

Bureau du
vérificateur
général

Special Report of the Auditor General of the Ville de Montréal to the City Council and to the Urban Agglomeration Council

For the Year Ended December 31, 2010

Montréal 

**SPECIAL REPORT
OF THE AUDITOR GENERAL
OF THE VILLE DE MONTRÉAL
TO THE CITY COUNCIL AND
TO THE URBAN AGGLOMERATION COUNCIL**

**For the Year
Ended December 31, 2010**

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June 17, 2011

Mr. Gérald Tremblay
Mayor of the Ville de Montréal
275 rue Notre-Dame Est
Suite 1.113
Montréal, QC H2Y 1C6

**Subject: Auditor General of the Ville de Montréal special report for the year ending on
December 31, 2010**

Dear Mr. Mayor:

In compliance with Article 107.13 of the *Cities and Town Act* (R.S.Q., chapter C-19), please find enclosed the *Special Report of the Auditor General of the Ville de Montréal to the City Council and to the Urban Agglomeration Council for the Year Ended December 31, 2010*, to be tabled at the next regular City Council meeting on June 20, 2011, and the next Urban Agglomeration Council meeting on June 22, 2011. This special report consists of two audits that could not be included in my annual report for the year 2010:

- Integrated Control System of the Montréal Metro
- Public Self-Serve Bicycle Project (BIXI).

Yours truly,



Jacques Bergeron, CA, MBA, M.Sc.
Auditor General of the Ville de Montréal

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Integrated Control System of the Montréal Metro

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1. INTRODUCTION

1.1. MONTRÉAL METRO, CONTROL CENTRE AND INTEGRATED CONTROL SYSTEM

The Montréal metro network currently consists of four metro lines running through a total of 68 stations, including 3 that were opened in Laval in 2007. The network covers a total distance of approximately 71 kilometres, and the metro lines connect at four transfer stations that allow users to go from one line to another. The Montréal metro is managed by the Société de transport de Montréal (STM).

Operations for the metro lines are centralised and run predominantly from the current control centre. The control centre is a vital element of metro network operations. It is the data gathering point where the vast majority of decisions are made for Montréal metro operations. The control centre is operated by staff that includes the head of operations, traffic controllers, communication controllers, power controllers and assistants who work together to control, coordinate and supervise metro operation activities. The control centre operates 24 hours a day and manages the movement of metro trains, power supply equipment, and communications and surveillance equipments. Overnight operations mainly concern system maintenance, which requires strict monitoring as certain areas of the network must be powered down and powered up again to ensure staff safety.

The current control centre depends on the operation and use of complex computer systems called the *integrated control system*. The control centre and the integrated control system were built and developed at the same time as the first metro line, and gradually renovated and expanded over time to respond to the growing needs and expansion of the Montréal metro network. The last major renovation to the integrated control computer systems was made in 1988 when the computers hardware ensuring monitoring of train traffic and supervision of stationary equipment were changed.

The integrated control system consists of a large number of interconnected computer systems that are fed with data through a vast array of data acquisition and processing equipments spread out across the entire network. Among other things, the integrated control system allows control centre staff to manage:

- operation equipments installed in the tunnels and stations (e.g., power supply, ventilation, movement of trains and fire detectors)
- the safety of persons and property

- signage
- terminal departure indicators
- station sonorization system

1.2. REPLACEMENT OF THE INTEGRATED CONTROL SYSTEM

In October 2000, the STM implemented a maintenance program (Réno-Systèmes) for the metro's stationary equipment holdings, which included replacing the existing integrated control system and its computer components. The objective of this program was to maintain the availability, reliability and safety of the metro's stationary equipment, including escalators, ventilation systems in tunnels and stations, alternative high voltage current supply, and rail equipment mechanical components used to propel and guide trains.

In order to successfully complete the Réno-Systèmes program, the STM also created a Bureau de projets in 2001, managed jointly by the STM and an engineering consulting firm.

