résiduelles de l'agglomération de Montréal 2010-2014*,²⁵ the sustainable development plan aims, among other things, to further reduce the amount of waste produced and maximize at source: reduction, reuse, recycling and recovery (4R principle). In particular, one of the 10 established collective targets is to meet governmental recovery objectives for recyclable material (70%) and organic materials (60%) by 2020.

To ensure the consistent deployment of all the actions proposed by the *Plan de développement durable de la collectivité montréalaise 2010-2015*, each borough was invited to develop a local sustainable development plan. It is also expected that this will be the case for the *Sustainable Montréal 2016-2020* plan, while the information we have obtained indicates that local borough plans are expected by June 30, 2017. We note that, apart from the Rosemont–La Petite-Patrie borough, the other three boroughs in our sample have a local sustainable development plan for 2010-2015 or 2011 to 2015, as the case may be. These local plans are tied to Montréal's major strategic plans in terms of sustainable development and waste management.

With this clarification, the following sections of this report will address the accountability mechanisms that were established by the audited boroughs and the Service de l'environnement with the aim of evaluating the contribution of the Éco-quartier program and the eco-centres in achieving the municipal objectives on sustainable development and waste management.

4.2.1. Éco-Quartier Program

4.2.1.A. Background and Findings

Meeting the goals of sustainable development inevitably means changes in behaviour and mentality on the part of Montrealers. Thus, the Éco-quartier program deployed in the boroughs is oriented to promoting eco-conscious habits among Montrealers.

²⁵ Latest version currently available.

Among other things, it aims to optimize the performance of the various existing green programs and gradually induce changes in attitudes and behaviours, in light of today's environmental concerns (e.g., increasing participation in selective collections). Over time, this program has evolved to adapt to the new realities and directions of the city.

As mentioned earlier, the boroughs are implementing the program through financial contributions to organizations that support the Éco-quartier program. For the four audited boroughs, the authorized financial contributions to the organizations responsible for the Éco-quartier program amounted to close to \$6 million from 2013 to 2016 (see Table 2).

Table 2 – Summary of Financial Contributions Authorized by the Audited Boroughs Under the Éco-Quartier Program, 2013 to 2016

Borough audited	Financial contribution authorized	
	Total amount	Annual average
Ahuntsic-Cartierville	\$1,523,850	\$380,963
Mercier–Hochelaga-Maisonneuve	\$1,489,882	\$372,471
Rosemont–La Petite-Patrie	\$1,315,392	\$328,848
Villeray–Saint-Michel–Parc-Extension	\$1,390,000	\$347,500
Total	\$5,719,124	

Within each of the audited boroughs, we note that this financial contribution is the subject of a management agreement concluded with the designated organization.

The agreements we examined in the course of our work, and the Éco-quartier program attached to it, were concluded by the four selected boroughs for a three-year duration, starting during the period 2014-2017, in staggered fashion.²⁶ These agreements, as well as the Éco-quartier program specific to each of the boroughs, were approved by the borough council.

More specifically regarding the Éco-quartier program, although the content differs from one borough to another, we note that the program specifies the general directions to be taken in light of the nature of interventions requested by the delegated organization. For example, the program contains guidelines such as:

²⁶ Ahuntsic-Cartierville borough: January 1, 2014 to December 31, 2016; Mercier–Hochelaga-Maisonneuve borough: November 1, 2014 to December 31, 2017; Rosemont–La Petite-Patrie and Villeray–Saint-Michel–Parc-Extension boroughs: January 1, 2015 to December 31, 2017

- Help achieve the objectives set out in the *Plan directeur de gestion des matières résiduelles de l'agglomération de Montréal 2010-2014* and in the next version, as well as the objectives set out in the *Plan de développement durable de la collectivité montréalaise 2010-2015* and in the 2016-2020 version;
- Encourage the participation and mobilization of citizens in the borough's environmental activities;
- Continue to implement recycling in buildings with four or more units;
- Encourage the ecological management of resources by setting up collective composting sites.

The Éco-quartier program, or management agreements, where applicable, include an obligation for the designated organization to submit annually to the borough an action plan established in accordance with the guidelines of the Éco-quartier program. This plan must be formally approved by the borough council or, as the case may be, by the director to whom this responsibility has been delegated. It is also envisaged that a report on the activities undertaken, as well as the specific management reports, will be produced annually, and that this will include statistics on the results obtained and the number of activities carried out according to the field of activity concerned.

Through our audit work, we have noted the existence of these documents required from the designated organizations. In particular, we have located the annual action plans submitted by the designated organizations, as well as the balance sheets or activity reports that have been produced. In this regard, the accountability of the designated organizations appears to us to meet the specifications of the audited boroughs. However, our examination revealed the following facts:

- At the time of our audit work, we found that the action plans submitted by the designated organizations had not always been formally approved, as specified by the borough (see Table 3).

Table 3 – Competent Authority to Approve the Action Plan Submitted Annually by the Designated Organization of the Éco-Quartier Program

Borough	Source of planned provision	Designated competent authority to approve the annual action plan
Ahuntsic-Cartierville	Éco-quartier Program (section 4.3)	Borough council
Mercier–Hochelaga-Maisonneuve	Éco-quartier Program (section 5)	Director of the Direction des travaux publics
Rosemont–La Petite-Patrie	Management agreement (section 4)	Director of the Direction du développement du territoire et des études techniques
Villeray–Saint-Michel–Parc-Extension	Éco-quartier Program (section 4.4)	Borough council

Regarding the boroughs of Ahuntsic-Cartierville, Mercier–Hochelaga-Maisonneuve and Rosemont–La Petite-Patrie, we could only find evidence that the action plan was approved for the first year of the Éco-quartier program. With respect to the Villeray–Saint-Michel–Parc-Extension borough, although the action plans produced by the organization had been forwarded to the manager responsible for monitoring them, it appears that they did not receive formal approval.

That said, in light of the information gathered from the staff responsible for monitoring the Éco-quartier program, it appears that the action plans submitted by the organization nevertheless were reviewed to assess their compliance with the program's objectives. However, we believe that the rules of approval set out by the boroughs must be followed to ensure that, in return for the financial contributions allocated, the activities to be carried out by the designated organizations do indeed contribute to the achievement of the sustainable development targets.

As part of the audit, we reviewed various balance sheets or activity reports produced by the designated organizations regarding the action plans proposed to meet the objectives of the Éco-quartier program, as well as the reports produced by certain boroughs regarding their local sustainable development plan. However, we found no documented analysis for any of the audited boroughs that would explain to what extent the financial contributions allocated to the Éco-quartier program were helping to meet the targets set out in the city's strategic plans for sustainable development and waste management.

In our opinion, this evaluation is essential as the financial contributions made to the organizations responsible for the Éco-quartier program constitute one of the

levers chosen by the authorities to facilitate achievement of the city's sustainable development objectives.

RECOMMENDATIONS	
4.2.1.B.	We recommend that the boroughs of Ahuntsic-Cartierville, Mercier–Hochelaga-Maisonneuve, Rosemont–La Petite-Patrie and Villeray–Saint-Michel–Parc-Extension comply with the rules of approval for action plans submitted under the Éco-quartier program in order to ensure that they contribute to achieving the sustainable development targets.
4.2.1.C.	We recommend that the boroughs of Ahuntsic-Cartierville, Mercier–Hochelaga-Maisonneuve, Rosemont–La Petite-Patrie and Villeray–Saint-Michel–Parc-Extension make the necessary arrangements to demonstrate that the Éco-quartier program does contribute to achieving the sustainable development targets.
BUSINESS UNITS' RESPONSES	
4.2.1.B.	Ahuntsic-Cartierville borough <i>[TRANSLATION] Annual approval by the borough council of the action plan of the Éco-quartier program. (Planned completion: December 2017)</i> <i>File once a year with the borough council an annual report produced by the managing organization of the Éco-quartier program. (Planned completion: June 2017)</i> Mercier–Hochelaga-Maisonneuve borough <i>[TRANSLATION] Enhance the 2017 action plan of the Éco-quartier program of the Mercier–Hochelaga-Maisonneuve borough by integrating the targets of Plan de développement durable de la collectivité montréalaise and/or the Plan local de développement durable of the Mercier–Hochelaga-Maisonneuve borough into the operational targets planned for the current year. The sustainable development targets that are selected will be adapted to borough management conditions but will contribute to the objectives of Plan de développement durable de la collectivité montréalaise. (Planned completion: June 2017)</i> <i>Integrate into the annual action plan of the Éco-quartier program of the Mercier–Hochelaga-Maisonneuve borough the targets of Plan de développement durable de la collectivité montréalaise and/or the Plan local de développement durable of the Mercier–Hochelaga-Maisonneuve borough the operational targets planned for the current</i>

	year. The sustainable development targets that are selected will be adapted to borough management conditions but will contribute to the objectives of Plan de développement durable de la collectivité montréalaise. This exercise will be in accordance with the current Éco-quartier program agreement. (Planned completion: December 2017 for the 2018 action plan) Participate in the boroughs' rewriting of the Éco-quartier program agreement to adapt it to the requirements of the Service des affaires juridiques. (Planned completion: December 2017) Rosemont–La Petite-Patrie borough [TRANSLATION] Formalize the approval process for the Éco-quartier program's annual action plan by adding the borough's director signature (the Éco-quartier program is no longer under the Direction du développement du territoire et des études techniques). Take advantage of the ending of the present Eco-quartier agreement (December 2017) to introduce this new approval practice and integrate it into the next agreement. Undertake a rewriting of the documents related to the action plan so that they clearly express the approval of the borough's director. (Planned completion: December 2017) Villeray–Saint-Michel–Parc-Extension borough [TRANSLATION] Adopt each year the action plans proposed under the Éco-quartier program to the borough council and grant annual financial contributions. Adopt each year the activity report of the Éco-quartier program to the borough council. (Planned completion: November 2017: Approval of the draft agreement amended for a one-year extension in 2018 and of the action plan, in addition to granting a financial contribution for 2018 to the borough council. February 2018: File with the borough council and have adopted the 2017 activity report.)
4.2.1.C.	Ahuntsic-Cartierville borough [TRANSLATION] Design an accountability tool to demonstrate that the Éco-quartier program is helping to achieve the targets set out in the

Plan local de développement durable 2016-2020. **(Planned completion: June 2018)**

Before producing an accountability tool, the Ahuntsic-Cartierville borough will develop the Plan local de développement durable 2016-2020 and review the Éco-quartier program.

*Analyze and interpret each year the results of this accountability tool. **(Planned completion: September 2017)***

Mercier–Hochelaga-Maisonneuve borough

*[TRANSLATION] Verify the achievement of sustainable development targets during the annual fiscal review/programming of the Éco-quartier annual action plan. The sustainable development targets that are selected will be adapted to borough management conditions but will contribute to the objectives of Plan de développement durable de la collectivité montréalaise. This exercise will be carried out in accordance with the current Éco-quartier program agreement. **(Planned completion: December 2017)***

Rosemont–La Petite-Patrie borough

[TRANSLATION] Add new performance indicators to the current evaluation criteria of the Éco-quartier program to assess the achievement of the targets set out in the Plan local de développement durable.

Add objectives to the Éco-quartier's annual action plan to meet the targets set out in the Plan local de développement durable.

*Undertake a rewriting of the documents related to the annual action plan so that they clearly express the new objectives and performance indicators for sustainable development. **(Planned completion: December 2017)***

Villeray–Saint-Michel–Parc-Extension borough

*[TRANSLATION] Develop an evaluation plan for the Éco-quartier program in relation to the actions of the Plan local de développement durable 2016-2020 of the Villeray–Saint-Michel–Parc-Extension borough. **(Planned completion: December 2017)***

Incorporate a set of updated indicators into the annual activity report of the Éco-quartier program.

*Analyze the indicators and the annual activity report and file the results with the borough council. **(Planned completion: December 2018)***

4.2.2. Eco-Centres

4.2.2.A. Background and Findings

Regarding the eco-centres under the Service de l'environnement, our work has shown that various information is being compiled within the Section opérations under the Division planification et opérations – gestion des matières résiduelles. In particular, we saw a report for the years 2013, 2014 and 2015²⁷ that lists annually, for each eco-centre in operation, information such as:

- types of materials brought to the eco-centres (e.g., wood, soil, recyclable materials, metals, electronic products)
- quantities (in tonnes) of each of these materials brought in, the number of shipments that were then made to disposal or treatment sites and the related processing costs
- observed traffic (number of visitors), eco-centre management costs and revenues from charging access to eco-centres in accordance with established fees
- quantities of ferrous and non-ferrous metals brought in, as well as the revenues from their sale, as declared by the organization responsible for the management of each eco-centre²⁸
- recovery rate (%) of materials brought to eco-centres annually.

According to the section head, this report of statistical compilations is based, among other things, on invoices obtained from firms contracted to handle the subsequent processing of materials brought to the eco-centres, since the city is invoiced based on the tonnage of each of these different types of materials to be processed.

In addition, according to the information obtained from the planning consultant assigned to the task, the quantities (in tonnes) of materials brought to the city's eco-centres are among the data that were used by the Service de l'environnement to produce the following documents:

- *Bilan 2010-2015 du Plan directeur de gestion des matières résiduelles de l'agglomération de Montréal*²⁹ (five-year results);
- *Bilan 2015 des matières résiduelles de l'agglomération de Montréal* (2015 result only).

These documents highlight the rate of progress in meeting the recovery objectives for recyclable material. In this regard, the *Plan directeur de gestion des matières résiduelles de l'agglomération de Montréal 2010-2014* and the *Sustainable Montréal 2016-2020* sustainable development plan include among the collective targets to be

²⁷ The report for 2016 was not available when the audit work was being done.

²⁸ It should be noted that a clause in the quote allows the successful bidder to retain revenues from the sale of ferrous and non-ferrous metals.

²⁹ Produced by the Division planification et opérations – gestion des matières résiduelles of the Service de l'environnement of the Ville de Montréal.

met: [TRANSLATION] "*Meeting governmental recovery objectives for recyclable material (70%) and organic materials (60%) by 2020.*"

In addition, we reviewed a document titled *Bilan des opérations – Document interne* for the years 2013, 2014 and 2015.³⁰ This report presents various relevant information concerning the management of eco-centres, in particular:

- List of contracts in progress
- Analysis of development made:
 - Traffic in the eco-centres and management fees
 - Revenues generated by the eco-centres
 - Quantities, by type, of material from eco-centres
 - Tonnage and revenues from ferrous and non-ferrous metals recovered by the eco-centre operator
 - Data relating to the transport of waste in containers
- Operational information related to eco-centres (e.g., maintenance and repairs undertaken, occupational health and safety)

According to information obtained from the section head responsible for the management of eco-centres, all these reports were produced on his own initiative. However, they would be sent to the managers of the department concerned (specifically to his immediate supervisor) and to departmental management.

Ultimately, the management reports that were produced seem to us to be relevant in monitoring eco-centre operations and in measuring the contribution made by eco-centres in meeting the corporate and governmental targets for waste management and sustainable development. In this regard, we have no specific recommendations to make.

5. Conclusion

Regarding compliance in the process of awarding contracts for managing the eco-centres, transporting waste recovered from them and supplying containers, the audit revealed certain shortcomings that need to be corrected.

It is a given that public funds must first be managed in compliance with the laws and regulations in force. However, in this context, it must be acknowledged that the managers responsible have to deal with a number of different issues while simultaneously ensuring that competitive tendering procedures are followed, in order to provide citizens with adequate services at the best prices, and also to preserve the principles of fairness and transparency while promoting the greatest possible competition.

³⁰ As with the statistical compilations report, the report for 2016 was not available when the audit work was being done.

We were not able to demonstrate without any doubt the circumvention of established procedures for selecting successful bidders for the period between 2011 and 2016. However, we have to question whether the principles of fairness and transparency that should govern the procedures for soliciting contracts and inviting competition from suppliers were tainted with regard to contracts awarded to the same organization for the management of all of the city's eco-centres. For this reason we consider it appropriate to forward the file to the Bureau de l'inspecteur général of the city, so that it may pursue any investigations it deems appropriate. In light of this, we believe that greater vigilance should dictate the make-up and conduct of the selection committee, to prevent any situations arising that may compromise the impartiality and objectivity of the bid evaluation process.

As for accountability, we consider that the mechanisms established for the management of eco-centres under the authority of the Service de l'environnement make it possible to demonstrate to what extent they are helping to meet the strategic targets of the Montréal agglomeration's sustainable development plan. However, in the case of the Éco-quartier program, which comes under the responsibility of the audited boroughs, this evidence seems to be more difficult to establish since no real documented evaluation has yet been carried out.

6. Appendices

6.1. Purposes and Evaluation Criteria

Purposes

The purpose of the audit was to ensure that the awarding of contracts to delegated organizations for the management of eco-centres and the transport of waste to recycling or recovery sites was being carried out in an objective, transparent and fair manner.

In addition, the audit aimed to ensure that the amounts allocated by the city to the organizations delegated to manage the Éco-quartier program and the eco-centres were subject to a regular reporting process that would permit evaluation of the results obtained.

Evaluation Criteria

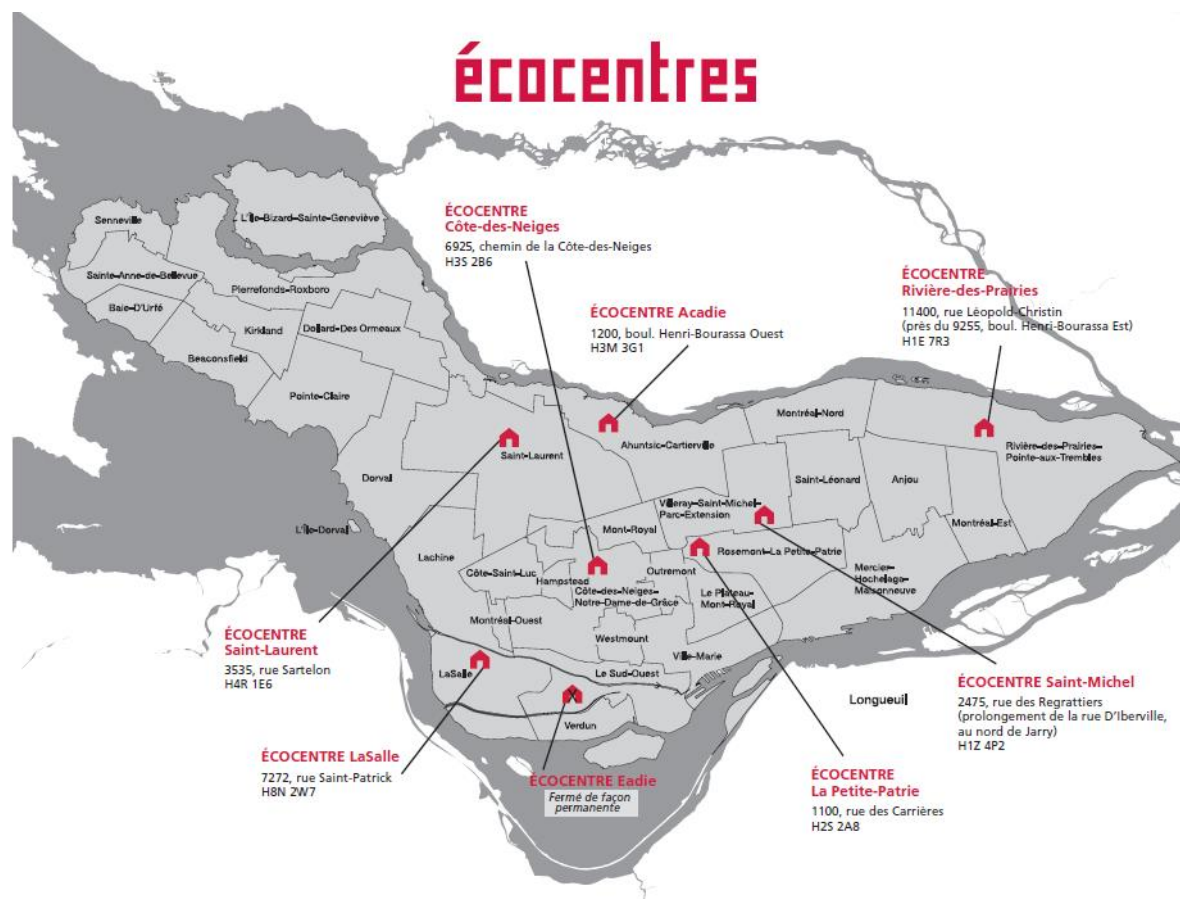
- The purpose of the audit was to ensure that the awarding of contracts to the organizations delegated to manage the eco-centres and the transport of waste to recycling or recovery sites was being carried out in an objective, transparent and fair manner.
- Accountability is periodically carried out to assess the results obtained based on established municipal waste management and sustainable development objectives.

6.2. Summary of Financial Contributions Authorized by the Boroughs Under the Éco-Quartier Program, 2013 to 2016

15 boroughs offering the Éco-quartier program		Total of authorized financial contributions, 2013 to 2016
1	Le Plateau-Mont-Royal	\$190,000
2	Lachine	\$376,263
3	Pierrefonds-Roxboro	\$383,242
4	Verdun	\$451,152
5	Montréal-Nord	\$462,900
6	Saint-Léonard	\$468,943
7	Saint-Laurent	\$555,000
8	Le Sud-Ouest	\$697,600
9	Rivière-des-Prairies– Pointe-aux-Trembles	\$728,000
10	Côte-des-Neiges– Notre-Dame-de-Grâce	\$1,300,000
11	Rosemont– La Petite-Patrie	\$1,315,392
12	Villeray–Saint-Michel– Parc-Extension	\$1,390,000
13	Mercier–Hochelaga- Maisonnette	\$1,489,882
14	Ahuntsic-Cartierville	\$1,523,850
15	Ville-Marie	\$2,100,000
Total		\$13,432,224

	Boroughs audited

6.3. Locations of Eco-Centres in the Ville de Montréal



Source: Dépliant sur les écocentres, Ville de Montréal.

6.4. Selection of Organizations Designated to Manage Eco-Centres, 2003 to 2016

Year	Eco-centres							
	La Petite-Patrie	Acadie	Saint-Michel	Côte-des-Neiges	Eadie	Rivière-des-Prairies	LaSalle	Saint-Laurent
	Open since: May 1997	Open since: May 1998	Open since: June 1999	Open since: October 1999	Open: August 2000 to November 2015	Open since: October 2003	Open since: August 2011	Open since: June 2016
2003	Other organization ^[a]	Other organization ^[a]	Other organization ^[a]	Other organization ^[a] Organization "B"	Organization "A"	Organization "B"		
2004	Other organization ^[a]	Other organization ^[a]	Other organization ^[a] Organization "B" ^[d]	Organization "B"	Organization "A"	Organization "B"		
2005	Other organization ^[a]	Organization "B"	Organization "B"	Organization "B"	Organization "A"	Organization "B"		
2006	Other organization ^[a]	Organization "B"	Organization "B"	Organization "B"	Organization "A"	Organization "B"		
2007	Other organization ^[a]	Organization "B" ^[c] Organization "A"	Organization "B"	Organization "B"	Organization "A"	Organization "B"		
2008	Organization "A" ^[b]	Organization "A"	Other organization ^[a]	Organization "B"	Organization "A"	Organization "B"		
2009	Organization "A"	Organization "A"	Other organization ^[a]	Organization "B"	Organization "A"	Organization "B"		
2010	Organization "A"	Organization "A"	Other organization ^[a]	Organization "B"	Organization "A"	Organization "B"		
2011	Organization "A"	Organization "A"	Other organization ^[a] Organization "A" ^[e]	Organization "B" ^[f] Organization "A"	Organization "A"	Organization "B" ^[h] Organization "A"	Organization "C" ^[i] Organization "A"	
2012	Organization "A"	Organization "A"	Organization "A"	Organization "A"	Organization "A"	Organization "A"	Organization "A"	
2013	Organization "A"	Organization "A"	Organization "A"	Organization "A"	Organization "A"	Organization "A"	Organization "A"	
2014	Organization "A"	Organization "A"	Organization "A"	Organization "A"	Organization "A"	Organization "A"	Organization "A"	
2015	Organization "A"	Organization "A"	Organization "A"	Organization "A"	Organization "A" ^[g]	Organization "A"	Organization "A"	
2016	Organization "A"	Organization "A"	Organization "A"	Organization "A"		Organization "A"	Organization "A"	Organization "A" ^[j]

^[a] Successful bidder other than organizations A, B or C.

^[b] Since July 2008.

^[c] January 2005 to November 2007.

^[d] July 2004 to December 2007.

^[e] Since February 2011.

^[f] September 2003 to January 2011.

^[g] August 2000 to November 2015.

^[h] October 2003 to January 2011.

^[i] August to October 2011 (3 months).

^[j] Since June 2016.

6.5. Calls for Tenders to Manage Eco-Centres, 2010 to 2016

AOP 10-11437 – Call for tenders cancelled (Successful bidder would have been "A" if tender had not been cancelled following evaluation of bids)								
Duration of contract	Tender method	Evaluation method	Eco-centre	Bidder Score Price ^[a]				
25 months (Oct. 1, 2010 to Oct. 31, 2012)	Public call for tenders	Weighting and evaluation system (1 envelope)	LaSalle	Organization "A" 68.50% \$945,994	Organization "B" 67.50% \$412,840	Other organization 61.75% \$934,327	Other organization 59.25% \$839,339	Organization "C" 46.75% \$1,581,650

^[a] Price submitted including taxes and contingencies.