Replacing the computer components was justified by their obsolescence, which presented a major problem for the STM, i.e., inability to obtain replacement parts. The existing integrated control solution no longer allowed for the expansion that was absolutely necessary to extend the metro lines. Replacing the integrated control system had become imperative: the programming languages used no longer met market standards, the computers no longer had expansion capacity, and the operating systems and software on these computers did not allow any room for developing process control systems meeting current engineering system industry standards. Data formats originating from new data acquisition equipment installed in the stations was no longer compatible with the data formats processed by the current computer components.

Moreover, in order to extend Line 2 to Laval and open the three new stations initially planned for January 2006, the STM needed to put in place a new integrated control solution that could interact with the new data acquisition equipments to be deployed in the stations.

1.3. CALL FOR TENDERS AND AWARDING OF CONTRACT

On December 19, 2002, the STM issued a public call for tenders to award a lump-sum contract for the replacement of the integrated control system located at the existing control centre. This call for tenders included the development of a computer system and replacement of the existing metro operations system used by control centre staff.

The call for tenders included the design, manufacture, delivery, installation and integration of all equipment and systems needed to replace the Montréal metro integrated control system. This included the functionalities and equipments required to extend Line 2 of the metro to Laval and the data acquisition equipments of the current network, and those to be deployed in Laval.

Technically speaking, the work related to the integrated control systems was based on the design, development and operation of three major components: the Système intégré de conduite (SIC), the Système d'acquisition de commande locale (SACL) and the Système de gestion de conditions de zones (SGCZ).

SIC ensures oversight of the metro lines, power equipments, ventilation equipment and the metro's other stationary equipments (such as escalators and surveillance cameras), as well as various overlay management functions, including the management of metro operating procedures, dissemination of information to passengers, internal communications and video surveillance.

In order to supply the components with data to monitor and control metro operations, SACL acquires data captured by a vast array of stationary equipment located across the entire network and transit equipment activity orders.

SGCZ enables operators in the control centre to view and control zone conditions throughout the entire metro system. The zone condition is the vital element that allows full control of the electrification of a zone or section of tunnel. The operator can cut traction power to the rails in a given section of rail (a zone) when necessary. For example, power to a zone can be interrupted during a staff-led emergency evacuation of passengers along the rails between stations, during a police pursuit of a criminal or a maintenance work activity.

Bids were required to include a technical proposal for software and a technical proposal for equipment. Features and performances had to correspond to the minimum requirements provided. Prices quoted in the bid had to be firm and include all direct and indirect costs built in to the contract. Planned completion for the work was set at 31 months from the date of the awarding of the contract.

The period for tenders ended in April 2003. Four firms submitted bids, with prices ranging from \$35,500,000 to \$48,200,000. The amounts indicated in this report exclude applicable taxes, except where indicated. The contract was awarded to the firm that had achieved the highest point score based on the weighting criteria established by the STM, and totalled \$36,100,000,

i.e., a maximum of \$32,819,714 and a contingency provision of \$3,281,971, equal to 10% of the value of the contract, to cover any unforeseen costs. This contract was duly approved by STM's board of directors on June 3, 2003.

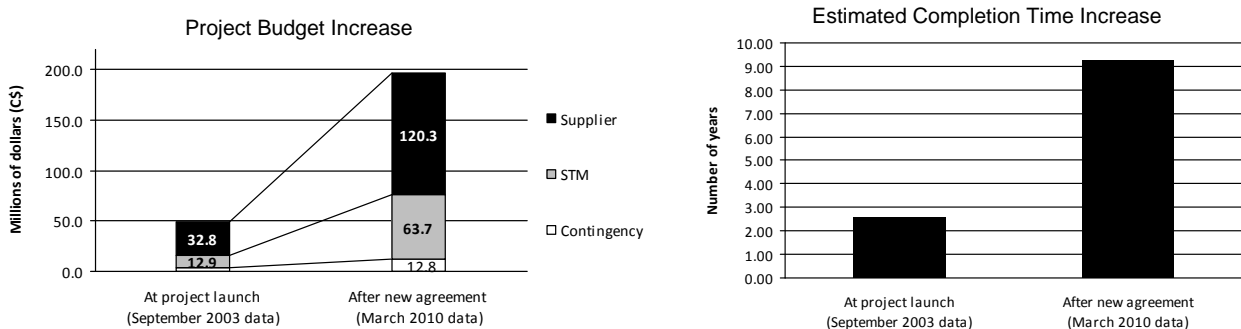
It is important to note that the supplier retained was not the engineering consulting firm involved in the Bureau de projets Réno-Systèmes program. Any mention of the supplier in this report, therefore, refers to the supplier retained through the call for tenders to replace the integrated control system and not the engineering consulting firm that works with the Bureau de projets.

Accordingly, final completion of all work to replace the integrated control system and install a new operational control centre was set for January 2006.

1.4. EXPLOSION OF COSTS AND DELAYS

Since awarding of the contract, costs and delays in completing the project have steadily increased. As of December 31, 2010, the project to replace the integrated control system is still in the development and testing stage, with the exception of the Laval branch, which uses a reduced version of the functionalities. The final cost to implement the integrated control system has now risen to almost \$200,000,000 and completion of the project has been postponed to fall 2012. Figure 1 shows the increases in the budget and time needed to complete the project since its 2003 launch.

Figure 1—Budget and Estimated Completion Time Escalation



Of the \$200,000,000 mentioned above, \$63,700,000 is budgeted and allocated specifically to the STM and represents the following costs, among others:

- knowledge transfer and system development support
- participation in tests and validation
- governance and budget monitoring

In addition, an amount estimated at \$12,800,000 is provided as a contingency in the event that new unforeseen work may be required.

To sum up, the total supplier costs budgeted at the project launch in September 2003 have quadrupled (from \$32,800,000 to \$120,300,000), STM costs have increased fivefold (from \$12,500,000 to \$63,700,000), and the contingency fund has quadrupled (from \$3,300,000 to \$12,800,000). The anticipated completion time of the project is now 3.5 times longer than initially planned.

2. AUDIT SCOPE AND LIMITS

Our audit dealt with the control and follow-up of the project to replace Montréal metro's integrated control system. We focused mainly on analyzing the project progression to replace the integrated control system, from the awarding of the contract in June 2003 to March 2010 in order to discover the main causes of the explosion of costs and delays. We also evaluated the state of the project as of December 31, 2010 to have a reasonable level of confidence that the necessary controls were in place to manage the current risks for developing and implementing an integrated control system. Our audit also analysed the degree of completion of the integrated control system project, estimated at 77.05% (according to information gleaned from the accounting opinion supporting the STM's financial statements at December 31, 2010), even though only the three new stations in Laval use the new system with reduced functionality.

The objectives of our audit can be summed up as follows:

- To determine the main causes and problems generating substantial delays and major cost overruns in the project to replace the integrated control system.
- To analyse the mechanisms in place to control costs.
- To provide a high-level assessment of the technical viability of the solution proposed by the supplier to deliver the integrated control system. This technical assessment was based on an analysis of the technical architecture documents and a review of performance tests completed in September 2010.
- To determine if the fall 2012 projected completion date is credible.
- To issue findings and make recommendations where relevant.

The project to replace the integrated control system is primarily a systems and software engineering project. Systems engineering is a discipline that deals with developing and maintaining complex systems from design to removal. These systems can be made up of various

components, e.g., mechanical, electronic, telecommunications, organizational procedures and processes and, obviously, software. Software engineering consists of *“the application of a systematic, disciplined, quantifiable approach to the development, operation and maintenance of software.”*¹

In order to meet the objectives of this audit, we used software engineering leading practices, in particular as defined in:

- SWEBOK Guide (Guide to the Software Engineering Body of Knowledge, ISO/IEC 19759) produced by the IEEE Computer Society and recognized by the ISO/IEC
- PMBOK Guide (Guide to the Project Management Body of Knowledge), produced by the Project Management Institute
- IEEE 830, 1233, 1362 international standards for systems and software requirements
- ISO/IEC 9126-1 standard: Information Technology – Software Engineering – Product Quality, Part 1: Quality Model
- IEEE 1028 standard: Software Reviews and Audits
- ISO/IEC 19761 standard: Software Engineering – COSMIC: A Functional Size Measurement Method
- ISO/IEC/IEEE 16326 standard: Systems and Software Engineering – Life Cycle Processes – Project Management