AOP 10-11441 – 6 separate contracts (Successful bidder was organization "A," authorized expenditure of \$552,200, taxes and contingencies included)								
Duration of contract	Tender method	Evaluation method	Eco-centre	Bidder Price ^[a]				
9 months Feb. 1 to Oct. 31, 2011)	Public call for tenders	Lowest compliant bidder	Acadie	Organization "A" \$83,000	Organization "B" \$121,900	Other organization \$155,729	Organization "C" \$159,902	Other organization \$230,693
			Côte-des-Neiges	Organization "A" \$85,000	Organization "B" \$116,790	Other organization \$132,052	Organization "C" \$148,365	Other organization \$230,693
			Eadie	Organization "A" \$83,000	Other organization \$125,817	Organization "B" \$131,014	Organization "C" \$157,158	Other organization \$230,693
			La Petite-Patrie	Organization "A" \$83,000	Organization "B" \$131,074	Other organization \$154,021	Organization "C" \$168,655	Other organization \$230,693
			Rivière-des-Prairies	Organization "A" \$85,000	Organization "B" \$116,790	Other organization \$132,052	Organization "C" \$147,823	Other organization \$230,693
			Saint-Michel	Organization "A" \$83,000	Organization "B" \$121,900	Other organization \$153,004	Organization "C" \$170,510	Other organization \$230,693

^[a] Price submitted with taxes.

AOI 11-11640 – 1 contract (Successful bidder was organization "C," authorized expenditure of \$66,265, taxes and contingencies included)								
Duration of contract	Tender method	Evaluation method	Eco-centre	Bid Price ^[a]				
3 months ^[b] (Aug. 1 to Oct. 31, 2011)	Call for tenders by invitation	Lowest compliant bidder	LaSalle	Organization "C" \$80,322	Organization "B" \$87,084	Organization "A" \$96,836	Other organization \$97,637	Other organization \$104,811

^[a] Price submitted with taxes.

^[b] Prices submitted were for a contract with an initial duration of four months rather than three months.

AOP 11-11577 ^[a] – 7 separate contracts (Successful bidder was organization "A," authorized expenditure of \$4,885,561, taxes and contingencies included)								
Duration of contract	Tender method	Evaluation method	Eco-centre	Bidder Score Price ^[b]				
36 months (Nov. 1, 2011 to Oct. 31, 2014)	Public call for tenders	Weighting and evaluation system (1 envelope)	Acadie	Organization "A" 91.50% \$607,942	Organization "C" 71.42% \$923,309	Other organization 54.04% \$1,622,087		
			Côte-des-Neiges	Organization "A" 91.50% \$558,723	Organization "B" 74.23% \$630,146	Organization "C" 72.67% \$817,662	Organization "D" 72.57% \$913,922	Other organization 54.78% \$1,434,384
			Eadie	Organization "A" 91.50% \$611,462	Organization "C" 71.61% \$923,309	Other organization 54.15% \$1,622,087		
			La Petite-Patrie	Organization "A" 91.50% \$680,899	Organization "C" 71.57% \$1,029,382	Other organization 54.11% \$1,810,200		
			LaSalle	Organization "A" 91.50% \$719,475	Organization "D" 74.99% \$1,351,011	Organization "C" 71.49% \$1,090,300	Other organization 55.17% \$1,810,200	
			Rivière-des-Prairies	Organization "A" 91.50% \$582,018	Organization "B" 76.08% \$630,146	Organization "C" 74.09% \$817,662	Organization "D" 71.37% \$990,828	Other organization 55.59% \$1,434,384
			Saint-Michel	Organization "A" 91.50% \$680,899	Organization "C" 71.57% \$1,029,382	Organization "D" 70.95% \$1,176,187	Other organization 54.11% \$1,810,200	

^[a] All contracts awarded under this call for tenders were extended for a period of eight weeks until the end of December 2014, based on the rates submitted, in accordance with decision CG14 0452 of the urban agglomeration council.

Subsequently, for the seven eco-centres, contracts were concluded by private agreement with organization "A" for January and February 2015. According to the information contained in the city's accounting system (SIMON), the total expenditure invoiced for these contracts was \$159,750, ranging from \$21,630 and \$24,532 per eco-centre.

^[b] Price submitted with taxes.

5.4. Éco-Quartier Program and Eco-Centres

AOP 14-14069 – 8 separate contracts (Successful bidder was organization "A," authorized expenditure of \$10,450,158, taxes and contingencies included)							
Duration of contract	Tender method	Evaluation method	Eco-centre	Organization "A" Interim score Price ^[a] Final score	Organization "B" ^[b] Interim score Price ^[a] Final score	Organization "C" Interim score Price ^[a] Final score	Organization "D" ^[b] Interim score Price ^[a] Final score
56 months (Mar. 1, 2015 to Oct. 31, 2019)	Public call for tenders	Weighting and evaluation system (2 envelopes)	Acadie	87.63% \$1,289,418 1.07		67.25% Not qualified N/A ^[c]	81.63% \$1,646,515 0.80
56 months (Mar. 1, 2015 to Oct. 31, 2019)			Côte-des-Neiges	87.63% \$1,174,040 1.17	65.00% Not qualified N/A ^[c]	67.25% Not qualified N/A ^[c]	81.63% \$1,634,074 0.81
9 months (Mar. 1 to Nov. 30, 2015)			Eadie	87.63% \$241,909 5.69		67.25% Not qualified N/A ^[c]	
56 months (Mar. 1, 2015 to Oct. 31, 2019)			La Petite-Patrie	87.63% \$1,479,995 0.93		67.25% Not qualified N/A ^[c]	81.63% \$1,873,606 0.70
56 months (Mar. 1, 2015 to Oct. 31, 2019)			LaSalle	87.63% \$1,147,721 1.20		67.25% Not qualified N/A ^[c]	81.63% \$1,664,034 0.79
56 months (Mar. 1, 2015 to Oct. 31, 2019)			Rivière-des-Prairies	87.63% \$1,401,273 0.98		67.25% Not qualified N/A ^[c]	81.63% \$1,808,639 0.73
39 months (Jun. 1, 2016 to Oct. 31, 2019) ^[b]			Saint-Laurent	87.63% \$1,094,432 1.26	65.00% Not qualified N/A ^[c]	67.25% Not qualified N/A ^[c]	81.63% \$1,701,186 0.77
56 months (Mar. 1, 2015 to Oct. 31, 2019)			Saint-Michel	87.63% \$1,435,674 0.96		67.25% Not qualified N/A ^[c]	81.63% \$1,779,943 0.74

^[a] Price submitted with taxes.

^[b] Bid amount based on a 49-month contract, but the contract was for 39 months, as the eco-centre opened later than expected.

^[c] Blank boxes signify that no proposal was obtained by this bidder for the eco-centre concerned.

6.6. Calls for Tenders to Provide Containers and Transportation for Waste, 2009 to 2016

History by transport company, by eco-centre									
Transport company	Call for tenders no.	AOP 09-11016	AOP 11-11438	AOP 12-11940	AOP 13-12892	AOI DA 157035001	AOP 15-14968	AOP 16-15121	Amount of contract (taxes and contingencies included)
	Tender method	(public)	(public)	(public)	(public)	(invitation)	(public)	(public)	
	Number of eco-centres	6	1	1	7	1	1	7	
	Duration of contract	48 months	29 months	16 months	36 months	2 months	6 months	39 and 42 months	
	Period	Nov. 1, 2009 - Oct. 31, 2013	Jul. 1, 2011 - Nov. 30, 2013	Aug. 1, 2012 to Nov. 30, 2013	Dec. 1, 2013 to Nov. 30, 2016	Dec. 14, 2015 to Feb. 14, 2016	Feb. 1, 2016 to Aug. 1, 2016	Jun. 1, 2016 to Nov. 30, 2019	
"1"	Acadie	\$1,077,618			\$815,196			\$662,856	\$2,555,670
	Côte-des-Neiges	\$958,760			\$1,074,350			\$790,185	\$2,823,295
	Eadie	\$983,367		\$551,232					\$1,534,599
	La Petite-Patrie				\$1,772,662			\$1,142,663	\$2,915,325
	LaSalle		\$1,704,816						\$1,704,816
	Rivière-des-Prairies							\$1,184,239	\$1,184,239
	Saint-Michel	\$1,502,953			\$1,781,225			\$1,498,612	\$4,782,790
	Indexing and fuel ^[a]							\$122,223	\$122,223
	Total	\$4,522,698	\$1,704,816	\$551,232	\$5,443,433	\$-	\$-	\$5,400,778	\$17,622,957
"2"	LaSalle							\$2,342,801	\$2,342,801
	Saint-Laurent							\$1,590,880	\$1,590,880
	Indexing and fuel ^[a]							\$79,442	\$79,442
	Total	\$-	\$-	\$-	\$-	\$-	\$-	\$4,013,123	\$4,013,123
"3"	La Petite-Patrie	\$1,847,538							\$1,847,538
	Rivière-des-Prairies	\$1,497,135							\$1,497,135
	Total	\$3,344,673	\$-	\$-	\$-	\$-	\$-	\$-	\$3,344,673
"4"	Eadie				\$3,657,751				\$3,657,751
	Total	\$-	\$-	\$-	\$3,657,751	\$-	\$-	\$-	\$3,657,751
"5"	LaSalle				\$1,131,473		\$309,433		\$1,440,906
	Total	\$-	\$-	\$-	\$1,131,473	\$-	\$309,433	\$-	\$1,440,906
"6"	Rivière-des-Prairies				\$1,048,190				\$1,048,190
	Total	\$-	\$-	\$-	\$1,048,190	\$-	\$-	\$-	\$1,048,190
"7"	LaSalle					\$53,728			\$53,728
	Total	\$-	\$-	\$-	\$-	\$53,728	\$-	\$-	\$53,728
General total		\$7,867,371	\$1,704,816	\$551,232	\$11,280,847	\$53,728	\$309,433	\$9,413,901	\$31,181,328

^[a] Revision of unit prices based on Consumer Price Index, additional distance travelled and price of fuel.

6.7. Publication of Contract Information in the Système électronique d'appel d'offres

Call for tenders		Publication - Nature of information audited in accordance with section 477.5 of the CTA (for contracts awarded after April 1, 2011)			
Number	Subject	Cost estimate	Opening result	Award result	Final amount – actual expenditure
Contracts under \$100,000 – calls for tenders by invitation					
AOP 11-11640	Eco-centre management	N/A ^[a]	Published Deadline not met ^[b]	Published Deadline not met ^[b]	Published
AOI DA 157035001	Supply of containers and transport of waste	N/A ^[a]	Not published	Not published	Not published
Contracts over \$100,000 – public calls for tenders					
AOP 11-11438	Supply of containers and transport of waste	Not published	Not published	Not published	Not published
AOP 11-11577	Eco-centre management	Not published	Not published	Not published	Not published
AOP 12-11940	Supply of containers and transport of waste	Published Mistake	Published Deadline not met ^[c]	Published Deadline not met ^[c]	Not published
AOP 13-12892	Supply of containers and transport of waste	Published Mistake	Published Deadline not met ^[d]	Published Deadline not met ^[d]	Not published
AOP 14-14069	Eco-centre management	Published	Published Deadline not met ^[e]	Published Deadline not met ^[e]	N/A ^[f]
AOP 15-14968	Supply of containers and transport of waste	Not published	Published	Published	Not published
AOP 16-15121	Supply of containers and transport of waste	Not published	Published	Not published	N/A ^[f]
Non-compliant calls for tenders		6	7	8	6
Percentage of non-compliance		6 in 7 86%	7 in 9 78%	8 in 9 89%	6 in 7 86%

^[a] Not applicable: Publication of the estimate and of each bidder's name is not mandatory if a contract is valued at less than \$100,000.

^[b] A 79-day publication deadline was observed for publication in SEAO between the opening result and the result of the contract award. According to the law, the update in the SEAO must be done monthly. Publication of the final amount of the actual expenditure was made less than a month after the end of the contract.

^[c] Publication deadlines of 80 and 772 days, respectively, were observed for publication in SEAO between the opening result and the result of the contract award. According to the law, the update in the SEAO must be done monthly.

^[d] Publication deadlines of 100 and 354 days, respectively, were observed for publication in SEAO between the opening result and the result of the contract award. According to the law, the update in SEAO must be done monthly.

^[e] Publication deadline of 88 days was observed for publication in SEAO between the opening result and the result of the contract award. According to the law, the update in SEAO must be done monthly.

^[f] Not applicable: contracts not yet completed.



Systeme évolué de radiocommunication de l'agglomération de Montréal (SERAM) Project

Summary of the Preliminary Audit Study

Purpose

Corroborate Service des technologies de l'information's (STI) diagnostic conclusions and ensure that the current remedial plan would be relevant and functional in remedying the SERAM project's management problems, stabilizing the network's reliability, and mitigating the risks associated with public safety issues.

Results

The background surrounding the conduct of this preliminary study and the results of our work resulted in no recommendations being made.

The details of these results and our conclusion are outlined in our preliminary audit study report, presented in the following pages.

Note that the business units have had the opportunity to formulate their comments, which appear after the preliminary audit study report conclusion.

We are of the opinion that the measures taken or in the process of being taken by the STI to put the SERAM project back on course are relevant and functional, and they should reduce the number and impact of outages while promoting system stability.

As for the technical aspects, various measures have been taken by the STI with its suppliers to reduce the frequency and duration of network outages and their impact on public safety services. These measures include infrastructure upgrades, the development of an operational back-up solution and the temporary provision of cellular communications equipment during the development period of this solution.

Despite the STI's efforts to meet the public safety requirements that were expected at the outset of the SERAM project, the resulting network will not, in our opinion, meet some significant functional and performance requirements, at least on a short- or medium-term basis.

Real-time geolocation and signal penetration in public buildings and Montréal's underground precincts are still considered essential needs by the public safety services, yet they could not be met by the SERAM project and will need to be considered in other projects. In addition, a solution remains to be found to satisfy the particular needs of the Service de police de la Ville de Montréal's specialized investigation activities.

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List of Acronyms

CSST	Commission de la santé et de la sécurité du travail	SIM	Service de sécurité incendie de Montréal
DAQ	Delivered Audio Quality	SLA	Service Level Agreement
RENIR	Réseau national intégré de radiocommunication	SPVM	Service de police de la Ville de Montréal
SERAM	Système évolué de radiocommunication de l'agglomération de Montréal	STI	Service des technologies de l'information
		UT	user terminals

5.5. Système évolué de radiocommunication de l'agglomération de Montréal (SERAM) Project

1. Background

The Système évolué de radiocommunication de l'agglomération de Montréal (SERAM) project results from the need to modernize the radiocommunication network of the Service de police de la Ville de Montréal (SPVM), which was acquired in 1989 and reached the end of its useful life in 2004.

A first call for tenders was launched in June 2008 with the purpose of permitting the SPVM to have access to a new radiocommunication network, both on the island of Montréal and in the Montréal Métro system, to meet current operational needs and to be developed into a modern and adaptable technological platform. The system being sought was to be divided into three parts:

- Rental of the surface network radio infrastructure
- Purchase or rental of user terminals (UTs)
- Addition of equipment to the Métro network needed for police operations

The planned duration of the contract was 10 years, and the SPVM expected to have migrated its police activities to the new network by October 2010, and its general investigations by October 2011.

The only compliant bidder to the tender proposed an overall price of \$179.1 million,¹ based, among other things, on a surface network infrastructure comprising at least 12 radio antenna sites and DAQ 4.0² (Delivered Audio Quality) quality equipment, to provide 97% coverage of the locations included in the area served.

However, having deemed this price too high, the authorities adopted a resolution in June 2009 not to proceed with the tender.

Subsequently, an ad hoc joint committee was mandated by the authorities in April 2010 to study this project and pay particular attention to governance, funding scenarios, monitoring mechanisms, accountability and the awarding process.

¹ Unless otherwise indicated, all sums of money mentioned in this report include applicable taxes.

² Delivered Audio Quality. Although this criterion is not measured technically, it represents an accurate assessment of the user. For more details, see Appendix 5.1, which provides a description of the various DAQ levels.

In its report filed with the authorities in May 2011, the committee made a number of recommendations in this regard (see Appendix 5.2). The report also envisaged a broader scope for the project to encompass all public safety stakeholders on the island of Montréal, the departments and boroughs of the city and, secondarily, related municipalities. The report stipulated that the project should be carried out in three distinct phases:

- Phase 1: surface network composed of a network of antennas, transmitters and receivers distributed over the island of Montréal, and other equipment.
- Phase 2: UT consisting of mobile radios, portable radios, fixed stations and other accessories.
- Phase 3: an underground network of 110 transmission and reception points distributed throughout the Montréal Métro network.

The report also stated that the technical requirements of the network would call for good audio quality essential to operations, as well as portable and mobile coverage throughout the island of Montréal, and all recognized public safety standards and protocols. In addition, the committee recommended that the Service des technologies de l'information (STI) continue to undertake a detailed analysis of a scenario based on two interoperable networks, the first dedicated to public safety and the second for other users.

Concerning audio quality, the report stated that the issue of equipment performance being of DAQ 4.0 quality had been analyzed by an external firm specializing in radio frequency coverage. According to the results of this analysis, DAQ 3.4 quality equipment would be satisfactory to meet the SPVM's needs and would require only 12 antenna sites rather than 14, representing savings of about \$16 million. Note: the greater the number of antenna sites, the better the signal quality and degree of penetration.

In January 2012, the authorities approved a loan by-law of \$87 million to finance the SERAM project. In addition to the contracts for carrying out the above-mentioned phases of the project, this loan by-law was to be used to finance professional services, as well as incidental and unforeseen expenses.

Following the calls for tender issued in August 2011 and October 2012 to carry out Phases 1 and 2 of the SERAM project, the authorities awarded a contract to Cassidian Communications Corp. and to Motorola Solutions Canada Inc. in June 2012 and June 2013 respectively. Note: Cassidian Communications changed its name to Airbus DS Communications in 2014.

For Phase 3 of the SERAM project, a solution other than the one originally considered was adopted, at a cost of \$0.4 million compared to the initial estimate of \$10.4 million. To this end, in June 2013, the authorities also approved a cooperation agreement between the Ville de Montréal and the Société de transport de Montréal for the use of

the expansion capacity of its Métro network, thus allowing interconnection with the SERAM network.

Table 1 below presents the main features of the original contracts awarded for each of the three phases of the SERAM project.

Table 1 – Main Features of Contracts Awarded

Phase	Purpose of contract	Original amount	Duration	Initial schedule
1	Acquisition, installation and maintenance of the surface network	\$42.5M	15 years	· Installation of infrastructure equipment: August 2013 · Provisional acceptance: November 2013 · Final acceptance: November 2014 · Maintenance: November 2028
2	Acquisition, installation, and maintenance of UTs	\$31.5M	10 years	· Start of acquisitions: Fall 2013 · Start of deployment: March 2014 · End of deployment: December 2015 · Maintenance: April 2024
3	Interconnection with Métro network	\$0.4M	10 years	· Start date: March 2014 · Network use: May 2023
Total		\$74.4M		

The decision-making records in support of the calls for tenders and the awarding of these contracts show that all eight recommendations made by the ad hoc joint committee were considered. They also state that the business objective was to replace the current radio networks of the aforementioned entities with proven open-architecture technology that would meet public safety standards of all stakeholders, including interoperability.³

It was emphasized that, with regard to both the Service de sécurité incendie de Montréal (SIM) and the SPVM, the lack of current interoperability affects the quality of service delivery to citizens. Moreover, in the case of the SPVM, the increase in the number of outages of the current network observed over the years can seriously impact its gendarmerie operations and investigations. Also, the inability to encrypt communications may jeopardize the efficiency of police operations and police security.

³ The Grand Dictionnaire Terminologique defines interoperability as "the capacity of heterogeneous computer systems to function jointly through the use of common languages and protocols, and to provide access to their resources in a reciprocal manner."

Lastly, the current network does not in any way meet the geolocation requirements of police officers using their portable radios.

However, the decision-making summary relating to the Phase 1 contract shows a price difference of 30.8% between the lowest bid and the second lowest bid, and 37.3% less between the lowest bid and the internal estimate. These differences are explained mainly by the fact that the lowest bid was based on an architecture consisting of seven radio antenna sites, while the second bid and the internal estimate were based on 12-site architecture.

Similarly, the Phase 2 contract decision-making summary makes reference to a price differential of 31.1% (lower) between the bidder and the internal estimate. This difference is attributable, among other things, to the large number of UTs requested in the bid list and to a drastic decline in their cost from 2012 to 2013.

The city gave its provisional acceptance to Phase 1 of the SERAM project in September 2014. Since then, the project has experienced a number of setbacks. Project management proved very deficient as evidenced by the results of an audit requested by the new STI manager within one month of his appointment in November 2014. Also, attempts to deploy SERAM with the two main clients, namely the SPVM and the SIM, highlighted a very worrying problem in the network's reliability. Moreover, outages in 2015 and 2016 made headlines in the media.

This situation necessitated the implementation of a remedial plan to rectify the management problems of the SERAM project and try to remedy the issue of the network's reliability.

In this regard, an accountability report was made jointly by the STI, SPVM and SIM to the executive committee on June 8, 2016, and to all elected representatives on June 16, 2016. The report underscored in particular the state of the SERAM deployment, as well as the efforts to stabilize the infrastructure and to meet urgent public safety needs, and also reviewed the financial framework of the project.

2. Purpose and Scope of the Preliminary Audit Study

The initial purpose of this preliminary study was to identify issues of importance to be addressed in our detailed audit, and to set out criteria that could form the basis of our conclusion.

Our approach was influenced by the strategic nature of the SERAM project for public safety services and by its considerable cost.

However, when we started our work, we saw that STI management had completed its own project evaluation, concluding that a major overhaul of the project was required, given the magnitude of the problems identified.

In this context, and given that some of the actions needed to correct the problems identified by this evaluation had already commenced, we determined that it was not appropriate at that time to begin a detailed audit of SERAM. Instead, we chose to corroborate STI's diagnostic conclusions and to ensure that the current remedial plan would be relevant and functional in remedying the project's management problems, stabilizing the network's reliability, and mitigating the risks associated with public safety issues.

We undertook to determine subsequently the appropriate time to undertake a detailed audit of this network, as well as to identify some important issues for further consideration.

Our preliminary study was conducted on an ad hoc basis from October 2015 to December 2016, and included an analysis of various documents related to the SERAM project, as well as interviews with the key stakeholders of the STI, SIM and SPVM. Therefore, this report does not reflect events occurring after that date.

3. Preliminary Audit Study Results

3.1. Fundamental Issues in the Remedial Plan

As soon as our work began, we observed that the SERAM project had a number of problems that were symptomatic of poor project management:

- The switch-over by the SIM and SPVM to the new network initiated in late 2014 resulted in several major outages, to the point that these units had to revert to their original system, despite the fact that the network was already functional in other units;
- Equipment shortages;
- Deployments behind schedule;
- Dissatisfaction among client units, specifically those related to public safety in connection with the STI's failure to listen and the needs they had expressed;
- Many change requests had to be made, thus increasing the total financial commitment to the project;
- Difficulties in backing up the system,⁴ as well as significant impacts on public safety operations that were observed when an outage occurred.

⁴ Back-up includes the implementation of mitigation measures to ensure, on the one hand, network availability in the event of outages caused by a failure of its components and, on the other, continuity of service in the event of a disaster or major incident rendering the network's infrastructure unusable. The risk of unavailability can be mitigated by specifically building redundancy into the critical

Given the magnitude of the problems and issues, the new director of the STI began an audit of the SERAM project the month after his appointment. The STI team dedicated to this audit was then mandated to examine the quality of delivered physical products and the quality of the project management. The report of this internal audit, completed in February 2015, stated that:

- The public safety services were dissatisfied and believed they were not treated as clients;
- The communication process was ineffective;
- The project's issues were presented to the steering committee, but it was not clear that they were subject to an impact assessment;
- The reliability of the network had never been presented as an issue or discussed as a risk element;
- Despite the existence of some detailed plans for each phase of the project, there was no integrated planning to assess progress and measure project performance;
- The risk register was incomplete and not up to date, and there was no quantitative analysis or only partial analysis;
- Several new needs were identified after the contracts were awarded, requiring a number of change requests.

Beyond these issues raised by the STI, our own ongoing analysis led us to observe that:

- No budget had been set aside to back up SERAM other than investments in redundant equipment;
- A comprehensive major incident management structure was lacking;
- A document called "Plan de continuité" describing the technological recovery or switch-over mechanisms during a component failure had been produced in November 2011, but had not been updated since then;
- The service levels defined in the contracts with respect to availability and continuity did not meet public safety needs;
- The back-up solutions used previously by the SIM and SPVM could only be available for a limited period after their migration to SERAM.

Although the initial failures in the system may have been related to isolated issues, other failures challenged the robustness of its infrastructure, notably the January 2016 outage. Moreover, according to the STI, the contracted SERAM infrastructure was not sufficiently robust for an infrastructure used in public safety operations.

In order to properly confront the implications of this set of problems, the SERAM project aimed to satisfy the radiocommunication needs of the city's two main clients, the public safety services and other municipal services. In addition, this network needs

components of the network. The risk of non-continuity is mitigated by the establishment of a remedial plan based on an analysis of the risk factors of a disaster or major incident and the impact of the resulting interruption of service.

cover the entire island of Montréal. Usually, city authorities use a separate network to serve each of these clienteles, because the needs are not the same.

A radiocommunication system used within the framework of public safety activities must be continuously available and cannot tolerate unavailability, even limited unavailability, since it is a vital support element for these operations. In such circumstances, a back-up system that is effective and transparent to the user in the event of a main network failure must be provided. In the case of other municipal services, smaller investments could be justified in this area.

Similarly, the territorial coverage required by the network is equally important for the public safety services because they serve the entire island of Montréal and must obtain an adequate audible signal, whatever their geographical location. In addition, these services sometimes have to maintain communication inside buildings or even go beyond the island of Montréal. Other municipal services, however, usually work within a more restricted area and the distance travelled by the signal between the sender of a message and its recipient is shorter.

As a result, a trade-off of needs had to be made: some remained unmet, while the cost of the project was driven up.

These observations illustrate several of the difficulties encountered by the SERAM project, the main causes of which were: major deficiencies in its management; and public safety infrastructure requirements that had apparently not been adequately reflected in the contracts.

Given these circumstances, it was clear that a project remedial plan was necessary. The challenge of this STI remedial plan was primarily to rectify the project management problems, otherwise it would have been difficult to make effective progress. In addition, the plan aimed to target and implement appropriate technical solutions to ensure greater reliability of network operations. Ultimately, the remedial plan sought to stabilize the network, which was essential for its improvement, and to the continuance of the project.

3.2. Remedial Plan Under Way

To better illustrate the actions to be taken in the remedial plan, we have divided them into two categories, namely those aimed at restructuring the management of the project itself and those aimed at improving the reliability of the solution.

3.2.1. Project Management

First, in view of the findings of the internal audit that he had requested, the STI manager put in place a new project unit, while also reorganizing the structure of his entire department.

Transparency in communications was improved. Relations between the STI and its public safety client units were improved and resumed in a collaborative environment. To this end, now, when there is a change to the network infrastructure that may have an impact on the operations of these units, they are informed beforehand. As a result, any major changes made to the infrastructure that affects them must first be approved. In addition, the financial framework for the project, which will be discussed further below, was updated.

The risk register was also monitored and updated. New risks were identified and the impacts on the approved financial framework, as well as on the project schedule, were assessed.

Additionally, regular accountability to the authorities resulted in the presentation of a status report on the project, including measures taken to stabilize the infrastructure and meet the urgent requirements of public safety.

In sum, several deficient elements of project management were addressed. However, contracts entered into produced issues that were not finalized or schedules that will affect future project operations. These include:

- An equipment installation contract with Motorola that will end in December 2017;
- An inter-municipal agreement to be concluded with each of the related municipalities;
- A service agreement to be entered into between the Service du matériel roulant et des ateliers of the city and each of the network's client units.

3.2.2. Reliability of the Solution

As noted earlier, a large number of major network outages occurred, which resulted in the STI having to review the agreement with its SERAM infrastructure provider. This enabled the STI to corroborate that certain needs had not been properly assessed at the outset, which meant having to determine and negotiate with the provider specific measures that needed to be put in place.

First, the frequency and duration of these outages had to be reduced in order to minimize the overall impact on the network. Thus, it was agreed with the provider to reprogram the public safety's UTs in order to limit the impacts of the signal interruptions. A moratorium on work related to deployment and infrastructure was also declared. It was also agreed with the network provider to make changes to SERAM's

infrastructure only at fixed times established in advance with the agreement of the two public safety services.

Second, given that public safety operations were disrupted due to the lack of an adequate back-up system, technical solutions had to be found to provide back-up as quickly and smoothly as possible whenever network outages occurred. These measures were also aimed at providing the radiocommunication network with the long-term stability necessary to develop the SERAM project.

Before specifying the measures agreed to with the successful bidder regarding these solutions, certain concepts need to be explained.

IT robustness, also known as IT resiliency, is defined as the ability of an IT solution to function as well as possible in the event of an incident. This capability is generally provided for in the initial design of the network, as it refers to how the network reacts to the occurrence of various incident scenarios related to relatively serious failures of its various components.

Redundancy is one of the elements making up the robustness of a system. This is defined as the duplication of certain components in a network that are critical to its operation. The redundancy ensures that, when one of these devices fails, the other installed component takes over, thus ensuring service continuity in a transparent manner.

As mentioned earlier, the measures taken to provide back-up to the SERAM network suffered from several shortcomings. This situation effectively rendered the network very vulnerable and, most important, was likely to have a direct impact on public safety operations if the network were to become unavailable.

The old radiocommunication network of the SPVM served as a back-up during the early stages of the switch-over to SERAM. However, having to use two different types of equipment, one of which was outdated, did not make this solution very functional.

As for back-up for the SIM, this service relied for a certain time after the deployment of SERAM on its old back-up system, called RENIR.⁵ However, prior to the SERAM implementation, the RENIR network manager had said that the city's installations would require modifications if this were to be used. But when SERAM was implemented, it was decided not to make these investments and eventually to abandon the RENIR. Currently, these installations are being dismantled.

⁵ RENIR: Réseau national intégré de radiocommunication. Provided by the Centre de services partagés du Québec, this service is for the benefit of public safety, security and public service organizations working in Québec.

In light of this problem, and as per the agreement concluded with the provider, the latter agreed to carry out the following at its own expense:

- Upgrade the existing infrastructure;
- Develop an operational back-up solution;
- Set up a temporary back-up solution and, for this purpose among others, provide cellular communication devices in the event of a network failure during the period from the development of the back-up solution to the stabilization of the network. These devices were delivered in the summer of 2016.

We note, therefore, that efforts were made to stabilize the infrastructure by adding and replacing equipment, thus increasing the network's power and robustness. Cellular devices with radiocommunication functionalities were also provided to the SIM and the SPVM in order to compensate for SERAM's downtime. It should be noted, however, that this solution had certain limitations, in particular due to the number of devices available and to certain programming that resulted in the devices being dedicated only to certain geographical areas.

In addition, the STI agreed to conduct a periodic audit of the infrastructure up to the date of final acceptance of SERAM, in order to identify all the problems and ensure that the necessary adjustments are made.

All of these measures should, in our view, help reduce the number and impact of outages and promote a certain stability of the network, as illustrated by Figure A of the Appendix 5.3 that shows the outages drawn up by the SPVM for 2016.

However, some issues and risks related to public safety and associated matters still remain. Let now clarify their key elements.

3.2.3. Issues and Risks Related to Public Safety and Associated Matters

Operations Back-Up Solutions

We previously discussed the provider's commitment to develop an automated operations back-up solution. This solution would allow users to recover network functionalities within five minutes of an outage, in a transparent way. During 2016, three solutions were proposed by the provider, but these proved to be unsatisfactory.

As of the writing of this report, the conditions for the implementation of an operations back-up solution had not yet been finalized. A proposal was under development and needed to be discussed with its main users—the SIM and SPVM—in early 2017. We understand that they would have to give their approval to this solution in consideration of the risks inherent to their operations.

According to the STI, the back-up solution should be the provider's responsibility and should be deployed by the end of the first quarter of 2017.

In addition, the contract provides for penalties for service breaches (SLA)⁶ set out in the contract. However, the current parameters are considered by STI managers to be too low since they only take into account a general unavailability of the network, regardless of the frequency or duration of outages. According to the information obtained, these parameters should be revised as part of the new SLA, following deployment of the automated back-up solution. Accordingly, following an agreement with the provider, the penalties will be revised upwards as of July 1, 2017, if the new parameters for the duration and frequency of outages are exceeded.

Signal Penetration into Buildings and Coverage

A distinctive feature of public service networks, such as those of the SPVM and SIM, is that the radiocommunication must sometimes extend beyond a simple exterior geographic space. During an intervention, it is not uncommon for communications to continue inside a building, or at least to be accessible in the entrance hall. The signal must therefore be able to pass through certain walls.

The old systems used by the city's public safety were not specifically provided with internal coverage. However, for the SPVM, the technology and frequency used meant that sometimes internal communication was possible. Analogue gives a degraded signal, while a lower frequency gives more power to the signal.

According to the information obtained, it was not foreseen by the ad hoc joint committee at the time of the project study that the new network would cover inside premises.

It should be noted that the issue of internal coverage includes public buildings and Montréal's underground precincts. In 2017, STI intends to carry out a study of opportunities within the framework of the SERAM project to solve this problem. Among other things, agreements with these buildings' owners are being considered in order to use their internal networks. If other avenues have to be considered and these result in additional costs, the problem will be resolved by a different project than SERAM.

Internal coverage is also an issue during emergency interventions in other buildings located on the territory of the Montréal agglomeration, especially for the SIM. Mobile and transportable repeaters⁷ will be acquired as part of the SERAM project, to ensure better coverage during these interventions.

⁶ Service Level Agreement

⁷ A repeater is an electronic device that compensates for the transmission losses of a medium by amplifying the signal between transmitter and receiver.

Similarly, some central departments, such as the Service de l'eau and the Espace pour la vie, do not yet use SERAM because internal coverage is essential for them. These units work mostly in tunnels or inside the city's buildings. In order to solve this problem, the STI notified us that it would perform an RFI⁸ and thus evaluate possible solutions with companies so that SERAM could be deployed in these departments. According to the information obtained, the implementation of this particular SERAM component is planned within the updated financial framework of the project.

Geolocation

GPS geolocation is a method of positioning an object on a plan or map using its geographic coordinates.

For the SPVM, this need arises from an enquiry undertaken by the Commission de la santé et de la sécurité du travail (CSST), now the CNESST⁹ following the death of a police officer in 2002. The enquiry revealed that real-time location (GPS) technology would have enabled several units to assist the police officer during his intervention. The CSST recommended over 10 years ago that geolocation technology be integrated into the SPVM communications network.

A partial solution was implemented in 2011, but it was not integrated into the SPVM's computerized distribution network. A project was subsequently created to rectify the situation. However, the project was suspended in 2014 in anticipation of the SERAM project.

According to the information provided to us by the STI, SERAM cannot conduct geolocation in real time. Indeed, the network is only able to carry out an emergency geolocation, upon request only. On this matter, the contract specifies that the geolocation data could be updated in three different ways:

- Polling
- Automatically at a pre-programmed rate (e.g., every 10 minutes)
- Triggered systematically during an emergency call

According to the information obtained, the SPVM, in collaboration with STI, will study the technical solutions currently available to enable real-time geolocation. Discussions were scheduled to take place in January 2017. Again, the timetable for implementation and the budget allocated to it will be part of a different project than SERAM.

⁸ RFI: Request for information.

⁹ Commission des normes, de l'équité, de la santé et de la sécurité du travail.

Prioritizing Voice Over Data

The UTs regularly need programming changes and software updates to ensure proper operation. This is why licences were acquired for the “Over the Air Programming (OTAP)” for each UT device.

With this feature, software changes and certain updates to each device can be performed remotely rather than manually. As a result, these changes and updates can be made in a short time with minimal resources, while keeping the devices in service.

However, since these devices are almost always in service and are used for voice communication, there must be a mechanism for prioritizing voice over data. Otherwise, it may cut off the conversation, corrupt the software update or render the UTs unavailable for an inappropriate period of time. This prioritization ensures that voice conversations always take precedence over data transmission.

At the moment, this prioritization is not functional as the configurations have yet to be finalized. In addition, another software version has to be installed within the infrastructure. This installation has not been carried out so far due to the network's instability.

Currently, changes and updates must be made manually, with impacts on resources, on deadlines for making the changes and on the availability of the devices involved.

According to the STI, this issue should be resolved within SERAM's capital budget and be deployed toward the months of March or April 2017.

Deployment of the Network in Some Service de police de la Ville de Montréal Units

The SPVM has three main operational divisions: gendarmerie, investigations and surveillance. Currently, only the gendarmerie division uses SERAM. The other two do not yet have SERAM, as technical solutions still need to be found to meet their particular needs. For now, these units use the old system, which is being used less than before.

According to STI, this issue should be resolved within SERAM's revised capital budget. However, the planned deployment date has not currently been halted due to the priority given to stabilizing the network.

Inventory Management of User Terminals

Phase 2 of the project resulted in the acquisition of nine separate lots of UTs as well as support and maintenance for these devices for a period of 10 years. A tool to manage the inventories of these UTs had to be set up at the start of the project.

During the first deployments, the devices were delivered directly to the units. Thereafter, there was some movement in the devices, mainly for repair and maintenance purposes.

Without adequate tools, it was difficult to monitor UTs in operation and manage replacement radios.

Also, most of these devices were physically similar, but special programs could be installed, mainly for those used by the SPVM. Since these devices were not clearly identified with their original unit, UTs from other units were sent to the SPVM as replacements. However, these devices could not be used by patrol officers, thus may create a temporary shortage.

For now, the inventory management tool is still not in place. The SIM and SPVM perform their inventory tracking manually, with all the hazards that this entails.

According to information obtained from the STI, inventories of UTs were taken for all the administrative units that received them. However, this inventory is available in an Excel format and is not in a database, permitting efficient management of the problems associated with a real-time inventory.

According to STI, this issue should be resolved within SERAM's revised capital budget, but a schedule has not yet been set.

3.2.4. Financial Framework of the Project

As mentioned in Table 1 under the heading "Background" of this report, the total of the original authorized amounts for SERAM is \$74.4 million. The portions attributable to capital and operating expenditures over the term of the contracts represent \$36.7 million and \$37.7 million, respectively.

Since then, various change requests and additions to the project required additional commitments of \$10.8 million for capital expenditures and \$4.5 million for operating expenses.

To these already approved commitments were added new financial requirements, mainly attributable to the implementation of the remedial plan. These requirements represent capital expenditures estimated at \$39.5 million and concern the addition of

additional infrastructure and equipment (\$28 million), implementation efforts (\$8 million) and a contingency¹⁰ (\$3.5 million).

In sum, the updated financial framework of the SERAM project is as follows:

Table 2 – Updated Financial Framework of the SERAM Project¹¹

Item	Expenditures		Total
	Investments	Operation	
Amount of original contract amounts (see Table 1)	\$36.7M	\$37.7M	\$74.4M
Change requests and additions to project	\$10.8M	\$4.5M	\$15.3M
Future commitments related to remedial plan	\$36.0M	–	\$36.0M
Contingency	\$3.5M	–	\$3.5M
Total	\$87.0M	\$42.2M	\$129.2M

Despite the upward revisions to the SERAM financial framework, we note that the updated capital expenditure budget of \$87 million coincides with the amount of the loan by-law adopted by the authorities in January 2012 to finance this project.

This situation is explained by the fact that the amount of the loan by-law was established on the basis of internal estimates of contract costs, which proved to be considerably higher than the bid prices of the successful bidders as previously explained in the “Background” section of this report. As a result, the discrepancies between these bid prices and these internal estimates provided some margin for manoeuvre that would permit funding the “change requests and additions to the project,” “future commitments related to the remedial plan” and “contingency.”

However, this projection of the updated financial framework remains to be confirmed in view of the issues still to be resolved and any risks that may arise. It should be noted that some commitments will need to be added eventually to this financial framework in order to align the planned duration of the UT maintenance services, for which the contract ends in April 2024, with that of the infrastructure contract, ending in November 2028. Furthermore, it appears that a significant number of UTs will have reached the end of their useful lives by the end of the expected duration of these services, and will need to be replaced.

¹⁰ The original contractual commitments of the project did not provide for any contingency.

¹¹ This financial framework is based on unaudited data obtained from STI in July 2016.

It should also be emphasized that this financial framework does not include certain significant indirect costs associated with, among other things, maintenance of temporary back-up solutions, resulting from delays in migration and in the provision of human resources by user services to support SERAM deployments and manage the impacts of network outages.

In addition, as outlined above, some unresolved issues, including real-time geolocation, will not be included in the SERAM project, but will fall under separate budget envelopes.

3.3. Continuing the Audit

As a result of our work, we considered it appropriate to postpone our detailed audit of this project for the following reasons, among others:

- The network was in stabilization mode and several recovery measures were in the development and implementation mode, which did not make it possible to currently audit its effectiveness;
- We did not want to interfere in the operations when all parties were involved in finding solutions to the various problems identified.

We were, however, in a position to assess that the remedial plan was relevant and functional, as were the public safety services—its main clients.

In this context, we postponed our detailed audit to a time when the network would be stabilized and the improvement phase would be well under way. In the meantime, we will be providing regular oversight with the Direction bureau de projet within the STI.

Some of the detailed audit topics that could be the subject of an eventual mission on our part include:

- Awarding of contracts
- Compliance, monitoring and reporting of the project's financial framework
- Managing contracts with suppliers and other entities
- Back-up and continuity of operations procedures covered by the system
- Managing and controlling UT inventories

4. Conclusion

The Système évolué de radiocommunication de l'agglomération de Montréal (SERAM) should ultimately meet the needs of several categories of users throughout the island of Montréal, including those of the public safety services.

Before the new Service des technologies de l'information (STI) team initiated a turnaround in the management of the SERAM project, major deficiencies had been

noted in the project management. These included an incomplete analysis of needs, a glaring lack of rigour in risk management, marked dissatisfaction from the public safety services and an inefficient communication process.

Concurrently with the start of this remedial process, the new network that had just been deployed among the public safety services was experiencing major failures, while major outages kept recurring. Furthermore, the observed recovery times underscored serious deficiencies in SERAM's back-up systems. The STI's findings indicated that SERAM's infrastructure did not have the robustness required for a public safety infrastructure.

These deficiencies in the SERAM project management, combined with the repeated network outages and downtime, meant that the initial efforts to finalize the project had to be rapidly redirected toward the launch of a remedial plan.

This resulted in significant delays in the initial timeline for project implementation, upward pressure on costs, and some needs that were neglected or put on hold.

The implementation of SERAM was initially scheduled for completion in December 2015. However, we understand that the implementation will not be complete until late 2017, subject to the remaining technical issues and challenges being resolved.

In terms of project costs, change requests resulting from poorly crafted quotes or needs that were not well defined at the beginning, coupled with remedial actions taken or in the process of being taken, resulted in an increase of \$46.8 million for capital expenditures and \$4.5 million for operations. Thus, the updated financial framework of the project is now \$129.2 million.

It should be noted that this revised financial framework does not take into account certain issues that must be addressed in meeting certain needs deemed essential by the public safety services, or the costs inherent to aligning the maintenance service term for user terminals (UT), and their eventual replacement, with that of the infrastructure contract. These needs include real-time geolocation and possibly signal penetration into public buildings and Montréal's underground precincts, which will be considered in projects other than SERAM.

On the other hand, despite the potential issues and pitfalls that remain to be addressed, we are of the opinion that the measures taken or in the process of being taken by the STI to put the SERAM project back on course are relevant and functional, and they should reduce the number and impact of outages while promoting system stability.

With regard to the management of the project itself, the STI has taken measures to:

- listen more carefully to its clients and enable participation in decision-making that affects them;
- update and monitor the risk register;
- strengthen its relations with its suppliers;
- acquire new technical expertise;
- develop and negotiate palliative measures and a new SLA;
- provide regular accountability to the authorities.

As for the technical aspects, various measures have been taken by the STI with its suppliers to reduce the frequency and duration of network outages and their impact on public safety services. These measures include infrastructure upgrades, the development of an operational back-up solution and the temporary provision of cellular communications equipment during the development period of this solution.

Despite the STI's efforts to meet the public safety requirements that were expected at the outset of the SERAM project, the resulting network will not, in our opinion, meet some significant functional and performance requirements, at least on a short- or medium-term basis.

Real-time geolocation and signal penetration in public buildings and Montréal's underground precincts are still considered essential needs by the public safety services, yet they could not be met by the SERAM project and will need to be considered in other projects. In addition, a solution remains to be found to satisfy the particular needs of the Service de police de la Ville de Montréal's (SPVM) specialized investigation activities, for which the expected deployment date has not yet been determined.

BUSINESS UNITS' RESPONSES

Service de police de la Ville de Montréal

*[TRANSLATION] It is with great interest that the SPVM reviewed this report consisting of the preliminary audit study on the SERAM project. We note the quality of the report that, while not containing any recommendations, clearly identifies the various issues brought to light in the SERAM project management and roll-out. **The aspects of planning the needs versus the offered product must be stressed.***

*Since the arrival of **new management at the helm of the STI**, it's safe to say that the situation has turned around by 180°. This sense of responsibility and rigour in the new business approach is inspiring us for the future of the radiocommunication system. Of course, many*

questions remain in the minds of users, but there's a **definite recognition of the efforts that have been made**.

Amongst the issues raised in this report, we would like to focus on a few that we feel are truly crucial. The table in Appendix 5.3 illustrates the number and duration of SERAM breakdowns viewed as major in 2016. At the bottom of the table, it is also stated that there were seven display breakdowns between January 1 and October 30, 2016. For the vast majority of these breakdowns, the SPVM's Centre de communications opérationnelles (CCO) did not have a temporary solution for communicating with policemen on patrol, a system that **was only installed at the end of August**.

It must be noted that during incidents or breakdowns, a large part of the SPVM personnel was mobilised and frequent adjustments were needed with regard to how we communicated with officers on patrol.

As indicated in the report, it was not anticipated that the SERAM would have internal coverage. But the report states, with good reason, that the old radio system allowed for some communications, sometimes limited, within buildings. Indeed, communication by radio is impossible in certain areas. The STI will have to prioritize the opportunity study mentioned in the report. We believe that this study will take several months to come up with viable solutions, and that the SPVM will have to adapt its communication methods during interventions within a building, in order to ensure the safety of police officers.

The "Over the Air Programming (OTAP)" function, that should make it possible to reprogram the UT devices in a short period of time with minimal resources, cannot be activated since the prioritization of voice over data is not currently functional. This meant that the last reprogramming of the UT devices had to be performed manually, that it took nearly 3 months, that it involved more than 10 people and that the SPVM personnel had to set up significant logistics in order to complete this reprogramming.

We again confirm that the STI has taken measures to ensure that we're better heard and that the SPVM can participate in the decision-making that relates to it. We agree that, despite the STI's efforts, the SERAM will not meet certain significant functionality and performance needs, such as real-time geolocation, whether in the short or medium terms. This observation means that the SPVM must devote resources to completing this important matter as quickly as possible, given that it traces back to an investigation report from nearly 15 years ago.

In parallel with the gendarmerie file, the component relating to specialised investigations must also be included, though it has so far not determined the appropriate system and functionalities required by the specialised units.

In conclusion, the next few weeks will see the STI launch a consultation on the future needs not initially addressed in the SERAM project. The number one challenge for this second phase will be to come up with recommendations and a quick implementation that will add to the SERAM functionalities. The SPVM will cooperate fully in this project, now and in the future.

Service de sécurité incendie de Montréal

[TRANSLATION] The report's overall drafting covers all aspects of the project. You've identified and brought to light the issues, shortcomings and pitfalls that have been experienced, on the levels of both the SIM and our partners. The conclusion accurately reflects the discussions with the project managers and clearly sets out the project's observations, while highlighting the hazards that lie in wait for us as well as the challenges that are still pending.

Just like the SPVM, the SIM must be able to rely on a radiocommunication system with a flawless infrastructure. In time, the SERAM should provide a functional and high-performance tool. Despite all of the efforts that have been made, these functionality and performance needs remain unstable over the short and medium terms. We hope that your report will serve as a springboard towards a much more reliable and robust system, one that offers the redundancy required of such a radiocommunication system.

Service des technologies de l'information

[TRANSLATION] After taking over the corrective measures for the SERAM project, we noted that several elements were missing from the project's scope and that certain elements of the technical solution resulted in a regression relative to public safety radiocommunication solutions. This assessment was performed in collaboration with the SERAM clients, notably the SPVM and the SIM.

Let us recall that in 2011, the city adopted a loan by-law for \$87 million, so as to provide the initial investment budget envelope. The project had no financial framework at the time of its inception. This loan by-law was approved by the Ministère des Affaires municipales et de l'Occupation du territoire. We also note that the initial investment budget of \$87 million has not changed.

A project review was carried out in 2016. This exercise served to improve SERAM's scope, to undertake system improvements, to

implement corrective measures with the supplier, and to adjust the service levels to the Airbus contract. It's important to mention that the improvement of the city's infrastructure and equipment will take place within an initial investment budget envelope of \$87 million.

Meanwhile, costs for the system's corrective improvements are entirely borne by Airbus, and are not at the city's expense. This includes specific corrective measures made by Airbus as a result of incidents that have occurred since December 2014. These measures were applied in 2015 and 2016 and others are still to be applied in 2017, in keeping with the system's upgrade, with Airbus still being responsible for these costs. We point out that the city's approach is to have suppliers pay the additional costs resulting from performance challenges.

As stated in the report, many risks have been identified and still exist within the project. Technical solutions in order to address major challenges are still being analysed by the architects, with the fulfilment costs and schedule still to be confirmed after the technical solutions have been identified.

Also, the city is working closely with the supplier Airbus in order for the system to be compliant with the expected quality standards, though significant challenges are still to be resolved.

5. Appendices

5.1. Perceived Audio Quality According to Delivered Audio Quality Criteria

Table A – Description of DAQ Criteria

DAQ	Subjective description
1	Speech heard, but unusable
2	Speech understandable with considerable effort
3	Speech understandable with slight effort, occasional repetition
3.4	Speech understandable with few repetitions, slight noise and distortion
4	Speech understandable, occasional noise
4.5	Speech easily understandable, infrequent noise
5	Speech easily understandable, no discernible noise

Source: Expert report by Pierre Lebel et associés inc., October 2010.