As part of our audit, we met some 30 key representatives of the integrated control system project, from various decision-making levels of the STM, the engineering consulting firm and the supplier. We conducted interviews lasting one to several hours with, among others, representatives of the governance committees, the system architect, project managers, technical and project managers, persons in charge of interfaces and various testing phases (software, integration, implementation and operation). We also met with key representatives of the Bureau de projets, i.e., budgetary and financial controls. We reviewed various analysis reports produced by external experts. In addition, we analysed an audit report produced by the Vérification générale at the STM and the documents supporting the report.

We should point out that we were unable to meet with a good many key resource people who are no longer part of the project team. Hence at the time of our audit, the vast majority of people we met had only been assigned to this project in the past three years. These people, therefore, were not involved in the start-up phase of the project or the first years of the work. We were able, nonetheless, to look at numerous documents written during this period. Moreover, the audit

¹ ISO/IEC 24765: 2011, Systems and Software Engineering Vocabulary.

required us to analyze a considerable volume of documents containing almost 5,000 files, among which we found numerous technical deliverables, presentations, minutes of meetings and a vast amount of correspondence between the STM and its supplier.

Under our mandate, we did not examine whether the call to tender process for the replacement of the integrated control system was compliant nor did we evaluate the choice of supplier retained. Neither did our audit deal with other projects that were part of the stationary equipment renovation program (Réno-Systèmes). We limited ourselves to the project to replace the integrated control system only, from the awarding of the contract on June 3, 2003 to December 31, 2010. Finally, it is important to note that cross-checking the SGCZ safety file produced by the supplier was not part of our mandate.

At the end of our audit, we presented a project report to the STM managers involved for the purposes of discussion. The final report was later sent to the chair of the STM's board of directors for preparation of an action plan and proposed completion dates for its implementation.

3. FINDINGS AND RECOMMENDATIONS

3.1. CHANGES TO THE CONTRACT

3.1.1. MAIN TERMS AND CONDITIONS OF THE CONTRACT

3.1.1.1. NATURE OF THE CONTRACT

The contract to replace the integrated control system that was awarded to the supplier on June 3, 2003 included the call for tenders documents and addenda, the bid, contract award notice, order and any other changes to the contract as defined in the general terms and conditions of the call for tenders. The parties are therefore bound by all these documents.

In this particular case, the prices in the lump-sum contract were firm and covered all the requirements stated in the call for tenders documents, including all direct and indirect costs built in to the contract. It specified that *[TRANSLATION] “no amounts whatsoever, other than those mentioned in the price schedule, would be paid by the Owner (the STM).”* In addition, it made provisions for the STM to reduce or increase the quantities of items without affecting the unit prices.

The supplier was required to provide all the qualified labour and everything needed to satisfactorily fulfill the contract (Article 8.1 of the general terms and conditions). As per the technical requirements of the contract, the supplier had full responsibility for the coordination, manufacture and installation of all materials and any changes made during completion of the work (Article 12.1 of the general terms and conditions.)

3.1.1.2. CHANGES TO THE CONTRACT AND ADDITIONAL WORK

Article 18.3 of the general terms and conditions made provisions for the STM to change the contract at any time. The supplier was to be officially informed via a notice of change outlining the nature of the change and the deadline for completion of the work. The STM could also request additional work. Article 24.1 of the specific terms and conditions stated that, if prices needed to be set for these contract changes, this could be done by mutual agreement of the parties.

3.1.1.3. WORK SCHEDULE

Under Article 3 of the specific terms and conditions, the maximum deadline for completing the work, including getting the integrated control system up and running, was 31 months from the date the contract was awarded, i.e., June 3, 2003. Completion of the work was set for January 2006. Contractual delays became a major issue, especially because the new integrated control system was needed to ensure the equipment interface of the Line 2 extension to Laval, which was scheduled to open in January 2006.