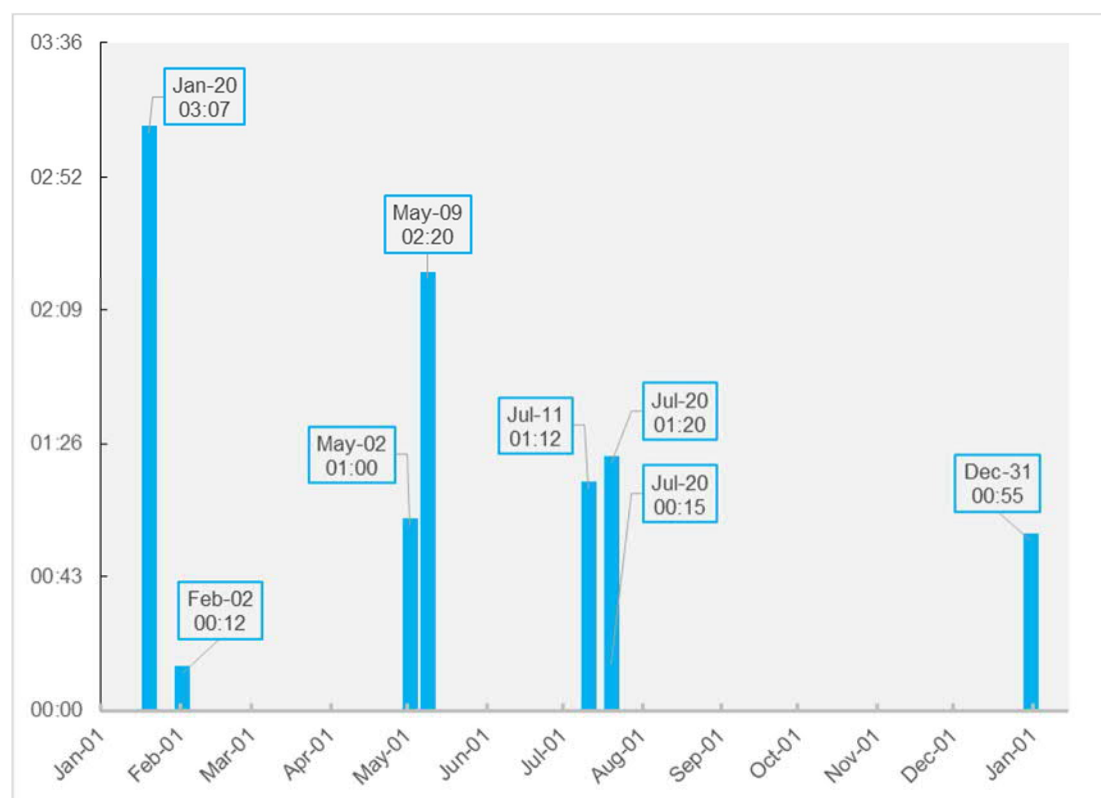
Note that, according to the Public Safety Wireless Advisory Committee, the audio quality level of messages exchanged on radio waves for a public safety service must be equal to or higher than the DAQ 3.4 standard, and provide 97% coverage of the service delivery area.

5.2. List of Recommendations Made by the Ad Hoc Joint Committee in April 2011

- R-1 *That the Montréal agglomeration continue to develop the common voice radiocommunication project for all public safety stakeholders and entrust its management to the Service des technologies de l'information.*
- R-2 *That the Service des technologies de l'information continue to undertake a detailed analysis of a scenario based on two interoperable networks, the first dedicated to public safety and the second for other users.*
- R-3 *That the Service des technologies de l'information continue with the comparative analysis and documentation of equipment lease and acquisition options, as well as scenarios for optimizing existing antenna towers, and identify the option that offers the greatest benefits to the Montréal agglomeration.*
- R-4 *That the Service des technologies de l'information, in collaboration with the Service des finances, continue with and finalize the financial analysis of the project, taking care to include all indirect costs of the project, including the costs for upgrading the technology and their impact on the payroll when conducting risk analyses, based on the revised scenarios.*
- R-5 *That the Service des technologies de l'information continue to develop the partnerships envisaged internally and externally in order to formalize the commitment of the various partners to the radiocommunication network modernization project and to identify avenues that could result in savings through shared resources.*
- R-6 *That the Service des technologies de l'information continue the project study and obtain the necessary validations from the decision-making authorities concerned according to the planned execution schedule and the governance framework of the municipal asset management projects and programs.*
- R-7 *That the Service des technologies de l'information, for information purposes, present the optimal solution chosen by the ad hoc committee for the radiocommunication network project before issuing the call for tenders.*
- R-8 *That the project be submitted to the contracts review committee before the contract is awarded by the city council and the urban agglomeration council.*

5.3. Duration of Major Outages of the Service de police de la Ville de Montréal in 2016

Figure A – Duration of Major Outages of the Service de police de la Ville de Montréal in 2016



Source: Data provided by the SPVM December 5, 2016 and subsequently updated.

In addition to these outages in 2016, there were seven display failures up to October 30, ranging from four minutes to a few hours.



Transfo-RH Program Management

Summary of the Preliminary Audit Study

Purpose

Corroborate our questioning of crucial aspects of the Transfo-RH program so that steps could be taken to correct the situation, if necessary, which would help make it a success. These crucial aspects concern the reorientation of the RH-Paie project and the change in technological direction, the governance and the public call for tenders for the Système intégré en ressources humaines (SIRH) project.

Results

In addition to these results, we have formulated various recommendations for the Transfo-RH program proponent.

The details of these recommendations and our conclusion are outlined in our preliminary audit study report, presented in the following pages.

Note that the Transfo-RH proponent and co-proponent have had the opportunity to formulate their comments, which appear after the conclusion of our preliminary audit study report.

The technological and scope changes of the RH-Paie project, which was transformed into the Transfo-RH program in 2015, certainly constitute major changes that should have been approved by the executive committee.

The Transfo-RH program's governance has deficiencies that require the following steps to be taken in order to facilitate its success:

- Clearly establish and approve the objectives and guiding principles underpinning the program's implementation;
- Implement a quality assurance process to ensure compliance with the requirements of the program, its projects and related deliverables;
- Implement a process that provides the proponent with periodic objective program status reports;
- Consider developing RACI (Responsible, Accountable, Consulted, Informed) matrices to clarify the authority relationships between the various stakeholders and how roles and responsibilities are shared.
- Establish engagement mechanisms for strategic milestones to lock in milestone deadlines and content;
- Implement integrated risk management to assess various risks including information security risks.

The content of the SIRH project's call for tenders needs to be reviewed to ensure it reflects market practices, and a new call for tenders must be launched as soon as possible.

In our opinion, the Transfo-RH program deserves special status beyond being one of the city's 75 or so priority projects. Based on the history of attempts to modernize human resource management and payroll processes, coupled with the risks involved in implementing this program, the municipal administration needs to follow up rigorously to ensure that its implementation will ultimately achieve the modernization objective.

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List of Acronyms

CSTI	Comité sectoriel des technologies de l'information	SIMON	Système intégré Montréal
HR	Human Resources	SIRH	Système intégré en RH
IT	information technology	SPVM	Service de police de la Ville de Montréal
PMBOK	<i>Project Management Body of Knowledge</i>	SRH	Service des ressources humaines
RACI	Responsible, Accountable, Consulted, Informed	STI	Service des technologies de l'information
SIG RH-Paie	Système intégré de gestion des ressources humaines et de la paie		

5.6. Transfo-RH Program Management

1. Background

The introduction of the Transfo-RH (Human Resources) program coincided with the municipal mergers. In 2001 the Ville de Montréal (the city) selected the SAP software package as a technical solution for its “Modernisation des processus administratifs et implantation d’un système intégré de gestion” project.

In 2002, the city abandoned the SAP solution. Then in 2003, it selected the Oracle solution for its program to implement a common and integrated platform for its financial, procurement, human resources and payroll systems. The program was called SIMON (Système intégré Montréal). An overall \$53.5-million budget was approved for the program, including \$25 million for implementing the human resources and payroll component. All the processes relating to this component, known as the SIG RH-Paie (Système intégré de gestion des ressources humaines et de la paie) project, were to be implemented in May 2007.

From 2004 to 2006, some functionalities related to the project’s processes were implemented. However, in July 2006, the city imposed a moratorium on the SIMON program, and work on the SIG RH-Paie project was interrupted.

In 2007, work resumed on the time management process of the project, but using a technological solution other than the Oracle platform. The city also started to develop human resource management processes using another platform.

In 2010, a status report on the SIMON program was submitted to the executive committee, which noted that several processes of the initial SIG RH-Paie project had yet to be completed. The report indicated that it would be advisable to return to the original strategy, which involved using the Oracle platform. The report stated that detailed planning was required for the entire project.

When our audit of the SIG RH-Paie project was submitted in October 2012, this planning had still not been completed. Our audit report indicated that *“in our opinion, it is unacceptable that an organization the size of Montréal does not yet dispose of appropriate administrative systems to manage processes that are a priori relatively simple.”* At that time, we estimated the costs incurred for this project at \$23 million. Our report included the following recommendation to the Direction générale:

Take all necessary measures to revive the entire [SIG RH-Paie] project in line with the strategy adopted in 2004 and the lessons learned from the past, and then decide on the objectives, development model and orientations that should be emphasized accordingly.

Then the SIG RH-Paie project, which had become the RH-Paie¹ project, was relaunched, but its scope was limited to human resources management processes considered necessary to produce the payroll. In this regard, in June 2013, the executive committee agreed in principle that the implementation phase of the project be continued based on a \$35.8 million budget and endorsed the guideline that the Oracle platform (SIMON) be used.

In April 2014, the RH-Paie project was suspended in order to review its scope, implementation approach, choice of technological platform and budget. Then in 2015, the RH-Paie project was converted to the Transfo-RH program to respond to the reengineering of the Service des ressources humaines's (SRH) delivery model.

The Transfo-RH program has a minimum 2020 implementation horizon with an overall \$83.2-million budget,² \$51.4 million³ for capital expenditures and \$31.8 million⁴ for operating expenditures. It is composed of the following projects:⁵

- SIRH (Système intégré en RH) solution;
- HR and Payroll model and service delivery;
- IT (information technology) delivery model;
- Time;
- Health and wellness;
- Staff management;
- Talent;
- Payroll;
- Staff relations.

When we began our preliminary survey in September 2016, the city was calling for public tenders regarding the *Acquisition de services pour l'utilisation d'une solution logiciel-service ou infonuagique hébergée des ressources humaines et paie* for the SIRH project, the main project of the Transfo-RH program. In October 2016, the city was unable to follow up on this public call for tenders because none of the bidders were compliant.

¹ The RH-Paie project, also known as the HRMS (Human Resources Management System).

² Unverified data based on documents provided by the Service des technologies de l'information (STI).

³ Equal to the sum of the following amounts: actual expenditures before 2015, the amount for 2015 entered in the 2015-2017 three-year capital expenditures program (TCEP), the amount for 2016 entered in the 2016-2018 TCEP and the amount in the 2017-2019 and future TCEP.

⁴ Equal to the amount for 2017 to 2020 and after.

⁵ Appendix 5.1 provides the description and objectives of the Transfo-RH program projects.

2. Purpose and Scope of the Preliminary Audit Study

The original purpose of this preliminary survey was to assess the appropriateness of performing an audit engagement on Transfo-RH program activities and, if appropriate, identify important issues to be considered during our detailed audit and define the criteria upon which to base our conclusion.

During the month after we started our work, October 2016, the city was unable to follow up on the public call for tenders on a solution for the project because none of the bidders were compliant. As a result, the Transfo-RH program will have to be completely re-planned and this will have significant repercussions on the initial timetable and probably on program costs.

Under the circumstances, we found that this was not the right time to undertake a detailed audit of Transfo-RH program activities in the short term. Since we were already questioning crucial aspects of the program at that time, we found it necessary to corroborate the essential components of the program so that steps could be taken to correct the situation, if necessary, which would help make the program a success. We have questions regarding three issues:

- Reorientation of the RH-Paie project and change in technological direction;
- Governance;
- Public call for tenders for the SIRH project.

Our preliminary survey was completed between September and December 2016 and included procedures that we considered necessary under the circumstances. Our work was performed with the participation of a recognized specialist in the field of IT project management in the public sector, and our diagnosis was based, in particular, on the book entitled *Project Management Body of Knowledge* (PMBOK).⁶

Note that this report does not reflect events that occurred after December 2016. We are aware that improvements have been made to Transfo-RH program management since then, especially in view of the fact it was at the start-up stage when we were completing our survey.

We will review the appropriate time for undertaking one or more detailed audits of Transfo-RH program activities and important issues that may attract our attention. For the time being, we will monitor the program on an ad hoc basis with the managers concerned.

⁶ *Project Management Body of Knowledge* is a reference guide published by the *Project Management Institute*, which defines the range of knowledge needed for effective project management and identifies best practices in this area.

3. Preliminary Audit Study Results

Because some of our findings and conclusions in this preliminary survey were made at the start-up phase of the Transfo-RH program, we cannot assess the impact on its implementation. However, it is important that we raise some concerns and make recommendations based on our preliminary findings, which deserve to be brought to the attention of program stakeholders in order to facilitate the program's success.

3.1. Reorientation of the RH-Paie Project and Change in Technological Direction

At its June 26, 2013 session, the city's executive committee noted three major projects in the planning phase, including the RH-Paie project mentioned above. The committee agreed in principle that the implementation (execution) phase of the project be continued for \$35.8 million. The decision-making summary in support of this decision states, among other things, the following:

[TRANSLATION] The strategic orientation regarding the information systems for the RH-Paie project is to use the Oracle software package. The city has already purchased licences for these products. Because the salaries of judges, elected officials, commissioners and pensioners are already produced using Oracle, the city has internal knowledge relating to the application.

It should be noted that, prior to this decision by the executive committee, the RH-Paie project was submitted to the Major project monitoring committee on May 31, 2013, in accordance with the *Cadre de gouvernance des projets et des programmes de gestion d'actifs municipaux*. The committee is now called the Major project coordinating committee.

As mentioned above, the RH-Paie project was suspended in April 2014 in order to review its scope, implementation approach, choice of technological platform and budget. Then in 2015, the RH-Paie project underwent major reframing and was converted to the Transfo-RH program to respond to the reengineering of the SRH's delivery model.

During the October 16, 2015 meeting of the Comité sectoriel des technologies de l'information (CSTI), one of the subjects discussed was the reorientation of the RH-Paie project. In this regard, the minutes stated that *[TRANSLATION] "the SRH management and STI concluded that there was an urgent need to review the scope of the current project to reflect significant changes in the SRH, as well as the HR and Payroll technology acquisition and exploitation strategy."*

This reorientation considerably modified the scope of the RH-Paie project, which was limited to human resource management processes considered necessary to process

the payroll under the above June 26, 2013 decision of the executive committee. Pursuant to this reorientation, the scope of the RH-Paie project, now called the Transfo-RH program, was reframed to encompass most of the processes involved in the above-mentioned SIG RH-Paie project, which was initiated in 2003. This program aims to establish an HR and Payroll service centre and has distinguished itself from the past in terms of technology, as shown by the cloud computing solution advocated by the Service des technologies de l'information (STI).

Subsequently, in late 2015 and in 2016, presentations on the Transfo-RH program were delivered to various decision-makers, including the president and the vice-president of the executive committee (responsible for IT) on December 2, 2015, the mayor on December 21, 2015 and the executive committee on May 11, 2016.

In conjunction with these presentations, a position on cloud computing was presented to the mayor on December 21, 2015. In addition, this positioning was also presented to the elected representatives on May 5, 2016 during a presentation encompassing the transformation of the STI and various projects or programs, including Transfo-RH.

3.1.A. Results

We agree that cloud computing is an irreversible trend. However, a migration to cloud computing involves several issues, including the protection of personal and confidential information.

According to the *Guide de l'infonuagique*⁷ published by the Secrétariat du Conseil du trésor of the Government of Québec, [TRANSLATION] “*services models [...], deployment methods [...] and the magnitude of the projects can be so variable that risk mitigation measures are specific to each project, depending on the situation in each organization.*”

According to the guide, the considerations to be taken into account before acquiring cloud services, include adopting a phased approach, starting with public services or data that are non-strategic or present little risk for the organization. The pace of adoption of cloud computing may vary between organizations, depending on their organizational capacity and in-house expertise.

The issue of cloud computing is beyond the scope of this report and is currently covered by a separate audit engagement. However, it should be noted that the STI has not been able to provide us with a documented analysis that demonstrates the advantages of choosing this solution versus continuing to use the city Oracle suite (SIMON), notwithstanding the abovementioned positioning. In fact, this positioning is a very general high-level policy document. In addition, we found the following:

⁷ Source: Secrétariat du Conseil du trésor of the Government of Québec, *Guide de l'infonuagique, Volume 1 – Notions fondamentales*, October 2014.

- Although the CSTI had approved the reorientation of the RH-Paie project at its October 16, 2015 session, the minutes do not mention the issues involved in the cloud computing option and the consequences of abandoning the Oracle suite;
- The December 2 and 21, 2015 presentations on the Transfo-RH program delivered to the president and the vice-president of the executive committee (responsible for TI) and then the mayor, did not address the issue of cloud computing, except that the *Horizon de réalisation* or *Approche d'appel d'offres au marché* sections did contain the following comment: "Subject to positioning on cloud computing";
- Because the presentation on the Transfo-RH program and the procurement approach to the cloud solution delivered to the executive committee on May 11, 2016 occurred in private and there was no report, there is no documentation regarding any questions, concerns and constraints that may have been discussed in the course of this presentation. As a result, we were not able to determine whether the public call for tenders a week later reflected the discussions and comments of this in-camera meeting.

Therefore, we cannot be sure whether this change in technological direction was endorsed by elected officials in full knowledge of the facts. Without documentation to justify the decision to abandon the city Oracle suite (SIMON) and to opt for a cloud solution, we believe that issues or constraints may not have been taken into account, which could have a significant impact on meeting the needs, costs and schedule of the Transfo-RH program. However, this risk is mitigated, at least temporarily, because the city has not been able to follow up on this public tender, which has to be reviewed and re-launched.

However, it should be noted that in working on our audit report on IT governance published in 2015, we found that the city's level of IT maturity was 1.5 on a 5-point scale. Although a major transformation of the STI has since been undertaken to modernize IT and raise this level of maturity, it will take several years to achieve a significant increase in this level. However, under the circumstances, some caution should be exercised before a major commitment is made to the cloud computing solution.

Moreover, under the rules and general principles governing municipal affairs management, the executive committee's decisions, like those of the city council, did not allow the municipal administration to make a technological shift, abandoning the human resources component of the city Oracle suite (SIMON) in favour of a cloud solution. This reorientation should have been authorized by a resolution of the executive committee to amend the resolution adopted on June 26, 2013. Otherwise, this reorientation allowed funds to be used for purposes for which the members of the executive committee had not voted.⁸

⁸ *Cities and Towns Act*, CQLR, C-19, Section 114.1.

We should bear in mind that this resolution was adopted in the context of the application of the *Cadre de gouvernance des projets et des programmes de gestion d'actifs municipaux* and frameworks stipulating that the transition to the implementation phase must be approved by the executive committee, as well as the major changes to the project or program. In our view, technological and scope changes to the RH-Paie project certainly constitute major changes that should have been approved by the executive committee.

RECOMMENDATION

3.1.B.

We recommend that the Transfo-RH program proponent take the necessary steps to:

- Provide the rationale for the recommended cloud computing approach and to reassure the authorities, prior to resumption of the call for tenders for the SIRH project, that this orientation is an optimal choice for the city;
- To have the executive committee endorse, if applicable, the change in technological orientation to move from the human resources modules of the city Oracle suite (SIMON) to a cloud solution.

BUSINESS UNIT'S REPONSE

3.1.B.

Transfo-RH program proponent

We were not able to obtain an action plan from the proponent of the Transfo-RH program in response to the recommendations from our preliminary audit study report before its publication due to delays in the drafting and validation process. The action plan should be submitted to us by June 30, 2017.

Nevertheless, we did receive from the program's proponent and co-proponent a general comment on their position with regards to our preliminary audit study report. It can be found following section 4 "Conclusion" of this report and is followed by comments from the Auditor General.

3.2. Governance

Program governance involves establishing the prerequisites that are essential to the program's success and then implementing management and control mechanisms that will help generate the expected benefits, meet program needs and comply with the financial framework and the schedule.

These prerequisites include the program's ranking in the organization's priorities, the availability of resources for the program and the identification of a single proponent. These mechanisms, among other things, are related to:

- Program objectives;
- Guiding principles;
- Roles and responsibilities;
- Schedule and costs;
- Risk management.

Note that the city adopted the *Cadre de gouvernance des projets et des programmes de gestion d'actifs municipaux* in April 2010. The purpose of the framework is to harmonize project and program implementation practices in accordance with municipal policies and directions. It applies to the city as a whole and covers so-called large projects, i.e., all projects with a value of \$10 million or more, complex projects or high risk projects.

The governance framework is characterized by a phasing process consisting of transition points that require approval from decision-makers at various levels in order for the program to move on to the next phase. Thus, a business case that meets best practices in project management must provide a rationale for moving forward when each transition point is reached. It must then be submitted to decision-makers at various levels and, where appropriate, to the executive committee, which then officially authorizes the project to move on to the next phase.

3.2.1. Establishing the Prerequisites to Ensure the Transfo-RH Program's Success

Various studies, including the study conducted by Shared Services Canada⁹ about the findings from 19 audits and reviews of major IT projects in Canada and internationally, revealed that senior management engagement and commitment are considered crucial for success. A project that is considered a priority and brings about significant change within the organization requires strong leadership, including support from senior management throughout its implementation.

This support is reflected in the priority given to the project, the allocation of resources required for its implementation, the appointment of a single proponent, etc.

3.2.1.A. Results

As described earlier in the "Background" section of this report, several attempts have been made to modernize human resource and payroll processes since 2003, but they

⁹ Shared Services Canada, *What prevents large IT projects from being successful? A synthesis of common risk factors and lessons learned*, 2013.

have not been successful. We should bear in mind that this modernization initiative was originally scheduled to be completed in May 2007 and that almost 10 years later the city is back at square one.

Is this modernization project a priority for the city? First, it is important to note that when the RH-Paie project was suspended in April 2014, it was foundering and its scope, reduced to the human resource management processes considered essential to produce the payroll, did not meet the SRH's needs pursuant to the reengineering of its service delivery model.

In this context, the SRH made various submissions to decision makers at various levels of the municipal administration, which led to a major reframing of the scope of the RH-Paie project, which was transformed into the Transfo-RH program in 2015. Pursuant to the reframing, a program manager was hired and a delivery team composed of project leads was established to organize, plan and structure project milestones and deliverables. At the same time, in conjunction with the STI, the SRH made the above-mentioned presentations to elected officials in late 2015 and in 2016 to promote the program and encourage elected officials to support the Transfo-RH program.

Finally, the Transfo-RH program was listed in the *Tableau de suivi des projets d'immobilisations prioritaires* as *Système de gestion des ressources humaines*. The table includes about 75 projects governed by the *Cadre de gouvernance des projets et des programmes de gestion d'actifs municipaux*.

Under the circumstances, we can only hope that the city will pay due attention to the Transfo-RH program and closely monitor its implementation in order to finally modernize human resource and payroll processes, a goal that the city has sought to achieve since 2003.

These same studies reveal that organizational capacity represents a recurring risk in large IT projects. Organizational capacity refers to the technical and management skills required to implement an IT project. Large projects require highly skilled people, which are scarce. Organizations that move forward without the appropriate expertise to implement these projects have difficulty completing them.

It should be noted that one of the main causes of the failure to modernize the above-mentioned processes is a lack of resources and expertise coupled with the city's lack of experience in large-scale business process transformation projects.

Although we did not perform a comprehensive review of this aspect during our preliminary survey, the failure of the public call for tenders for the SIRH project, which is discussed in more detail in section 3.3 of this report, raises the question of whether

the city had the resources to develop tender documents for the acquisition of a cloud solution that reflected market practices.

The Transfo-RH program has developed a resource allocation matrix structure that is increasingly used because it has several advantages. For example, it provides more resource flexibility and allows resources to spend more time working. Nevertheless, the two main disadvantages inherent in this type of structure must not be overlooked in order to take steps to deal with them:

- The risk of conflict that arises when resources that are supposed to work on the Transfo-RH program also have to perform tasks for their home business unit or other priority projects;
- The risk of not having the expert or scarce resources (in fact, the resources that everyone is fighting for) that were expected during periods of overwork, for example when completing several concurrent projects prioritized by the city.

In our opinion, if these risks were to materialize, this could have a significant impact on meeting program requirements, costs and deadlines.

We found that the latest version of the program governance structure includes a proponent, delegated proponent and co-proponent.

One of the key governance components that will contribute to the success of a project is the identification of a single proponent within the organization whose main role is to ensure the success of the project or program, in addition to engaging stakeholders and liaising with senior management and governing bodies.

In our view, having two proponents could dilute accountability for program success or failure.

3.2.2. Definition of Program Objectives

Defining a clear mandate and objectives establishes what needs to be done over time, especially in terms of the scope of a program and its related projects.

According to PMBOK, a program is a group of projects managed in a coordinated way. At the outset of the program, a summary describing the basic business case must be made to provide an overview of the program's scope, schedule, costs and organization.

This summary allows the various stakeholders to build a common understanding of the program and provides the information that authorities need to make informed decisions when the program is to be approved. This initial documentation will be used to create the project charter, which will be more fully developed by the start of the program.

In principle, this document should be approved when the rationale for the program is provided. The document is then used to formalize the requirements and oversight over the subsequent phases (start-up, planning and execution). This key document represents the main commitment of all stakeholders.

3.2.2.A. Results

In the course of our work, we found that, contrary to the operating rules set out in the *Cadre de gouvernance des projets et des programmes de gestion d'actifs municipaux*, a basic business case was not developed for the Transfo-RH program, which would have clearly and succinctly described the objectives and outlined the program's scope, costs, schedule and milestones as soon as the RH-Paie project was converted to the Transfo-RH program.

Program information is provided through several documents, such as presentations delivered by the Transfo-RH program and governance. The mandate and objectives are not all clearly defined in the documents provided to us and are not necessarily agreed upon between the two management teams at the SRH and the STI.

In our view, without a basic business case duly approved as soon as the rationale for the program was provided, each stakeholder could have different interpretations of the mandate, leading to misunderstandings and even conflicts over the objectives to be achieved. This could jeopardize program delivery in terms of costs, scheduling and expected content.

RECOMMENDATION

3.2.2.B.

We recommend that the Transfo-RH program proponent take the necessary steps to:

- Prepare a summary document describing the basic business case for the Transfo-RH program, as prescribed by the *Cadre de gouvernance des projets et des programmes de gestion d'actifs municipaux*, defining its objectives and outlining its scope, costs, schedule and milestones;
- Submit this basic business case to the Comité sectoriel des technologies de l'information and have it approved by the Major project coordinating committee.

BUSINESS UNIT'S REPONSE

3.2.2.B.

Transfo-RH program proponent

We were not able to obtain an action plan from the proponent of the Transfo-RH program in response to the recommendations from our preliminary audit study report before its publication due to delays in

the drafting and validation process. The action plan should be submitted to us by June 30, 2017.

Nevertheless, we did receive from the program's proponent and co-proponent a general comment on their position with regards to our preliminary audit study report. It can be found following section 4 "Conclusion" of this report and is followed by comments from the Auditor General.

3.2.3. Guiding Principles

In order to stay focused on the objectives and scope of the program, guiding principles should be developed at the start of the program.

A guiding principle facilitates program decision-making. This same principle may cause discontent if it is applied routinely, but will help to ensure that the program does not exceed its initial scope and that outcomes meet project deadlines and costs.

Here are examples of guiding principles:

- The software selected for the program is adopted, not adapted;
- An approved milestone cannot be changed. It is characterized by the name of the responsible person and a delivery date;
- The scope of the program is cast in stone. There is no such thing as "while we're at it."

3.2.3.A. Results

During our preliminary survey, we found that the guiding principles defined for the Transfo-RH program are clear enough. Nine guiding principles are described in Transfo-RH program presentations:

[TRANSLATION]

1. *We are not bound by past practices;*
2. *Prioritize efficiency and value-added activities for the client;*
3. *Create and strengthen common, consistent practices throughout the city;*
4. *Set aside redundant or non-value added activities;*
5. *Limit breakdowns in HR and Payroll administrative processes;*
6. *Promote simple procedures and processes;*
7. *Aim to resolve service line issues as quickly as possible;*
8. *Implement user-friendly, easy-to-use technologies for everyone and maximize the use of technologies (self-service portal, mobility, workflow);*
9. *Stay focused on our business needs.*

We believe that these guiding principles have more to do with human resources processes than the running the program and its projects. We should bear in mind that

establishing guiding principles is critical to ensuring compliance with the objectives and scope of the program.

In our view, without clear guiding principles, the ability to stay focused on the initial objectives and scope of the Transfo-RH program could be compromised, leading to major policy changes throughout its implementation. As a result, the Transfo-RH program would only partially meet the SRH's needs.

RECOMMENDATION

3.2.3.B.	We recommend that the Transfo-RH program proponent take the necessary steps to: · Define guiding principles in order to stay focused on the initial objectives and scope of the program in order to foster stakeholder engagement throughout the program; · Have these principles approved by the program steering committee.

BUSINESS UNIT'S RESPONSE

3.2.3.B.	<i>Transfo-RH program proponent</i> We were not able to obtain an action plan from the proponent of the Transfo-RH program in response to the recommendations from our preliminary audit study report before its publication due to delays in the drafting and validation process. The action plan should be submitted to us by June 30, 2017. Nevertheless, we did receive from the program's proponent and co-proponent a general comment on their position with regards to our preliminary audit study report. It can be found following section 4 "Conclusion" of this report and is followed by comments from the Auditor General.

3.2.4. Program Governance Structure

An organization's culture, management style and structure have a definite influence on how its programs or projects are implemented. An organization's level of maturity in terms of program or project management is also likely to influence the implementation of such programs.

The governance or organizational structure of a program and its related projects should, in accordance with best practices, include an "orchestra conductor" leading a group of people who work together through various processes to achieve the program's objectives. This group typically includes the management and governance

team as well as the various types of technical and business expertise required to produce the deliverables. One of the key processes is quality assurance, which is a tool used to validate compliance with the program's requirements, projects and deliverables during its implementation so that expected objectives and benefits are achieved.

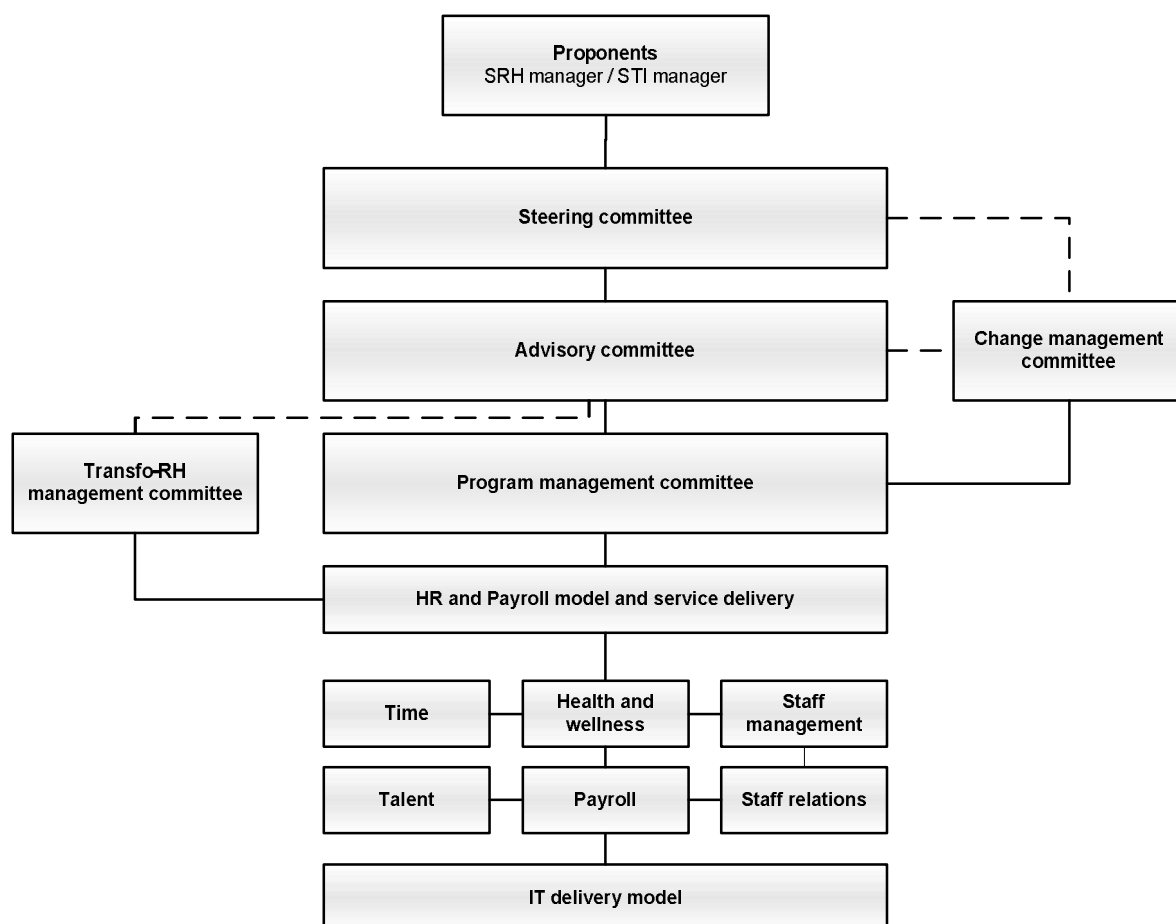
Although the characteristics of this structure may vary significantly, the “orchestra conductor’s” role as a team leader remains a constant. This structure should also meet the following requirements to support the program’s success:

- Clearly assigned roles and responsibilities;
- Clearly defined relationships and levels of authority;
- Accountability of the various stakeholders for achieving project deliverables, program projects and, ultimately, the success or failure of the project;
- Agility in the decision-making process.

It should be noted that developing a RACI matrix, which means “Responsible, Accountable, Consulted, Informed” is one of the widespread and recognized practices involved in assigning roles and responsibilities. According to PMBOK, the RACI matrix “*ensures that there is only one person accountable for any one task to avoid confusion as to who is ultimately in charge or has authority for the task.*”

Figure 1 presents the governance structure of the Transfo-RH program. Appendices 5.2 and 5.3 describe respectively the roles and responsibilities of the committees within this structure as well as those of the key stakeholders involved in implementing the Transfo-RH program.

Figure 1 – Transfo-RH Program Structure



Source: *Gouvernance Programme Transfo-RH – Organigramme et détail des comités*, October 31, 2016.

It should be noted that this governance structure replaces the one used prior to November 4, 2016 (see Appendix 5.4).

The abovementioned document (*Gouvernance Programme Transfo-RH – Organigramme et détail des comités*) states that governance is required to:

[TRANSLATION]

- Ensure efficient decision-making in project implementation;
- Ensure consistency of information and the use of common accountability processes;
- Ensure that program activity planning is properly recalibrated to reflect current priorities.
- Manage activities, the schedule and risk management with HR and IT stakeholders twice a month;
- Ensure that each project's stakeholders are responsible and accountable.

3.2.4.A. Results

While working on the survey, we found that the Transfo-RH program governance structure does not include roles and responsibilities for quality assurance. In our view, without quality assurance, the objectives and expected benefits of the program may not be achieved.

Also, this program did not adopt an independent status reporting process. In our opinion, this process would provide the proponent and other decision makers at various levels of the municipal administration with objective information from a respondent reporting directly to the proponent. Without this process, the authorities would not necessarily receive accurate program status reports.

We note that this structure is obviously somewhat cumbersome compared to the structure used prior to November 4, 2016 (see Appendix 5.4). For example, it now has five committees and a management committee for each project in the program. This type of structure raises questions regarding one of the objectives it is supposed to meet, [TRANSLATION] “*Ensure efficient decision-making in project implementation.*”

We also note that the organizational chart presented in the above document (*Gouvernance Programme Transfo-RH – Organigramme et détail des comités*) is not consistent with the roles and responsibilities described in that document. Two proponents, the SRH manager and the STI manager, are shown on the organizational chart, while the description of roles and responsibilities refers to a proponent, delegated proponent and co-proponent.

This structure also has overlapping responsibilities and shared responsibilities that dilute accountability for deliverables required to implement the program's projects and ultimately for the success or failure of the program.

For example, the proponent and delegated proponent have identical responsibilities, whereas they and the co-proponent have a common responsibility to [TRANSLATION] “*guide and advise the teams and play a supportive role in resolving issues.*” The responsibility for deliverables is shared between a business representative and an IT representative. Relationships and levels of authority are not clearly defined either, particularly with respect to the various committees.

It should be noted that the SRH and STI management do not share our position on this governance structure. In fact, they believe this structure will facilitate the success of the Transfo-RH program and argue that it is simplified, documented and includes an accountability mechanism that allows the various committees to perform the necessary work.

We agree that a program's structure does not necessarily guarantee that the program will be a success, and we acknowledge that its characteristics may vary significantly. However, it should meet the requirements mentioned above.

From this standpoint, we believe that the development of RACI matrices should at least be considered in order to clarify the authority relationships between the various Transfo-RH program stakeholders and how roles and responsibilities are shared.

RECOMMENDATION

3.2.4.B.

We recommend that the Transfo-RH program proponent:

- Take the steps needed to:
 - Implement a quality assurance process to ensure compliance with the requirements of the program, its projects and related deliverables;
 - Implement a process that provides periodic objective program status reports;
- Consider developing RACI matrices to clarify the authority relationships between the various stakeholders and how roles and responsibilities are shared.

BUSINESS UNIT'S REPONSE

3.2.4.B.

Transfo-RH program proponent

We were not able to obtain an action plan from the proponent of the Transfo-RH program in response to the recommendations from our preliminary audit study report before its publication due to delays in the drafting and validation process. The action plan should be submitted to us by June 30, 2017.

Nevertheless, we did receive from the program's proponent and co-proponent a general comment on their position with regards to our preliminary audit study report. It can be found following section 4 "Conclusion" of this report and is followed by comments from the Auditor General.

3.2.5. Schedule and Costs

To successfully implement a program, the scheduling for the main activities and interrelationships of each of its projects has to be planned. Some program constraints will be included and will be subject to delivery deadlines, as well as milestones to split the program into logical chronological phases. Milestone content and deadlines should be set in stone. They will not only ensure that the delivery date is met, but will also keep a sharp focus on the scope of the program.

Also, milestones help to determine the amount of resources to be allocated to the program as well as other costs such as licences and equipment.

The program manager and project managers monitor costs and scheduling. The steering committee and other relevant bodies must receive timely budget and planning reports.

In the case of the Transfo-RH program, using a cloud solution for the project raises questions about the possibility of considering capital costs. The Public Sector Accounting Board has not yet issued specific standards on accounting treatment for cloud computing in the public sector. In the United States, the *Financial Accounting Standards Board* (FASB)¹⁰ has published guidance on cloud computing. However, it appears that the accounting treatment to be applied must be carefully assessed based on the facts and circumstances given that each cloud structure can be unique and specific to the organization.

3.2.5.A. Results

During our preliminary survey, we found that the major milestones in the Transfo-RH program's master schedule do not include commitment mechanisms to lock in program content. Some high-level milestones are defined for projects under the Transfo-RH program. However, the documentation does not clearly indicate whether these milestones will include commitment mechanisms to lock content. Because the city was unable to complete the public tender for the SIRH project, the STI will adjust these milestones in time.

¹⁰ FASB Accounting Standards Update No. 2015-05 – Intangibles – Goodwill and Other – Internal-Use Software (Subtopic 350-40): Customer's Accounting for Fees Paid in a Cloud Computing Arrangement, April 2015.

Table 1 presents the major milestones of the Transfo-RH program.

Table 1 – Major Milestones

Project name	Project phase	Project status	2016				2017				2018				2019				2020 and after
			Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	
Labour relations management	Not started	To be evaluated									Delay								
IT delivery model	Not started	In progress																	
Time management: addition of police officer payroll functionalities and integration in Kronos	Not started	Not started																	
Staff management	1 - Project brief	To be evaluated					Delay												
HR model and services centre	2 - Identification of the solution	In progress																	
Integrated solution (SIRH)	2 - Identification of the solution	To be evaluated					Delay												
Migration plan - police officer payroll	2 - Identification of the solution	In progress																	
Succession management	3 - Planning	In progress																	
Kronos upgrade (including dev. TS911)	3 - Planning	In progress																	
Update and dev. functionalities in Employeur D	3 - Planning	To be evaluated					Delay												
Training	4 - Realization	In progress																	

Legend

	Delay caused by the delayed call for tenders
	Delay caused by the sale of the Employeur D solution

Source: Transfo-RH program status presentation delivered to the steering committee, November 4, 2016.

For example, one of the Transfo-RH program's strategic milestones involves processing the payroll for the police officers of the Service de police de la Ville de Montréal (SPVM) by Médi-Solution, a service provider whose contract ends on December 31, 2018. As the city was unable to complete the public tender for the SIRH project, a specific project will review the police officers' payroll because it is urgent that this issue be resolved. The STI is working to find a transitional solution.

In our view, without commitment mechanisms on strategic milestones, the scope of the Transfo-RH program and compliance with implementation deadlines could be compromised and costs could increase. As a result, the program would only partially meet the needs of the SRH.

A program budget was established based on the resource plan per project, \$51.4 million for capital expenditures and \$31.8 million for operating expenditures. Until the Public Sector Accounting Board issues specific standards on accounting treatment for cloud computing in the public sector, the Service des finances recommends that the city's *Capitalisation et amortissement des dépenses en immobilisations* policy be applied. Based on information obtained from the Service des finances, a cloud computing expense should be considered part of an asset insofar as the city owns the source code and therefore control that application. Otherwise, it will be considered an operating expense.

The accounting treatment aspects of cloud computing will be discussed in more detail in our upcoming audit engagement on the city's cloud computing strategy.

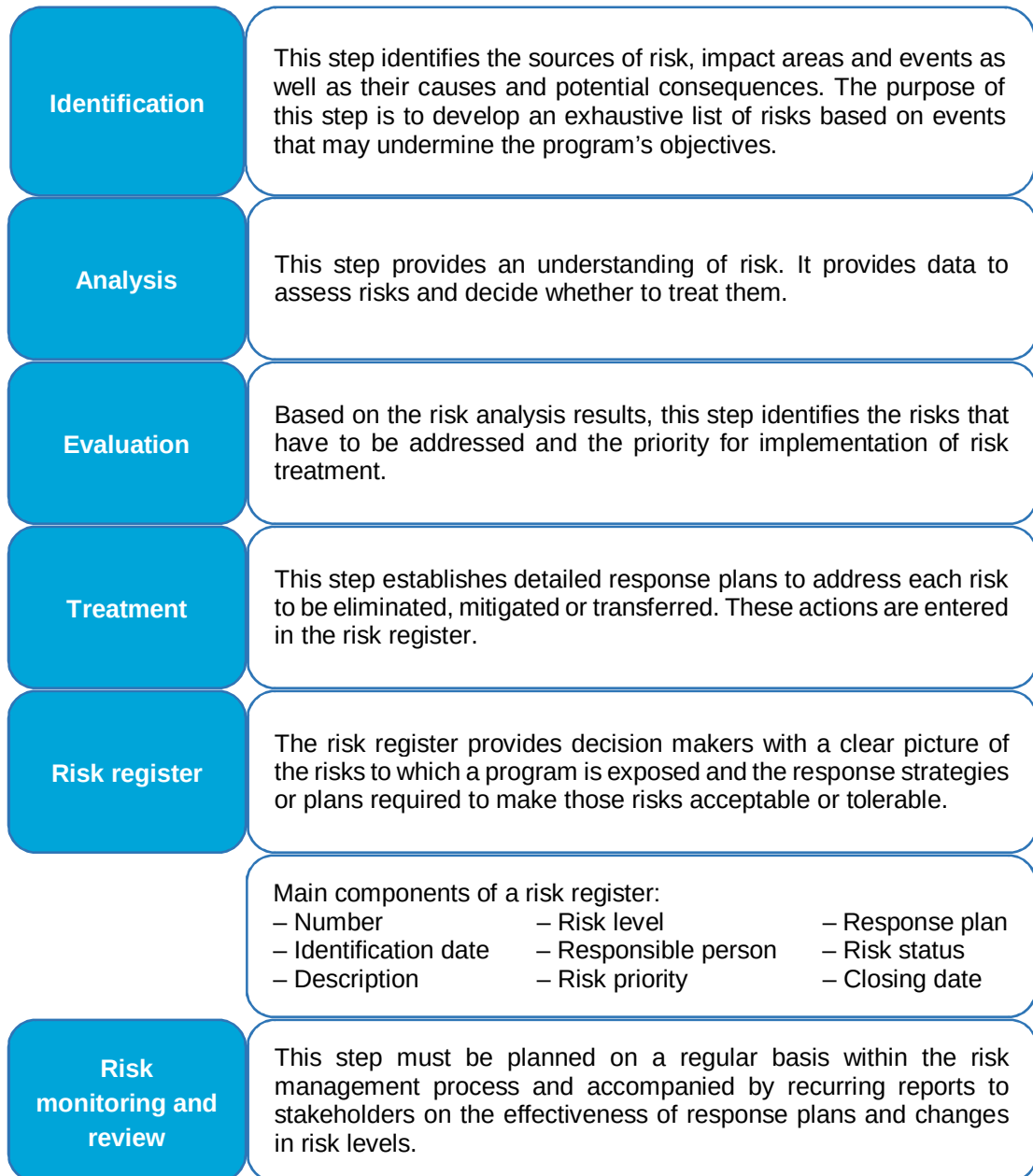
RECOMMENDATION	
3.2.5.B.	We recommend that the Transfo-RH program proponent take the necessary steps to establish commitment mechanisms on strategic milestones to lock in deadlines and content.
BUSINESS UNIT'S REPONSE	
3.2.5.B.	<i>Transfo-RH program proponent</i> We were not able to obtain an action plan from the proponent of the Transfo-RH program in response to the recommendations from our preliminary audit study report before its publication due to delays in the drafting and validation process. The action plan should be submitted to us by June 30, 2017. Nevertheless, we did receive from the program's proponent and co-proponent a general comment on their position with regards to our preliminary audit study report. It can be found following section 4 "Conclusion" of this report and is followed by comments from the Auditor General.

3.2.6. Risk Management

Risk management allows a program to respond to some of the changing conditions in its environment in order to stay focused on objectives while developing an appropriate response to identified risks.

Risk management is critical to ensuring that programs run efficiently and avoiding situations where solutions have to be improvised. It identifies risks and introduces response measures to reduce risks to an acceptable level. These aspects must be taken into consideration from the start of a program and reviewed periodically.

According to ISO 3001 "Risk Management," the risk management process includes the steps described in Figure 2.

Figure 2 – Steps in the Risk Management Process

One of the major risks of a cloud computing solution for managing human resources and payroll is the risk related to protecting personal information. This information includes personal data which can be stored in several geographic areas and is therefore covered by different legislations. This is a particularly critical issue for the city, because the SIRH project covers the city's human resources as a whole, including those of the SPVM.

3.2.6.A. Results

During our preliminary survey, we found that there was no integrated risk management framework for the Transfo-RH program. In fact:

- Regarding risk management for the Transfo-RH program, we only obtained risk registers for the program, the SIRH project, the Temps (Kronos) project and the Payroll project:
 - The program risk register contains two risks not assigned to a responsible person;
 - The SIRH project risk register contains 10 risks in all, none of which are assigned to a responsible person. Also, a response strategy has not been identified for three of these risks;
 - The risk register for the Temps (Kronos) project contains eight risks, one of which is briefly documented: only the category, title and description are listed;
 - The risk register for the Payroll project contains four risks and a response strategy. However, only one of these risks has been assigned to a responsible person.
- With respect to information security risks, in October 2015, the STI produced a document entitled *Analyse d'impact (sécurité) Projet TransfoRH* which does not even describe the impacts. We therefore consider that this impact assessment is not complete enough to adequately deal with the information security risks involved in using a cloud solution. Also, no risk register was produced as a result of this assessment. More specifically:
 - This assessment deals with the Transfo-RH program as a whole, but does not contain assessments specific to the various program projects;
 - This assessment is not a risk assessment per se since the likelihood the risk and its probable causes are not discussed;
 - This assessment deals with information in a broad high-level sense, such as personal information. What about information on SPVM police officer, for example?
 - The document contains a "Information classification" section, but the information is not classified. The document only classifies scenarios to which impact levels in terms of availability, integrity and confidentiality have been assigned;
 - The business impact assessment grids are concise and, most importantly, business impacts are not described. For example:

6.1. Impacts related to availability of IT services

Scenarios	Types of impacts	Business impacts	Severity of the impact	After how long
IT service unavailable for less than 4 hours	Financial impacts		1	
	Legal impacts		1	
	Impacts on citizens		1	
	Impacts on the city's image		2	
	Impacts on other city's services		2	
	Impacts on users		2	

Source: STI, *Analyse d'impact (sécurité) Projet TransfoRH*, October 2015.

6.2. Impacts related to the integrity of IT services

Scenarios	Types of impacts	Business impacts	Severity of the impact
Corruption of data used by IT services	Financial impacts		3
	Legal impacts		2 or 3
	Impacts on citizens		1
	Impacts on the city's image		2
	Impacts on other city's services		3
	Impacts on users		3

Source : STI, *Analyse d'impact (sécurité) Projet TransfoRH*, octobre 2015.

6.5. Impacts related to confidentiality of information

Scenarios	Types of impacts	Business impacts	Severity of the impact
Following malicious acts, confidential information is made public.	Financial impacts	Complaint,...	3
	Legal impacts	Privacy Act	3
	Impacts on citizens		--
	Impacts on the city's image		3
	Impacts on other city's services		3
	Impacts on users		3

Source: STI, *Analyse d'impact (sécurité) Projet TransfoRH*, October 2015.

In our view, without an integrated risk management process for the Transfo-RH program, major risks may not be identified and, if these risks materialize, the program could be affected in terms of meeting its objectives and cost, deadline and content commitments. Also, without a comprehensive information security risk assessment, and especially in the context of the SIRH project, confidential human resources information could be disclosed to unauthorized persons and jeopardize the safety of employees and especially police officers.

RECOMMENDATION	
3.2.6.B.	We recommend that the Transfo-RH program proponent take the necessary steps to implement integrated risk management to assess various risks including information security risks.
BUSINESS UNIT'S REPONSE	
3.2.6.B.	<i>Transfo-RH program proponent</i> We were not able to obtain an action plan from the proponent of the Transfo-RH program in response to the recommendations from our preliminary audit study report before its publication due to delays in the drafting and validation process. The action plan should be submitted to us by June 30, 2017. Nevertheless, we did receive from the program's proponent and co-proponent a general comment on their position with regards to our preliminary audit study report. It can be found following section 4 "Conclusion" of this report and is followed by comments from the Auditor General.

3.3. Public Call for Tenders for the SIRH Project

According to the *Politique d'approvisionnement de la Ville de Montréal*: [TRANSLATION] "Planning and defining needs are critical steps in the procurement process. The city must ensure that it develops strategies and processes required for consistent, common and economic management of its acquisitions and execution of its work." The policy provides this clarification: [TRANSLATION] "The identification of needs must also consider the risks, constraints and details of each procurement project, and possible options."

When a new product is introduced, such as cloud computing, it is necessary to update market knowledge through monitoring and, potentially, a Request For Information (RFI).

SRH and STI multidisciplinary teams have identified their needs in order to produce the specifications for the public call for tenders on the *Acquisition de services pour l'utilisation d'une solution logiciel-service ou infonuagique hébergée des ressources humaines et paie*. The public call for tenders was launched in May 2016. The specifications described the general bid assessment method:

- Assessment of administrative compliance.
- Mandatory requirements: 226 mandatory and disqualifying requirements,¹¹ i.e., submissions that failed to meet the mandatory requirements are rejected. Some specific modules had to meet mandatory functional and technological requirements as soon as the tender was submitted. For some modules referred to in the bid documents, a 12-month period could be obtained to comply with mandatory requirements.
- Assessment grid: Once a tender met the administrative compliance assessment requirements and was found to comply with the mandatory requirements, the tender was scored using a weighted assessment criteria grid. The criteria included 983 non-mandatory¹² requirements, demonstration of functional and technological scenarios and the price. Some specific modules had to meet non-mandatory functional and technological requirements as soon as the tender was submitted. For some modules referred to in the bid documents, a 12-month period could be obtained to comply with non-mandatory functional and technological requirements.

In October 2016, the city was unable to complete the public call for tenders because none of the three tenders received met the administrative compliance requirements. The STI, the Service de l'approvisionnement and the Service des affaires juridiques reviewed the clauses and processes of the call for tenders in order to attract more market interest and promote consistent bidding.

3.3.A. Results

During our preliminary survey, we found that public tendering involved significant risks in terms of the long periods of time that bidders were given to comply with some mandatory requirements. The public call for tenders allowed bidders to obtain a 12-month period to comply with mandatory requirements for a maximum of two of the following modules:

- Staff management;
- Performance management;
- Career management;
- Succession management;
- Training management;
- Employee self-service and manager self-service.

¹¹ Namely: 3 business, 133 functional, 22 technological and 68 security requirements.

¹² Namely: 897 functional, 71 technological and 15 security requirements.

In addition, the public call for tenders received 102 questions from bidders and 14 addenda were issued. As a result some requirements were amended or withdrawn. Based on the questions raised and the changes made through the addenda, it can be argued that the content of the public tender was challenged by the market, particularly the administrative clauses. The addenda issued were intended, among other things, to clarify the city's requests so they could be understood by the suppliers. Here are some examples of changes made through addenda:

- Removal of the penalty for late delivery;
- Replacement of performance penalties defined by the city by those proposed by the bidders;
- Removal of the 1-hour maximum data recovery time from the level of service offered by the bidders;
- Withdrawal of the \$500 per day penalty for each failure to meet a requirement;
- The city's deadline for submitting the notice of termination of contract was increased from 10 days to 180 days;
- The city's deadline for retrieving its data decreased from 60 days to 30 days.

As the city was unable to complete the public call for tenders, the STI was in the process of preparing an action plan focused on revising legal clauses. During a statutory meeting held with the mayor in November 2016, the STI presented the elements which made it impossible for the city to complete the public call for tenders and the action plan to be produced to issue a new call for tenders likely to reflect market practices. This action plan includes writing new generic specifications and establishing a specific procurement process for cloud computing solutions, but mainly requires that administrative clauses be revised.

In our view, unclear or inconsistent bidding requirements may compromise the appropriate choice of a cloud solution that meets the needs and objectives of the SRH. Granting bidders a 12-month period in the event of an absent or incomplete module in their tender for mandatory requirements could result in the supplier never being in compliance with these requirements. Thus, the agreement would not adequately protect the interests of the city in the event of disagreement or litigation. Unless all the clauses of the previous public tender are revised, the next call for tenders may have the same problems, which would lead to a delay in starting the SIRH project, or the proposed solutions may not meet the city's requirements and objectives.

RECOMMENDATION

3.3.B.

We recommend that the Transfo-RH program proponent ensure that all clauses of the previous SIRH project's public call for tenders be reviewed in order to ensure the success of the next call for tenders and that the proponent take into account the results of the risk assessments referred to in recommendation 3.2.6.B.

BUSINESS UNIT'S REPONSE**3.3.B.*****Transfo-RH program proponent***

We were not able to obtain an action plan from the proponent of the Transfo-RH program in response to the recommendations from our preliminary audit study report before its publication due to delays in the drafting and validation process. The action plan should be submitted to us by June 30, 2017.

Nevertheless, we did receive from the program's proponent and co-proponent a general comment on their position with regards to our preliminary audit study report. It can be found following section 4 "Conclusion" of this report and is followed by comments from the Auditor General.

4. Conclusion

Various attempts were made to modernize human resources and payroll processes prior to the launch of the Transfo-RH program in October 2015. These attempts, made under the SIG RH-Paie and RH-Paie projects, were unsuccessful. We should bear in mind that this modernization project was to be completed in May 2007.

However, 10 years have gone by and the city is back to square one. The May 2016 public call for tenders for the Système intégré en ressources humaines (SIRH) project could not be completed. Because this project is the main component of the Transfo-RH program, the program is being completely replanned.

This replanning is likely to lead to significant delays in the initial Transfo-RH program implementation schedule and may also have an impact on program costs. According to the latest forecasts produced by the city, the estimated cost is \$51.4 million for capital expenditures and \$31.8 million for operating expenditures.

The causes of the above-mentioned SIG RH-Paie and RH-Paie project failures are symptomatic of poor governance. We found similar deficiencies in the Transfo-RH program's governance. In this regard and in order to facilitate the success of the program, the following steps should be taken:

- Clearly establish and approve the objectives and guiding principles underpinning the program's implementation;
- Implement a quality assurance process to ensure compliance with the requirements of the program, its projects and related deliverables;
- Implement a process that provides the proponent with periodic objective program status reports;
- Consider developing RACI matrices to clarify the authority relationships between the various stakeholders and how roles and responsibilities are shared.

- Establish engagement mechanisms for strategic milestones to lock in milestone deadlines and content;
- Implement integrated risk management to assess various risks including information security risks.

In addition to the above-mentioned governance issues, it is important to substantiate the reasons for adopting a cloud computing solution and to reassure the authorities that this solution is an optimal choice for the city. Also, the content of the SIRH project's call for tenders needs to be reviewed to ensure it reflects market practices, and a new call for tenders must be launched as soon as possible.

In conclusion, we believe that the Transfo-RH program deserves special status beyond being one of the city's 75 or so priority projects. Based on the history of attempts to modernize human resource management and payroll processes, coupled with the risks involved in implementing the Transfo-RH program, the municipal administration needs to follow up rigorously to ensure that the implementation of this program will ultimately achieve the modernization objective.

BUSINESS UNIT'S REPONSE	
	<i>Transfo-RH program proponent</i> <i>[TRANSLATION] Background</i> <i>In 2014, the Direction générale had mandated the management of STI to review its service model. In 2015, STI began the transformation of its service offering, its operations and its work organization in order to support the realization of the business plans of the city's units by implementing best practices in management, solutions delivery and customer service.</i> <i>At the same time, the SRH decided to take an organizational break by suspending its Paie-RH project. This key moment allowed the service to review its vision of human resources at the city, in this way, reframing its reason for being, scope, objectives as well as the anticipated benefits of all future initiatives. During this time, the SRH repositioned its service delivery model and continued its discussions with STI on the solutions needed in order to support its transformation.</i> <i>The SRH and STI management jointly decided to initiate a whole new program called Transfo-RH aimed at first, meeting the needs and orientations of the SRH and second, making up for the obsolescence</i>

of the application portfolio made up of dozens of applications of various technologies that do not support all of the HR practices.

When the program started, the team began a watch of technological solutions with regards to the integrated management of human resources. Parallel to this exercise, the STI established its technological positioning regarding cloud-computing solutions that the program took into account in defining its target architecture.

During the summer of 2016, the STI proceeded in hiring one of its first major project managers specifically for this program. His first responsibilities consisted in structuring the program, defining and implementing a governance as well as a project management and delivery team. The team began planning the major milestones and the road map deliverables.

Answers to the preliminary audit study

During the preliminary audit study that took place from September to December 2016, the team proceeded in defining each of the program's projects (scope, budget, required expertise, deliverables, effort and schedule). A program governance was deployed, including committees, rendering of accounts and roles and responsibilities. Because most program's projects were only starting up, they were mostly at the "identifying the solution" phase. According to the process established by the project office, the required deliverables at this stage were:

1. an evolving scope (not fixed);
2. activity planning for each project resulting in a high-level schedule;
3. preliminary budget estimate;
4. preliminary risk register.

Since January, the project teams that have entered into the "planning" and "realization" phase will be working on:

1. getting the initial scope set and approved;
2. defining the detailed planning made up of two milestones and deadlines;
3. putting together the detailed budget;
4. putting together the teams and beginning the activities;
5. documenting and keeping track of the risk register. All the activities are carried out while respecting the established governance.

Reorientation of the RH-Paie project and change in technological orientation

To support the preparation of our orientation in terms of public cloud computing, the STI developed a target architecture within the framework made up of a rigorous and structured project:

1. Complete review of the approaches (supply, security and privacy) – (2015);
2. Legal opinion favourable to the use of public cloud computing (2015);
3. Legal opinion on the clauses to be included in the specifications (end of 2015);
4. Developing a risk analysis matrix (data privacy, integrity and availability) to determine the contract clauses to be used in keeping with the context (end of 2015);
5. Adoption by the Direction générale of a positioning on the sourcing of IT solutions (end of 2015);
6. Preparation of the clauses to be included in the cloud-computing specifications (early 2016);
7. Validation of the clauses to be included in the specifications by the city's Service des affaires juridiques (early 2016).

As it is customary in the city's governance, the change in technological orientation for an on-site cloud-computing solution was presented to the elected officials on May 5, 2016 and to the executive committee on May 11, 2016. During these meetings, the STI presented the characteristics, advantages, costs and benefits of its new positioning.

Definition of program objectives

While it would have been desirable to have a detailed chart for each project, the program's management nevertheless documented all of the objectives, scopes, costs and high-level schedules through a series of documents including among others, various presentations made to the management committee. A project chart has been carried out from the start of each project.

Governance

From the start of the program, the team proposed a series of guiding principles endorsed by the management committee. The SRH and STI management deemed it appropriate to improve on these principles in such a way as to ensure that the teams stay the course on the initial objectives and scope of the program, in this way promoting stakeholder buy-in.

Although the governance in place ensures a complete rendering of accounts, the program management will make certain adjustments aiming to eliminate satellite committees of an operational nature.

The STI project office is working to implement a review and support process of IT projects to make sure that best practices are respected, to validate that requirements and objectives are met and to assure quality. Furthermore, these objective and independent project reviews will enable to tracking the state of health of the projects and the program. To this effect, the program will comply with the standards of the project office.

Finally, in keeping with the project office's project management framework, the roles and responsibilities have been duly defined, documented and endorsed by the program's management committee. Moreover, a RACI responsibility matrix will be completed to ensure that all stakeholders are on the same page.

Call for tenders for the SIRH project

Following the non-compliance of the tenderers at the last call for tenders, a mandate was given by the Service des affaires juridiques to an outside firm in order to revise the city's general and administrative clauses. Until the expected conclusions and deliverables are available, the team is analyzing the clauses of the previous SIRH call for tenders as well as the proposals received in order to improve upon and ensure the success of the next call for tenders.

Auditor General's comments

We acknowledge firstly that since January 2017, that is, prior to the end of our work, different activities have been carried out related to some of our recommendations and in keeping with the progress of the Transfo-RH program.

Secondly, as to the content of the comments pertaining to the reorientation and the technological change in orientation, we maintain the opinion expressed in section 3.1 of our report with regards that the technological change in orientation in which the city Oracle suite (SIMON) human resource modules were set aside in favour of a cloud-computing solution, should have been the object of a resolution on the part of the executive committee.

We will monitor the Transfo-RH program given the risk involved with its realization and its history regarding past

	attempts to modernize human resources and payroll processes. Therefore, other than the evaluation and follow-up of the action plan that will be submitted to us in response to our recommendations, we will reassess the appropriate time to undertake one or more detailed audits of the activities of the Transfo-RH program and important questions that could attract our attention.

5. Appendices

5.1. Description of the Transfo-RH Program Projects

Table A – Summary Description and Objectives of the Transfo-RH Program Projects

Project	Description / Objectives
SIRH solution	Major Transfo-RH program project. Its objectives are to: · Complete calls for tenders in order to acquire a cloud solution and an integrator · Implement an IT solution that includes: employee management, time and payroll management, talent management and the service centre
HR and Payroll model and service delivery	Diagnose, review and define the HR business model and HR business architecture, and implement target business processes and the HR and Payroll services centre
IT delivery model	Define roles and responsibilities for the IT service model required to maintain an integrated solution
Time	Update the Kronos application and review governance to optimize its use
Health and wellness	Update the Employeur D application that is used to manage obligations to the Commission des normes, de l'équité, de la santé et de la sécurité du travail (CNESST)
Staff management	Implement a call for tenders process and set up a staff management system based on collective agreements (e.g., a recall list for staffing positions)
Talent	Implement transitional solutions for succession and training
Payroll	Police officer payroll mitigation plan: complete a functional process analysis to produce an architecture and then a IT solution for the police officers' payroll by January 1, 2019
Staff relations	The staff relations project aims to: · Respond to needs that will not be addressed by the integrated HR solution: - Improve overall management of grievances against the city - Streamline computerized grievance management processes - Reduce double entry costs and errors - Improve management of hearing schedules · Develop the archiving, interpretation, monitoring and control of versions of various letters of agreement, employment contracts or collective agreements

5.2. Roles and Responsibilities of Transfo-RH Program Committees

Table B – Description of the Roles and Responsibilities of the Six Transfo-RH Program Committees

Committee	Roles and responsibilities
Steering committee	· Approve guiding principles · Approve objectives · Approve key milestones · Lead and decide on main options and directions · Monitor progress of work · Approve and verify planned budgets versus reality · Approve deliverables and the implementation strategy · Approve requests for changes · Monitor risk management
Advisory committee	· Maintain an even-handed perspective to balance needs, solutions and resources · Find ways to solve problems and recommend them to the steering committee · Arbitrate and screen issues to be addressed to the steering committee · Follow up on change requests and bring them to the steering committee's attention
Program management committee	· Monitor each project and the program as a whole · Review and update planning · Communicate outstanding project issues and recommend solutions to the program advisory committee · Monitor requests for project changes, prioritize requests, review impacts on projects and develop solutions · Identify and establish overall project and program timelines · Produce program status updates
Project management committee	· Monitor the project as a whole · Update the project implementation plan · Communicate outstanding issues and recommend solutions to the program management committee · Monitor requests for project changes, prioritize requests, review impacts on the project and develop solutions · Produce project status updates
Transfo-RH management committee	· Design the architecture of the future business services model · Write key milestones and deliverables for the business model · Monitor progress on the business model · Produce the deliverables for development of the new business model and strategy · Support and confirm the priorities of each SRH business process · Provide guidance to the program advisory committee

Committee	Roles and responsibilities
Change management committee	· Oversee governance of project change management · Organize and plan workshops to engage stakeholders · Identify human risks and develop mitigation plans · Develop and adapt the training strategy · Develop and implement the change measurement strategy (dashboard) · Develop the support and coaching structure · Ensure that the approach is based on quality communication · Anticipate the effects of communications and propose an appropriate communication strategy and tools

Source: *Gouvernance Programme Transfo-RH – Organigramme et détail des comités*, October 31, 2016.

5.3. Roles and Responsibilities of the Key Transfo-RH Program Stakeholders

Table C – Description of the Roles and Responsibilities of the Key Transfo-RH Program Stakeholders

Role	Responsibilities
Proponent and delegated proponent	· Ensure that the program is in line with the city's master plan · Provide the components of the vision for HR and Payroll that underpin the program · Ensure that human resources are available · Enhance the program's visibility among senior city officials, central services and the boroughs, and encourage them to make the program a priority · Guide and advise teams and play a supportive role in resolving issues · Co-chair steering committee meetings
Co-proponent	· Provide the components of the vision for IT that underpin the program · Ensure that IT human resources are available · Guide and advise teams and play a supportive role in resolving issues · Ensure that funding is available
IT staff manager	· Manage business relationships and reporting requirements in business units · Responsible for managing the IT portfolio, IT strategy and the business Roadmap · Manage priorities defined in conjunction with business units · Support, maintain and oversee changes in technological solutions related to business unit objectives · Be accountable for delivery of various IT projects/requests · See to hiring/assigning resources for IT projects and requests
Program manager	· Organize, plan and generally coordinate the program in accordance with guiding principles · Continuously follow up with and produce reports for the steering committee members, STI management and the program proponents · Prepare and co-chair steering committee meetings · Provide leadership for technical teams based on milestones and expected outcomes · Closely monitor the program and control the program budget · Validate and approve the detailed plan and methodologies of the program · Co-validate and co-approve deliverables for submission to the steering committee · Support and advise program members in carrying out their activities

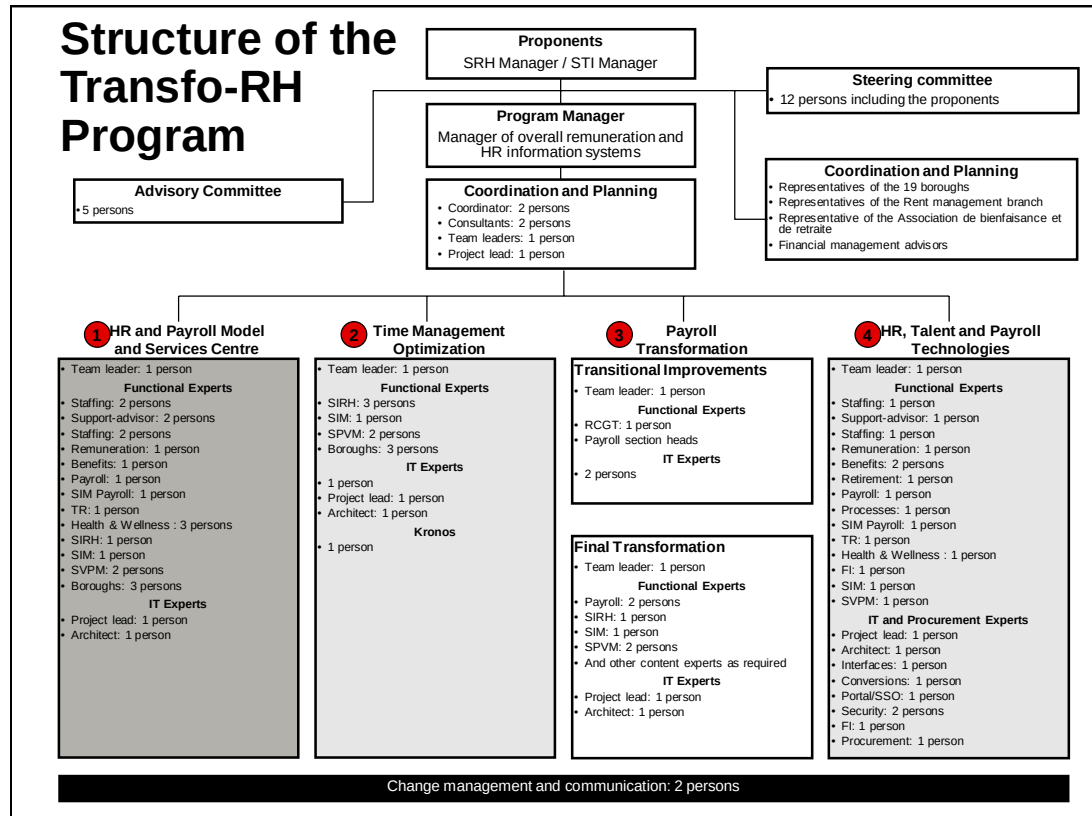
Role	Responsibilities
HR expert	· Participate in feasibility and requirement reviews related to the following activities: - ü Decommissioning - ü Conversions - ü Security management · Help specify functional requirements (all HR areas) · Work with the program team to develop implementation requirements · Help implement the various projects where he is assigned
Section head / Business manager	· Help organize, plan and generally coordinate the program in accordance with guiding principles · Follow up with and produce business reports for program proponents and members of the Transfo-RH management committee · Help prepare meetings of the steering committee · Provide leadership for business teams based on milestones and expected outcomes · Co-validate and co-approve deliverables for submission to the steering committee · Support and advise program members in carrying out their activities · Help develop guiding principles for the target business architecture · In conjunction with program teams, help produce future business architecture options that meet the objectives and guiding principles of the program
Change management	· Develop a stakeholder management strategy to achieve and maintain the level of commitment required · In conjunction with other resources, develop and maintain an action plan based on the impacts and risks associated with transformation (communication plan, workshops, engagement workshops, skills assessment, training plans, etc.) · Build and maintain a change management dashboard
Transformation consultant (external)	· Help teams plan and coordinate the program (budget estimates, business plan, project promotion, follow-up, etc.) · Provide advice on how to align the business model with technology · Provide a high level of specific content expertise (HR service model, shared services centre, process optimization, evaluation and selection of a technology solution, tools and methodological approach, etc.) · In conjunction with project teams, advise on future (technical and business) architecture options that are consistent with program objectives and guiding principles · Provide advice on specifying requirements for future business architecture
Senior architect (IT)	· Provide documentation on current TIRH Paie architecture · Keep up with new developments in technology and best practices · Develop guiding principles for target architecture · In conjunction with project teams, produce options for future architectures that are consistent with program objectives and guiding principles · Specify technical requirements for the preferred future architecture

Role	Responsibilities
Business owner	· Help develop specifications (and/or attend workshops on developing specifications) for current activities · Provide functional knowledge on current practices/processes · Work with the team to identify opportunities for efficiency and effectiveness · Help specify functional requirements for future HR and Payroll technologies · Identify key personnel, experts in their field, in order to achieve milestones
Business team leader	· Oversee production of deliverables based on objectives, guiding principles and milestones · Ensure the consistency and quality of the work · Play an important role producing diagnostics and defining future solutions · Validate and approve deliverables produced by his business team · Document and describe the merits, benefits, costs and requirements of proposed solutions · Help identify transition impacts and requirements · Help prepare budget estimates for future phases · Actively participate in developing the implementation strategy · Identify and resolve business delivery and coordination issues
Project lead	· Develop and closely monitor his project plan in conjunction with his project control officer (PCO) · Coordinate his project activities and deliverables · Take into account and manage deliverables that are interdependent with other projects inside or outside the program · Ensure that his project progresses and provide reports to his business area representative (including the business program manager) and the program manager · Identify and resolve delivery and coordination issues · Closely monitor expenditures versus the budget · Actively participate in developing the implementation strategy
Project control officer (PCO)	· Help develop the way the project is structured and divided · Help develop project cost estimates · Help develop the project control and coding structure · Coordinate information on current project status received from stakeholders · Perform data analysis to determine project cost performance · Produce project cost-tracking reports
IT expert	· Conduct and provide feasibility analyses and requirements related to the following activities: - ü Decommissioning - ü Interfacing - ü Conversions - ü Security management · Help specify technical requirements · Work with the program team to develop budget assessments and implementation requirements · Help develop the implementation strategy

Source: *Gouvernance Programme Transfo-RH – Organigramme et détail des comités*, October 31, 2016.

5.4. Structure of the Transfo-RH Program prior to November 4, 2016

Figure A – Structure of the Transfo-RH Program prior to November 4, 2016



Source: Gouvernance Programme Transfo-RH – Organigramme et détail des comités, October 31, 2016.



Physical Penetration Tests

Summary of the Audit

Purpose

Test physical security under real conditions in order to determine whether non-authorized physical access to the city’s strategic buildings is possible.

Results

For obvious security reasons, we cannot disclose in this annual report the results of our physical penetration tests.

Note that the business units have had the opportunity to formulate their comments concerning our penetration tests results.

If required, the business units agreed to take the necessary actions to correct the deficiencies found.

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5.7. Physical Penetration Tests

1. Background

The Ville de Montréal (the city) and its controlled organizations have a great deal of essential and vital assets that are located, stored or held in various buildings and other premises.

Given the importance of these assets, they must be adequately protected in order to, first, maintain a sufficient level of protection to guarantee the safety of people and property, and second, to ensure that essential services continue to be offered for the functioning and well-being of the Montréal community.

Physical security is the first means of defence that must be put in place in order to manage the risks associated to protecting the city's assets. This is because physical penetration is one of the first ways chosen by those of malicious intent to perpetrate acts aiming to steal, damage or destroy these assets or the information they contain.

In order to control or limit access to buildings that contain protected assets (e.g., confidential information, expensive material and equipment) and to prevent fraudulent operations, efficient protection, surveillance and access control mechanisms must be put in place. With all the material and modus operandi available on the Internet, the risk of non-authorized physical access by anyone motivated enough and adequately prepared is increased. To this effect, best security practices advocate running physical penetration tests under real conditions.

We therefore decided to carry out an audit mission that includes physical penetration tests. Contrary to the process we usually follow, it was necessary that we did not send a notice to the owners of the assets targeted by our audit. This approach was used to test, under real conditions, the physical security controls in order to avoid having them be reinforced temporarily, in time for our visits.

2. Purpose and Scope of the Audit

The purpose of our audit mission was to test physical security under real conditions in order to determine whether non-authorized physical access to the city's strategic buildings was possible.

This audit mission is in keeping with our physical penetration test program, which was undertaken in 2010. This program will continue in 2017.

3. Physical Penetration Tests Results

For obvious security reasons, we cannot disclose in this annual report the results of our physical penetration tests. We should mention that, if necessary, the business units concerned have been informed of the deficiencies we have found and that they will be the object of upcoming action plans.

6

FOLLOW-UP ON RECOMMENDATIONS OF PREVIOUS YEARS

6. Follow-Up on Recommendations of Previous Years

The percentage of recommendations made by the Bureau du vérificateur général (the BVG) that have led to concrete measures is an essential indicator in ensuring that central departments and boroughs implement their recommendations.

The BVG's policy is to follow up on the recommendations in the year following their publication in the annual report. The follow-up cycle of a given year's recommendations is generally limited to a period not exceeding three years, except in very special circumstances where some recommendations are followed up for one, two or three additional years.

RESULTS OF FOLLOW-UPS TO RECOMMENDATIONS – VALUE-FOR-MONEY AND INFORMATION TECHNOLOGY AUDIT

The results of follow-ups to the recommendations made in the 2010-2015 annual reports are presented in Table 1.

**Table 1 – Results of Follow-Ups to Recommendations
Value-for-Money and Information Technology Audit
As of April 21, 2017, by Status**

Status of recommendations	No. of recommendations per year						
	2010	2011	2012	2013	2014	2015	Total
Resolved	169	180	205	154	247	164	1,119
In progress	5	20	26	23	128	101	303
Deferred	1	–	1	–	9	2	13
Not resolved	–	23	–	30	–	–	53
To be implemented ^[a]	–	–	–	–	9	63	72
Total number of recommendations made	175	223	232	207	393	330	1,560

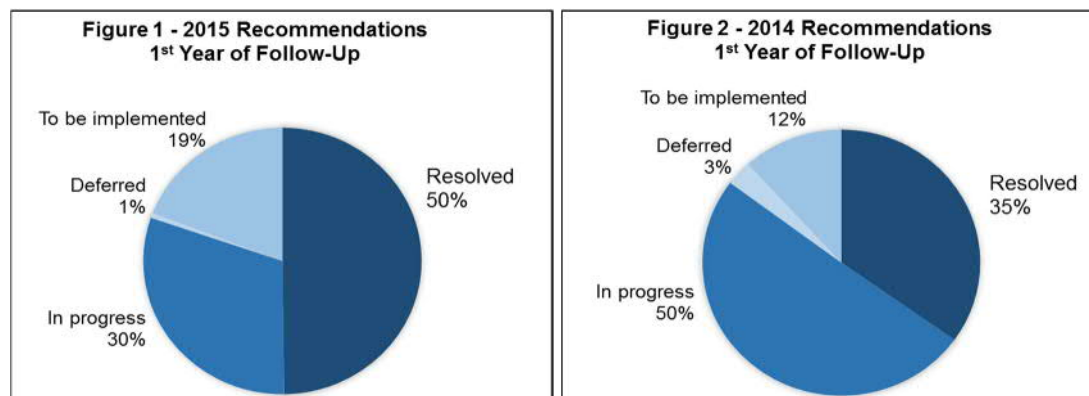
^[a] These recommendations have not been followed-up by the business units concerned.

We note that recommendations whose status is "resolved" in the first year of follow-up after their publication in the BVG's annual report represent 50% for those of 2015 (35% for those of 2014) – (see Figures 1 and 2).

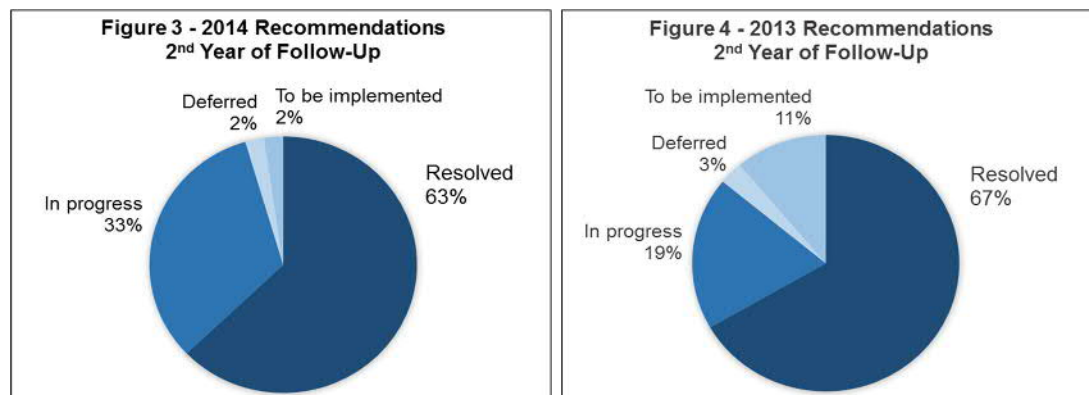
Recommendations whose status is "resolved" in the second year of follow-up after their publication represent 63% for those of 2014 (67% for those of 2013) – (see Figures 3 and 4).

Recommendations whose status is "resolved" in the third year of follow-up represent 74% for those of 2013 (79% for those of 2012) – (see Figures 5 and 6).

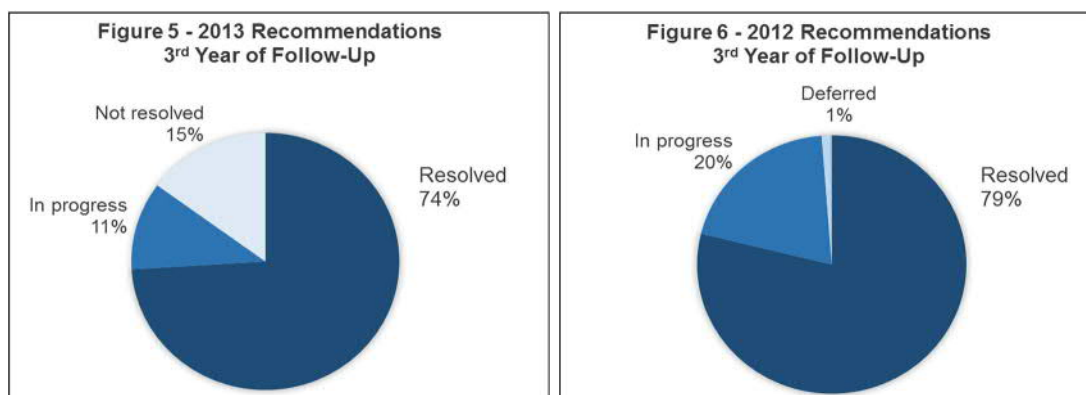
**Figures 1 and 2 – Implementation Rate of 2015 and 2014 Recommendations
Value-for-Money and Information Technology Audit
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**Figures 3 and 4 – Implementation Rate of 2014 and 2013 Recommendations
Value-for-Money and Information Technology Audit
2nd Year of Follow-Up, by Status**



**Figures 5 and 6 – Implementation Rate of 2013 and 2012 Recommendations
Value-for-Money and Information Technology Audit
3rd Year of Follow-Up, by Status**



ADDITIONAL NOTES FOR RESULTS OF RECOMMENDATION FOLLOW-UPS

The objective of our follow-up work is to ensure that business units undertake measures to implement the action plans they have provided, within the planned implementation schedule. In this context, it is expected that business units will ensure a rigorous response to the BVG's recommendations while following up on the implementation of action plans for these recommendations at the appropriate time.

According to the action plans of business units for the 2015 recommendations, the scheduled implementation times ranged from 0 to just over 36 months (43 months). We compared the scheduled implementation rate with the actual implementation rate following our first year of follow-up. The results are presented in Table 2.

**Table 2 – Implementation Rate of 2015 Recommendations
Compared to Schedules Set Out in the Action Plans**

Implementation period for recommendations	Scheduled implementation based on implementation dates set out in the action plans		Actual implementation	
	Rate	No. of recommendations	Rate	No. of recommendations
0 to 12 months	87%	289	50%	164
12 to 24 months	10%	33	N/A ^[a]	—
24 to 36 months	2%	5	N/A ^[a]	—
More than 36 months	1%	3	N/A ^[a]	—
Total for 2015	100%	330	50%	164

^[a] Implementation date not yet due, as of the date of this report.

Along the same lines, we have established the time required to implement the 2015 recommendations from the date initially scheduled in the action plans provided by the business units. Our results are presented in Table 3.

Table 3 – Implementation Deadlines for 2015 Recommendations Compared to Implementation Dates Set Out in the Action Plans As of April 21, 2017, by Status

Status of recommendations confirmed by the BVG	No. of recommendations by status Rate	Implementation date passed		Implementation date not expired or met
		No. Rate	Average timeline calculated	No. Rate
Resolved	164 50%	147 90%	196 days ^[b] (6.4 months)	17 10%
In progress	101 30%	80 79%	183 days ^[c] (6.0 months)	21 21%
Deferred	2 1%	0 0%	N/A	2 100%
To be implemented ^[a]	63 19%	47 75%	208 days ^[c] (6.8 months)	16 25%
Total number of 2015 recommendations	330 100%	274 83%	194 days (6.4 months)	56 17%

^[a] These recommendations have not been followed up by the business units concerned.

^[b] Timeline calculated from the date the business unit follows up on the recommendations ("resolved" provisional status) and the implementation date initially scheduled in the action plan.

^[c] Timeline calculated between April 21, 2017 and the implementation date originally scheduled in the action plan.

In addition, for several recommendations, our follow-up work revealed that the business units did not take sufficient steps to implement the recommendations, or were unable to demonstrate the status. We note the following:

- 90 recommendations (18%) from 2014 and 2015, or 50 from 2014 and 40 from 2015, which had been resolved in 2016 according to the business units, had to be kept "in progress" since the measures put in place by the business units did not respond to the recommendations, or the business units had not been able to demonstrate any evidence of the measures having been taken;
- 55 recommendations (8%) from 2014 and 2015, 8 from 2014 and 47 from 2015, for which the initial implementation date had passed, still have the "to be implemented" status, indicating no follow-up on them by the business units concerned.

RESULTS OF FOLLOW-UPS TO RECOMMENDATIONS – AUDIT OF FINANCIAL STATEMENTS

Results of follow-ups to recommendations made in the 2010 to 2015 reports on internal control weaknesses are presented in Table 4.

**Table 4 – Results of Follow-Ups to Recommendations
Audit of Financial Statements
As of April 21, 2017, by Status**

Status of recommendations	No. of recommendations per year						
	2010	2011	2012	2013	2014	2015	Total
Resolved	20	15	8	10	5	5	63
In progress	–	–	3	–	1	7	11
Deferred	–	–	–	–	–	–	–
Not resolved	2	2	1	–	–	–	5
To be implemented ^[a]	–	–	–	–	–	–	–
Total of recommendations made	22	17	12	10	6	12	79

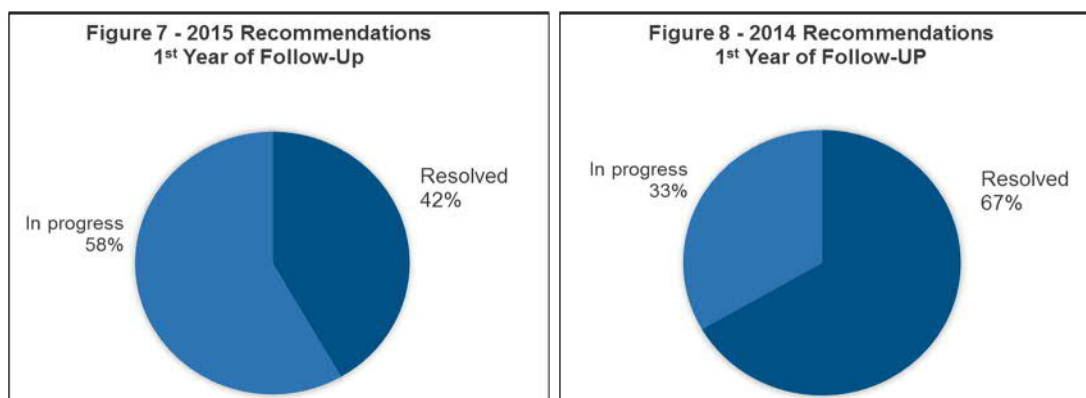
^[a] These recommendations have not been followed up by the business units concerned.

We note that recommendations whose status was "resolved" in the first year of follow-up after their publication in the report on internal control weaknesses for the Ville de Montréal audit committee represent 42% for those of 2015 (67% for those of 2014) – (see Figures 7 and 8).

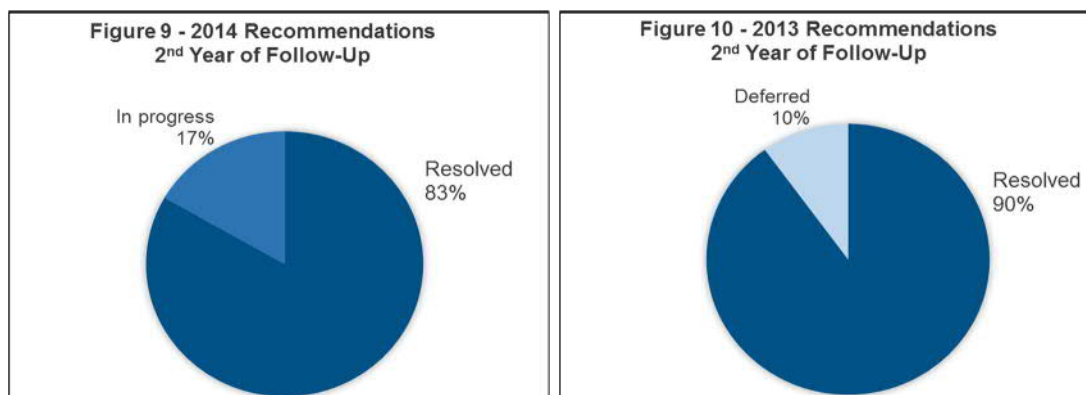
Recommendations whose status is "resolved" in the second year of follow-up after their publication represent 83% for those of 2014 (90% for those of 2013) – (see Figures 9 and 10).

Recommendations whose status is "resolved" in the third year of follow-up represent 100% for those of 2013 (67% for those of 2012) – (see Figures 11 and 12).

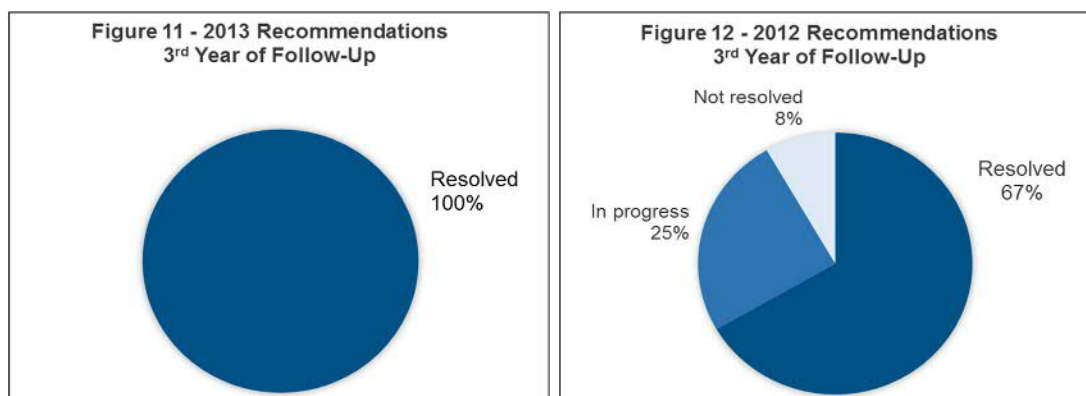
**Figures 7 and 8 – Implementation Rate of 2015 and 2014 Recommendations
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**Figures 9 and 10 – Implementation Rate of 2014 and 2013 Recommendations
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2nd Year of Follow-Up, by Status**



**Figures 11 and 12 – Implementation Rate of 2013 and 2012 Recommendations
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3rd Year of Follow-Up, by Status**



CONCLUSION

For the value-for-money and information technology audit, the implementation rate for the recommendations in the first year of follow-up improved for those of 2015, with a 50% result compared to the rate observed for those of 2014, which was 35% (see Figures 1 and 2).

Recommendations in their third year of follow-up in 2015, i.e., those from 2013, had an implementation rate of 74% (79% for those of 2014) – (see Figures 5 and 6).

Our follow-up work highlights the fact that several business units do not give adequate consideration to the recommendations addressed to them, which does not favour the implementation of the recommendations. To this end, we note that only 10% of the 2015 recommendations have been granted "resolved" status in accordance with the business plan initially provided by the business units in their action plans (see Table 3). However, it should be noted that a significant number of all the 2015 recommendations, 50%, were resolved within a 12-month period (see Table 2).

With regard to the audit of the financial statements, the implementation rate of the recommendations in the first year of follow-up deteriorated for those of 2015, with a result of 42%, compared to the rate observed for those of 2014, which was 67% (see Figures 7 and 8).

However, the 2013 recommendations in their third year of follow-up, i.e., 2015, show a result of 100% (67% for those of 2012) – (see Figures 11 and 12).

We recommend that municipal administration establish performance indicators to measure the degree of implementation of the recommendations included in the Auditor General's audit reports and do the follow-up.

OVERVIEW OF THE BUREAU DU VÉRIFICATEUR GÉNÉRAL

7.1 FINANCIAL RESULTS

7.2 NUMBER OF AUDIT REPORTS ISSUED

7.3 HUMAN RESOURCES

7. Overview of the Bureau du vérificateur général

This chapter presents the highlights of the results obtained for the year 2016 regarding the performance of the Auditor General's mandate and the utilization of resources for this purpose. More specifically, we present different indicators so the reader can appreciate the performance of the Bureau du vérificateur général (the Bureau).

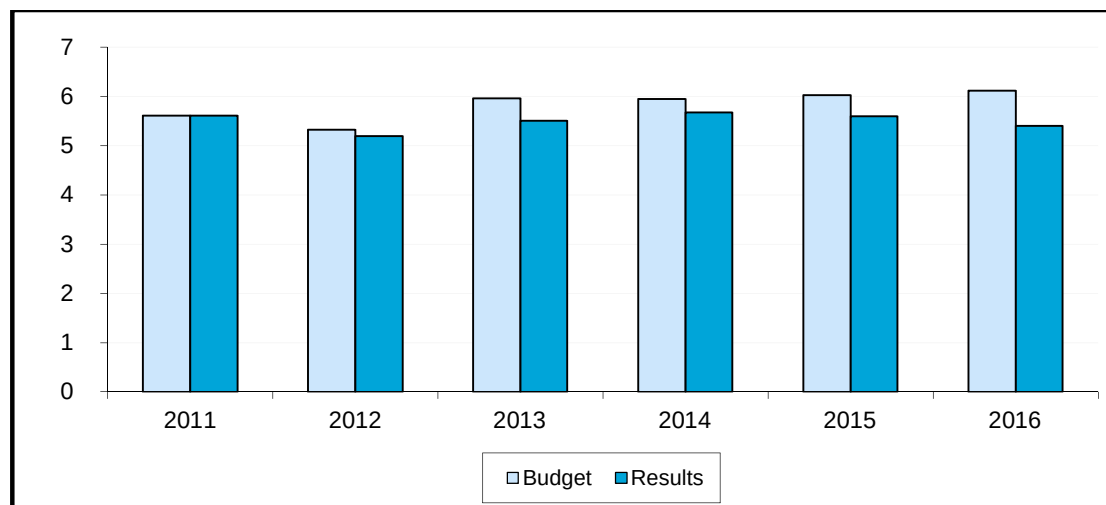
The indicators presented are:

- The financial results;
- The number of audit reports issued;
- Human resources:
 - Workforce trends and status,
 - Workforce evolution and forecasting,
 - Use of time,
 - Staff turnover rate,
 - Absenteeism rate,
 - Average number of hours and cost of training,
 - Equal access to employment.

7.1. Financial Results

For the year 2016, the Bureau's operating expenditures amounted to \$5.5 million, compared to the budget of \$6.1 million. This favourable variance is explained, in particular, by the three positions that remained vacant and the maternity leaves of three employees. Figure 1 illustrates the Bureau's financial results for the past five years.

Figure 1 – Budget and Financial Results
(in millions of dollars)



In accordance with the provisions of section 108.2.1 of the *Cities and Towns Act*, the Auditor General accounts for the year ended December 31, 2016, were audited by an independent auditor mandated by the city. The report of the independent auditor is presented in Appendix 8.2.

7.2. Number of Audit Reports Issued

Table 1 details the number of reports issued over the past few years for audits of the financial statements, regulatory compliance, as well as value for money (VM) and information technology (IT) audits.

Table 1 – Number of Audit Reports Issued from 2012 to 2016

Reference annual report	Financial statements	Compliance	VM and IT	Total number of audit reports
2012	35	1	13	49
2013	18	1	11	30
2014	19	1	12	32
2015	17	1	8	26
2016	18	2	7	27

The number of reports issued in 2016 remained essentially the same as in the previous year.

7.3. Human Resources

Human resources are the cornerstone of an organization like ours. Indeed, the Bureau's credibility and power to influence are primarily based on the expertise of its human resources.

WORKFORCE TRENDS AND STATUS

Table 2 presents the workforce trends as of December 31 of the years 2012 to 2016.

**Table 2 – Workforce Trends as of December 31
of the Years 2012 to 2016**

Year	Total employees
2012	30
2013	30
2014	28
2015	30
2016	30

The number of employees as of December 31, 2016 stood at 30 remaining stable. Following the departures of the Auditor General and an Assistant Auditor General, these two positions were filled. The new Auditor General and Assistant Auditor General took office on August 15 and December 14 respectively.

Table 3 illustrates the workforce status of the Bureau by directorate and in relation to authorized and filled positions as of December 31, 2016.

Table 3 – Workforce Status as of December 31, 2016

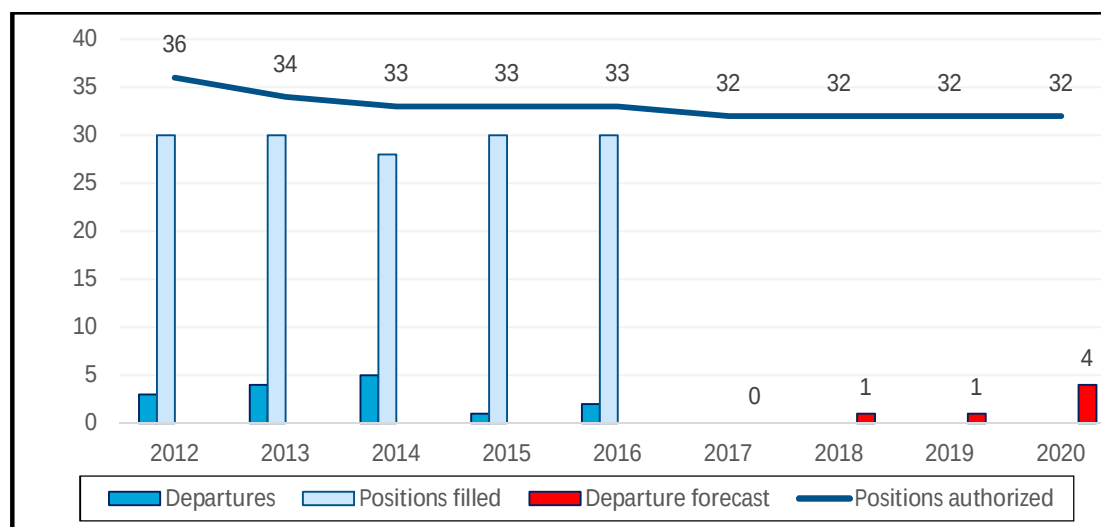
Directorates	Authorized positions	Filled positions	Positions to fill
Bureau de la vérificatrice générale	3	3	0
Certification des états financiers Ville et autres organismes	11	11	0
Optimisation des ressources et conformité réglementaire	11	8	3
Technologies de l'information, juricomptabilité et administration	8	8	0
Total	33	30	3

At year end, we had three vacant positions, all in the Direction optimisation des ressources et conformité réglementaire. Note that at the beginning of 2017, a senior auditor position in the Technologies de l'information, juricomptabilité et administration group became vacant following the transfer of an employee to the Service des technologies de l'information.

WORKFORCE EVOLUTION AND FORECASTING

The Bureau's philosophy, on the one hand, is to have an internal core of seasoned professionals, insofar as this is possible, who collectively have expertise in issues relating to the city's different spheres of professional activity, in connection with the financial audit and value for money and regulatory compliance audit, fields of action included in our mandate. On the other hand, its philosophy is to appoint external resources to meet our one-off needs for very specialized expertise or to cover workload during peak period related to audits of the financial statements of the city and the bodies under its control.

Attract and retain skilled human resources within the Bureau remains a constant challenge. Moreover, the evolution and forecasting of the Bureau's workforce, for the period from 2012 to 2020 (see Figure 2), eloquently illustrate the risk of sustainability of expertise we face.

Figure 2 – Evolution and Forecasting of the Workforce from 2012 to 2020

We find that positions were vacant at year end from 2012 to 2016. Moreover, the situation continues to be cause for concern for the next three years, since:

- Three positions were vacant as of December 31, 2016.
- Six departures are planned between now and the end of 2020, including two of the four members of the Bureau's management team.
- Results of the most recent recruitment campaigns were very disappointing, even disastrous in the value for money audit group.
- The steps taken by the previous Auditor General with the Service des ressources humaines to support the Bureau in the search for solutions to solve this thorny question of sustainability of expertise has not yet resulted in concrete strategies and measures.

This situation significantly jeopardizes the capacity to perform our mission of watchdog of municipal public finances for Montréal's elected officers and citizens, especially since the qualified personnel the Bureau needs is rare, in addition to being heavily solicited by the private sector and the other entities of the public administration.

Nonetheless, we must pursue our efforts to try to recruit people whose competencies meet our expectations, which are very high. Approaches will be made to the Service des ressources humaines and the Direction générale to evaluate possible solutions and develop an action plan accordingly in 2017.

USE OF TIME

Figures 3 and 4 present the breakdown of total hours and hours worked of the Bureau's members for the past five years. Note that the hours worked by

administrative support staff and the management members are included in the basic data of the following indicators for the first time this year.

Figure 3 – Breakdown of Total Hours

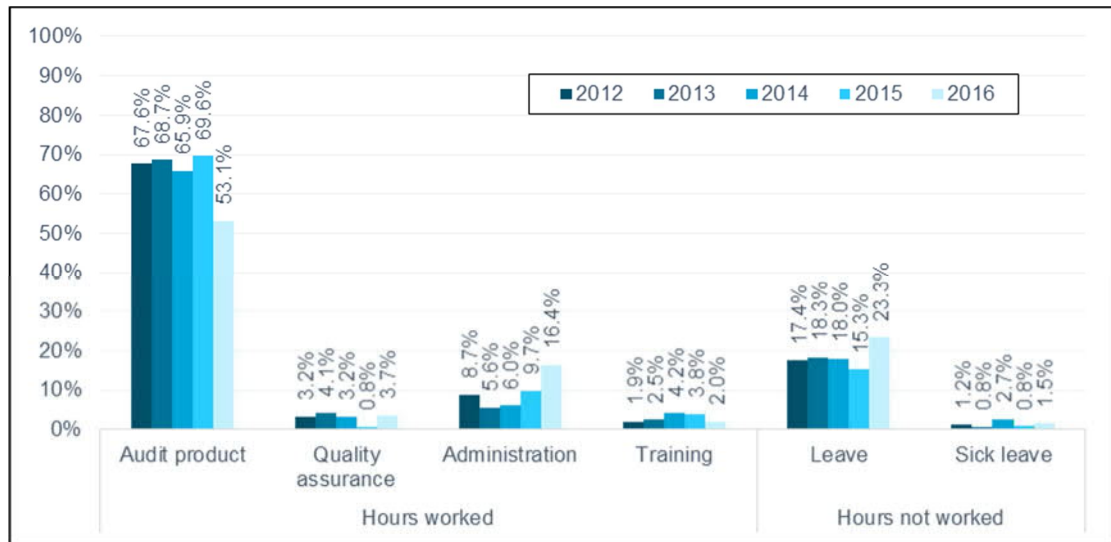
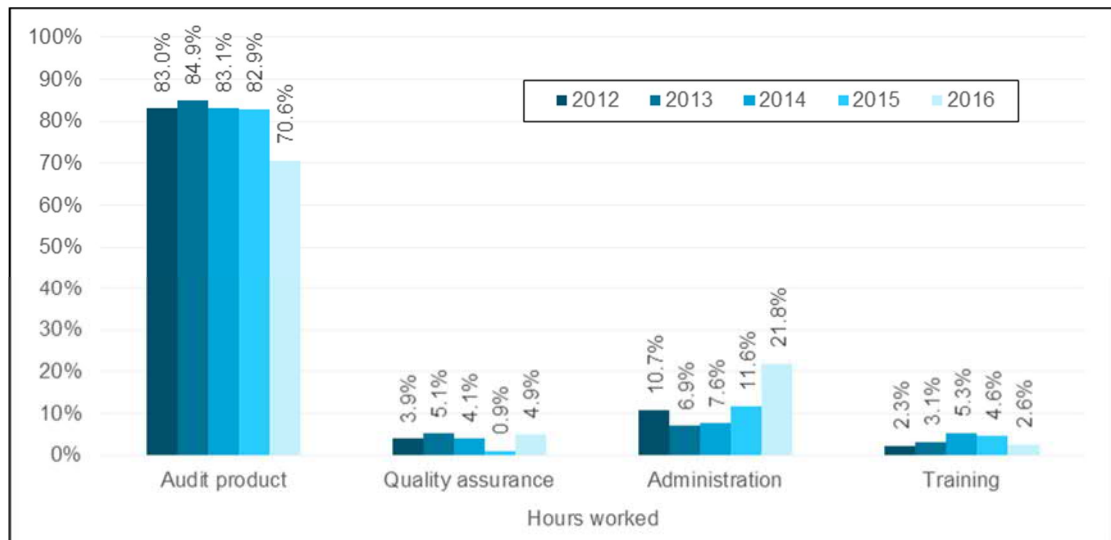


Figure 4 – Breakdown of Hours Worked, by Activity



Audit product: includes the activities of audit of the financial statements and compliance, value-for-money and information technology audits.

Quality assurance: includes the time devoted to quality control of audit engagements, both during the engagement and after the fact, which control is exercised pursuant to the standards in force.

Administration: includes general administration, meeting, financial management, human resources management, goods and services acquisition, IT support and secretarial tasks

The results presented in Figure 4 show an increase in the proportion of hours worked in administrative activities. This increase is explained by the addition this year of the hours of the administrative staff and the members of management to our basic data. These additions obviously had an inverse effect on the percentage of hours worked devoted to audit product activities. Concerning the increase in hours worked in the quality assurance category relative to the previous year, it is explained by the vacancy in the Quality Assurance and Professional Methods Officer position for a nine-month period in 2015.

Other indicators related to the use of time and the staff turnover rate are presented in Tables 4 to 6.

STAFF TURNOVER RATE

Table 4 – Staff Turnover Rate

	2012	2013	2014	2015	2016
Turnover rate	10.0%	13.3%	17.9%	3.4%	6.7%

The calculation of the staff turnover rate includes retirements, resignations and departures by transfer to another department or borough of the city. The increase in the turnover rate is explained by the departure of two employees this year, compared to only one in 2015.

ABSENTEEISM RATE

Table 5 – Absenteeism Rate

	2012	2013	2014	2015	2016
Absenteeism rate	1.2%	1.1%	2.4%	1.0%	1.5%

The absenteeism rate increased by 0.5% between 2015 and 2016. This rate has remained relatively stable over the years.

NUMBER OF HOURS AND COST OF TRAINING

Table 6 – Number of Hours and Cost of Training

	2012	2013	2014	2015	2016
Average hours of training per employee	32	46	66	62	36
Training cost to payroll ratio	2.7%	4.0%	4.9%	4.9%	3.4%

We observe a decrease in the average hours of training per employee. It declined from an average of 62 hours per employee to 36 hours. This decrease has an impact on the training cost to payroll ratio, in accordance with the *Act to promote workforce skills development and recognition*. We should note that the objective for the city as a whole is 1%.

EQUAL ACCESS TO EMPLOYMENT

Like the city, the Bureau pays special attention to questions of equal access to employment. The breakdown of the representation of target groups in the *Act respecting equal access to employment in public bodies*, as of December 31 of the past five years, is presented in Table 7.

Table 7 – Representation of Target Groups

Target group	2012	2013	2014	2015	2016
Men	53.3%	51.6%	51.8%	46.7%	43.3%
Women	46.7%	48.4%	48.2%	53.3%	56.7%

Target group	2012	2013	2014	2015	2016
Aboriginal peoples	0.0%	0.0%	0.0%	0.0%	0.0%
Visible minorities	6.7%	9.7%	11.1%	10.0%	10.0%
Ethnic minorities	3.3%	3.3%	11.1%	10.0%	6.7%
Total	10.0%	13.0%	22.2%	20.0%	16.7%

We observe that the representation of women and of visible minorities and ethnic minorities within our workforce improved considerably over this period. In particular, there are now 17 women in our workforce of 30 employees.

8

APPENDICES



8.1 APPENDIX 1
EXCERPTS FROM THE
CITIES AND TOWNS ACT

8.2 APPENDIX 2
ACCOUNTS STATEMENT OF THE
BUREAU DU VÉRIFICATEUR GÉNÉRAL

8. Appendices

8.1. Appendix 1 – Excerpts from the *Cities and Towns Act*

CQLR, chapter C-19
Updated to December 31, 2016

IV.1. — *Chief auditor*

2001, c. 25, s. 15.

Chief auditor. **107.1.** The council of every municipality having 100,000 inhabitants or more shall have an officer called the chief auditor.
2001, c. 25, s. 15.

Term. **107.2.** The chief auditor shall, by a resolution approved by a two-thirds majority of the votes of the members of the council, be appointed for a term of seven years. The term may not be renewed.
2001, c. 25, s. 15.

Ineligibility. **107.3.** In no case may the following persons act as chief auditor:
(1) a member of the council of the municipality and, where applicable, of a borough council;
(2) the associate of a member mentioned in subparagraph 1;
(3) a person who, personally or through an associate, has any direct or indirect interest in a contract with the municipality or a legal person referred to in paragraph 2 of section 107.7.

Disclosure of interest. The chief auditor shall disclose in every report produced any situation that could cause a conflict between the chief auditor's personal interest and duties of office.
2001, c. 25, s. 15.

Inability or vacancy. **107.4.** If the chief auditor is unable to act, or if the office of chief auditor is vacant, the council shall,

- (1) not later than at the sitting following the inability to act or the vacancy, designate a person qualified to replace the chief auditor, for a period of not more than 180 days;
- (2) not later than at the sitting following the inability or the vacancy, or not later than at the sitting following the expiry of the period fixed under paragraph 1, appoint a new chief auditor in accordance with section 107.2.

2001, c. 25, s. 15.

Expenses.

107.5. The budget of the municipality shall include an appropriation to provide for payment of a sum to the chief auditor to cover the expenses relating to the exercise of the chief auditor's duties.

Amount of appropriation.

Subject to the third paragraph, the appropriation must be equal to or greater than the product obtained by multiplying the total of the other appropriations provided for in the budget for operating expenses by

- (1) 0.17% where the total of those appropriations is less than \$100,000,000;
- (2) 0.16% where the total of those appropriations is at least \$100,000,000 and less than \$200,000,000;
- (3) 0.15% where the total of those appropriations is at least \$200,000,000 and less than \$400,000,000;
- (4) 0.14% where the total of those appropriations is at least \$400,000,000 and less than \$600,000,000;
- (5) 0.13% where the total of those appropriations is at least \$600,000,000 and less than \$800,000,000;
- (6) 0.12% where the total of those appropriations is at least \$800,000,000 and less than \$1,000,000,000;
- (7) 0.11% where the total of those appropriations is at least \$1,000,000,000.

Exception.

Where the budget of the municipality provides for appropriations for operating expenses related to the operation of a system of production, transmission or distribution of electric power, 50% only of those appropriations shall be taken into account in establishing the total of the appropriations referred to in the second paragraph.

2001, c. 25, s. 15; 2001, c. 68, s. 5.

Duties.

107.6. The chief auditor is responsible for the application of the municipality's policies and standards relating to the management of the human, material and financial resources assigned to auditing.

2001, c. 25, s. 15.

Duties.	107.7. The chief auditor shall audit the accounts and affairs (1) of the municipality; (2) of every legal person (a) that is part of the reporting entity defined in the municipality's financial statements; (b) of which the municipality or a mandatary of the municipality appoints more than 50% of the members of the board of directors; or (c) of which the municipality or a mandatary of the municipality holds more than 50% of the outstanding voting shares or units. 2001, c. 25, s. 15; 2010, c. 18, s. 20.
Audit.	107.8. The audit of the affairs and accounts of the municipality and of any legal person referred to in paragraph 2 of section 107.7 comprises, to the extent considered appropriate by the chief auditor, financial auditing, auditing for compliance of their operations with the Acts, regulations, policies and directives, and auditing for value-for-money.
Audit.	The audit must not call into question the merits of the policies and objectives of the municipality or legal persons referred to in paragraph 2 of section 107.7.
Documents and information.	The chief auditor in the performance of his duties is authorized (1) to examine any document concerning the affairs and accounts relating to the objects of the audit; (2) to require from any employee of the municipality or any legal person referred to in paragraph 2 of section 107.7 all information, reports and explanations the chief auditor considers necessary. 2001, c. 25, s. 15; 2001, c. 68, s. 6.
Audit.	107.9. Any legal person receiving an annual subsidy from the municipality of at least \$100,000 is required to have its financial statements audited.
Copy.	The auditor of a legal person not referred to in paragraph 2 of section 107.7 that receives an annual subsidy from the municipality of at least \$100,000 shall transmit to the chief auditor a copy of (1) the annual financial statements of the legal person; (2) the auditor's report on the statements;

- (3) any other report summarizing the auditor's findings and recommendations to the board of directors or the officers of the legal person.

Documents and information.

That auditor shall also, on the request of the chief auditor,

- (1) place at the disposal of the chief auditor any document relating to the auditor's audit and its results;
- (2) provide all information and explanations the chief auditor considers necessary concerning the auditor's audit and its results.

Additional audit.

Where the chief auditor considers that the information, explanations and documents provided by an auditor under the second paragraph are insufficient, the chief auditor may conduct such additional audit as he considers necessary.

2001, c. 25, s. 15.

Audit.

107.10. The chief auditor may conduct an audit of the accounts or documents of any person having received financial assistance from the municipality or from a legal person referred to in paragraph 2 of section 107.7, as regards the use made of such assistance.

Accounts and documents.

The municipality and the person having received the financial assistance are required to furnish to or place at the disposal of the chief auditor any accounts and documents that the chief auditor considers relevant to the performance of the chief auditor's duties.

Information.

The chief auditor is authorized to require from any officer or employee of the municipality or from any person having received financial assistance any information, reports and explanations the chief auditor considers necessary to the performance of the chief auditor's duties.

2001, c. 25, s. 15.

Audit.

107.11. The chief auditor may conduct an audit of the pension plan or pension fund of a pension committee of a municipality or a legal person referred to in paragraph 2 of section 107.7 where the committee requests the chief auditor to do so with the approval of the council.

2001, c. 25, s. 15.

Duties.	107.12. The chief auditor shall, every time the council so requests, investigate and report on any matter within the competence of the chief auditor. In no case, however, may the investigation take precedence over the primary responsibilities of the chief auditor. 2001, c. 25, s. 15.
Report.	107.13. Not later than 31 August each year, the chief auditor shall transmit to the mayor, to be filed with the council at the first regular sitting following its receipt, a report presenting the results of the audit for the fiscal year ending on the previous 31 December and indicate any fact or irregularity the chief auditor considers expedient to mention, in particular in relation to (1) control of revenue including assessment and collection; (2) control of expenditure, including authorization, and compliance with appropriations; (3) control of assets and liabilities including related authorizations; (4) accounting for operations and related statements; (5) control and safeguard of property owned or administered; (6) acquisition and utilization of resources without sufficient regard to economy or efficiency; (7) implementation of satisfactory procedures to measure and report effectiveness in cases where it is reasonable to do so.
Report.	The chief auditor may also, at any time, transmit to the mayor or the chair of the board of directors of a legal person described in paragraph 2 of section 107.7 a report of the findings and recommendations that, in the opinion of the chief auditor, warrant being brought to the attention of the council or the board of directors, as applicable, before the transmission of the chief auditor's annual report. The mayor or the chair of the board of directors must file the report with the council or board, as applicable, at the first regular sitting or meeting following its receipt.
Copy of report.	If the chief auditor transmits a report to the chair of the board of directors of a legal person described in paragraph 2 of section 107.7, the chief auditor must also transmit a copy of the report to the mayor of the municipality, to be filed with the council at the first regular sitting following its receipt. 2001, c. 25, s. 15; 2010, c. 18, s. 21.
Report.	107.14. The chief auditor shall report to the council on the audit of the financial statements of the municipality and the statement fixing the aggregate taxation rate.

Report.	In the report, which shall be transmitted to the treasurer, the chief auditor shall state, in particular, whether (1) the financial statements faithfully represent the municipality's financial position on 31 December and the results of its operations for the fiscal year ending on that date; (2) the effective aggregate taxation rate was fixed in accordance with Division III of Chapter XVIII.1 of the <i>Act respecting municipal taxation</i> (chapter F-2.1). 2001, c. 25, s. 15; 2006, c. 31, s. 16; 2010, c. 18, s. 22.
Report.	107.15. The chief auditor shall report to the boards of directors of the legal persons referred to in paragraph 2 of section 107.7 on the audit of the financial statements before the expiry of the time within which they are to produce their financial statements.
Report.	In the report, the chief auditor shall state, in particular, whether the financial statements faithfully represent their financial position and the results of their operations at the end of their fiscal year. 2001, c. 25, s. 15.
Testimony.	107.16. Notwithstanding any general law or special Act, neither the chief auditor nor the employees under the chief auditor's direction or the professionals under contract may be compelled to give testimony relating to any information obtained in the performance of their duties or to produce any document containing such information.
Immunity.	Neither the chief auditor nor the employees under the chief auditor's direction may be prosecuted by reason of any act they have done or failed to do in good faith in the performance of their duties.
Immunity.	No civil action may be instituted by reason of the publication of a report of the chief auditor prepared under this Act or of the publication in good faith of an extract or summary of such a report.
Immunity.	Except on a question of jurisdiction, no application for judicial review under the Code of Civil Procedure (chapter C-25.01) may be exercised nor any injunction granted against the chief auditor, the employees under the chief auditor's direction or the professionals under contract acting in their official capacity.
Annulment.	A judge of the Court of Appeal, on an application, may summarily annul any proceeding instituted or decision rendered contrary to the provisions of the first paragraph. 2001, c. 25, s. 15; I.N. 2016-01-01 (NCCP).

Audit committee. **107.17.** The council may establish an audit committee and determine its composition and powers.

Audit committee of the urban agglomeration of Montréal. Despite the first paragraph, in the case of the urban agglomeration of Montréal, the council must establish an audit committee composed of not more than 10 members appointed on the proposal of the mayor of the central municipality. Two of the committee members must be council members representing the reconstituted municipalities. Those two members shall take part in deliberations and votes of the committee on any matter related to an urban agglomeration power.

Opinions and information of the committee. In addition to the other powers that may be entrusted to it, the committee established in the case of the urban agglomeration of Montréal shall submit opinions to the urban agglomeration council on the requests, findings and recommendations of the chief auditor concerning the urban agglomeration. It shall also inform the chief auditor of the interests and concerns of the urban agglomeration council with respect to the audit of the accounts and affairs of the central municipality. On an invitation by the committee, the chief auditor or a person designated by the chief auditor may attend a sitting and take part in deliberations.

2001, c. 25, s. 15; 2008, c. 19, s. 11; 2009, c. 26, s. 19.

V. — External auditor

2001, c. 25, s. 16.

External auditors. **108.** The council shall appoint an external auditor for not more than three fiscal years, except in the case of a municipality with a population of 100,000 or more, where the external auditor shall be appointed for three fiscal years. At the end of the term, the external auditor shall remain in office until replaced or reappointed.

R. S. 1964, c. 193, s. 104; 1975, c. 66, s. 11; 1984, c. 38, s. 11; 1995, c. 34, s. 12; 1996, c. 27, s. 12; 1999, c. 43, s. 13; 2001, c. 25, s. 17; 2003, c. 19, s. 110, s. 250; 2005, c. 28, s. 196; 2009, c. 26, s. 109; 2016, c. 17, s. 8

Vacancy. **108.1.** If the office of the external auditor becomes vacant before the expiry of his term, the council shall fill the vacancy as soon as possible.

1984, c. 38, s. 11; 2001, c. 25, s. 18; 2003, c. 19, s. 111.

Duties.	108.2. Subject to section 108.2.1, the external auditor shall audit, for the fiscal year for which he was appointed, the financial statements, the statement fixing the aggregate taxation rate and any other document determined by the Minister of Municipal Affairs, Regions and Land Occupancy by regulation published in the <i>Gazette officielle du Québec</i>.
Report.	The auditor shall make a report of his audit to the council. He shall state in his report, in particular, whether (1) the financial statements faithfully represent the municipality's financial position on 31 December and the results of its operations for the fiscal year ending on that date; (2) the effective aggregate taxation rate was fixed in accordance with Division III of Chapter XVIII.1 of the <i>Act respecting municipal taxation</i> (chapter F-2.1). 1984, c. 38, s. 11; 1996, c. 2, s. 209; 1999, c. 43, s. 13; 2001, c. 25, s. 19; 2003, c. 19, s. 250; 2005, c. 28, s. 196; 2006, c. 31, s. 17; 2009, c. 26, s. 109.
Duties.	108.2.1. In the case of a municipality having 100,000 inhabitants or more, the external auditor shall audit, for each fiscal year for which the external auditor has been appointed, (1) the accounts relating to the chief auditor; (2) the financial statements of the municipality and any document determined by the Minister of Municipal Affairs, Regions and Land Occupancy by regulation published in the <i>Gazette officielle du Québec</i>.
Report.	The external auditor shall make a report of the audit to the council. The external auditor shall state in the report on the financial statements, in particular, whether the financial statements faithfully represent the municipality's financial position on 31 December, and the results of its operations for the fiscal year ending on that date. 2001, c. 25, s. 20; 2001, c. 68, s. 7; 2003, c. 19, s. 250; 2005, c. 28, s. 196; 2009, c. 26, s. 109.
Report to the treasurer.	108.3. The external auditor shall transmit to the treasurer the report referred to in section 108.2 or, as the case may be, the report referred to in subparagraph 2 of the first paragraph of section 108.2.1.

Report to the council.	The report referred to in subparagraph 1 of the first paragraph of section 108.2.1 shall be transmitted to the council on the date determined by the council. 1984, c. 38, s. 11; 2001, c. 25, s. 21; 2010, c. 18, s. 23.
Audits.	108.4. The council may require any other audit it considers necessary, and require a report. 1984, c. 38, s. 11.
Access to books and information.	108.4.1. The external auditor shall have access to the books, accounts, securities, documents and vouchers and may require the employees of the municipality to furnish any information and explanations necessary for the performance of the external auditor's mandate. 2001, c. 25, s. 22.
Documents.	108.4.2. The chief auditor shall place at the disposal of the external auditor all books, statements and other documents prepared or used by the chief auditor during the audit conducted under section 107.7 and that the external auditor considers necessary to carry out his mandate. 2001, c. 25, s. 22; 2005, c. 28, s. 49.
Ineligibility.	108.5. In no case may the following persons act as external auditor of the municipality; (1) a member of the council of the municipality and, where applicable, of a borough council; (2) an officer or an employee of the municipality; (3) the associate of a person mentioned in paragraph 1 or 2; (4) a person who, during the fiscal year for which the audit is carried out, has, directly or indirectly, personally or through his associate, any participation, interest or commission in or under a contract with the municipality or in respect of such a contract, or who derives any benefit from the contract, unless his connection with the contract arises from the practice of his profession. 1984, c. 38, s. 11; 1996, c. 2, s. 209; 1999, c. 40, s. 51; 2001, c. 25, s. 23.

Partnership. **108.6.** The external auditor may be an individual or a partnership. The external auditor may entrust his employees with his work but his responsibility is then the same as if he had performed all the work personally.

1984, c. 38, s. 11; 1999, c. 40, s. 51; 2001, c. 25, s. 24.

VII. — *Director general*

Status. **113.** The director general is the chief officer of the municipality.

Authority. The director general has authority over all the other officers and employees of the municipality, except the chief auditor, who reports directly to the council. With respect to an officer or employee whose duties are prescribed by law, the authority of the director general is exercised only within the framework of his duties as the administrator of human, material and financial resources of the municipality and may in no case hinder the carrying out of duties that are prescribed by law.

Suspension. The director general may suspend an officer or employee from his duties. He shall immediately make a report of the suspension to the council. The council shall decide the case of the suspended officer or employee, after inquiry.

R. S. 1964, c. 193, s. 109; 1968, c. 55, s. 5; 1983, c. 57, s. 50; 2001, c. 25, s. 27.

Accounts statement of the Bureau du vérificateur général of the Ville de Montréal

December 31, 2016

Independent Auditor's Report

To the Mayor,
the Chairman and Members of the Executive Committee,
the Members of the Council of the Ville de Montréal, and
the Members of the Agglomeration Council of the Ville de Montréal

In compliance with the provisions of section 108.2.1 of the *Cities and Towns Act* (the "Act"), we have audited the accounts of the Bureau du vérificateur général of the Ville de Montréal (the "Bureau du vérificateur général") for the year ended December 31, 2016, and a summary of significant accounting policies and other explanatory information (called afterward the "financial information"). The financial information have been prepared by management of the Bureau du vérificateur général in accordance with Canadian accounting standards for public sector under the same accounting policies listed in Note 2 of the consolidated financial statements of the Ville de Montréal.

Management's Responsibility for the Financial Information

Management of the Bureau du vérificateur général (the "management") is responsible for the preparation of the financial information in accordance with the recognition and measurement principles of Canadian accounting standards for public sector, as described in Note 2 to the consolidated financial statements of the Ville de Montréal, and for such internal control as management determines is necessary to enable the preparation of the financial information that is free from material misstatement, whether due to fraud or error.

Auditor's Responsibility

Our responsibility is to express an opinion on the financial information based on our audit. We conducted our audit in accordance with Canadian generally accepted auditing standards. Those standards require that we comply with ethical requirements and plan and perform the audit to obtain reasonable assurance about whether the financial information is free from material misstatement.

An audit involves performing procedures to obtain audit evidence about the amounts and disclosures in the financial information. The procedures selected depend on the auditor's judgment, including the assessment of the risks of material misstatement of the financial information, whether due to fraud or error. In making those risk assessments, the auditor considers internal control relevant to the entity's preparation of the financial information in order to design audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of the entity's internal control. An audit also includes evaluating the appropriateness of accounting policies used and the reasonableness of accounting estimates, if any, made by management, as well as evaluating the overall presentation of the financial information.

We believe that the audit evidence we have obtained is sufficient and appropriate to provide a basis for our audit opinion.

Opinion

In our opinion, the financial information related to the Bureau du vérificateur général for the year ended December 31, 2016, is prepared in all material respects, in accordance with the recognition and measurement principles of Canadian accounting standards for public sector, as described in Note 2 to the consolidated financial statements of the Ville de Montréal.

Deloitte LLP¹

April 28, 2017

¹ CPA auditor, CA, public accountancy permit No. A116207

Accounts statement of the Bureau du vérificateur général

Year ended December 31, 2016

(In thousands of dollars)

	2016⁽¹⁾	2016	2015
	Budget	Actual	Actual
	\$	\$	\$
Compensation of personnel	4,146	4,191	3,942
Professional, technical and administrative services	1,503	748	1,155
Other operating expenses	463	459	505
Total	6,112	5,398	5,602

⁽¹⁾ Approved budget, as modified, presented in the accounting system of the Ville de Montréal for the Bureau du vérificateur général and approved by the executive committee of the Ville de Montréal.

This accounts statement of the Bureau du vérificateur général was prepared in accordance with the recognition and measurement principles of Canadian public sector accounting standards, according to the same accounting policies described in Note 2 to the consolidated financial statements of the Ville de Montréal for the year ended December 31, 2016.