If the STM wanted to expedite completion, it could have asked the supplier to accelerate the work, as with any other contract change, and assume the costs, unless the acceleration was due to the supplier's fault or negligence (Article 18.3.5).

Article 6 of the specific terms and conditions allows the STM to postpone completion of work by a month without compensating the supplier. Beyond the one month period, any delay is subject to the contract change process and involves compensating the supplier, unless it can be shown that the latter caused the delay. In that case, the supplier would be required to provide solutions to mitigate the delays and submit a catch-up plan for lost time that would not incur additional costs for the STM.

In the event of a delay in implementing the integrated control system caused by the supplier, the supplier would have to pay the STM a cash fine for damages plus interest, calculated on the basis of the number of days of delay up to 10% of the value of the contract.

3.1.1.4. TERMINATION OF THE CONTRACT

In the event the supplier failed to meet any of the contractual terms and conditions, the STM could terminate the contract with five days advance notice, remedy the breach at its own expense or notify the guarantor (Article 18.4 of the general terms and conditions).

Article 22 of the general terms and conditions also made provisions for the STM to cancel a contract at its discretion with 30 days notice by paying the supplier for the work done, including the cost of materials, labour, general expenses and benefits calculated proportionally based on the percentage of work completed at the date of cancellation.

3.1.2. INCREASED COSTS AND DELAYS AND THE MARCH 2006 AGREEMENT

3.1.2.1. DELAYS

By December 2004, it was already apparent to the STM that completion of the work was lagging four months behind schedule. The STM pointed the situation out to the supplier and asked for a redressing plan. The main cause of the delay seems to have been the inadequate allocation of resources to the project. The supplier produced a new schedule with completion of the work moved back to July 2006. Delays continued to mount.

In January 2005, the STM sent a formal demand to the supplier to correct the situation and to put in place the resources and measures necessary to recover lost time and guarantee the delivery date. In April 2005, the supplier put new project management in place and committed to shoring up the team's rail system expertise. In spite of this, the rate of progress left little hope of meeting the delivery dates.

3.1.2.2. SUPPLIER'S CLAIMS

Believing that he was not responsible for the delays, the supplier filed claim DCC #4 in July 2005 for \$10M in compensation. The amount essentially included compensation for changes to the

delivery date and the resulting costs incurred as a result of these delays and accelerated work effort. The claim also sought to have the contractual dates and work progress reviewed.

In November 2005, the supplier revised claim DCC #4 and presented a new request to change the contract to provide for delivery of the project in two stages, i.e., getting the new integrated control system for Line 2, including the Laval stations, up and running between December 2006 and March 2007, and postponing completion of work on the other lines to August 2007. The costs associated with this solution increased the claim to \$20M.

The supplier also produced claims for various requested changes amounting to almost \$8M. These change requests were essentially for additional work required as a result of:

- the STM's failure or delay in providing several vital pieces of information about existing facilities, which led to delays in developing technical solutions.
- the definition of solutions in other TCPE projects, which generated changes to the interface hypotheses with the peripheral systems.
- the addition of interfaces between other supplies and the supplier of the integrated control system.

3.1.2.3. LITIGATION

The STM and the supplier saw things differently. A contentious environment quickly developed between the parties. Each one blamed the other for the delays and resulting cost overruns. The source of contention revolved around two main points: field surveys and interfaces.

A) Field Surveys

The field surveys contain all the stationary equipment information required to develop the integrated control system. This information was needed to determine specifications and design the integrated control system. In the case of new equipment, the data was produced by the manufacturers based on templates arranged with the suppliers. They contained, among other things:

- detailed plans of the location of the installed equipment and data acquisition points
- specifications on the data format the equipment would be receiving and transmitting
- physical dimensions of the installed equipment
- details of the stationary equipment input and output data
- operating procedures for every piece of equipment in the existing network

The STM was responsible for providing the supplier with the field surveys. However, the contract did not specify a timeframe for delivering these surveys. The supplier blamed the STM for providing the field surveys late. The STM blamed the supplier for not having reacted quickly enough and for not specifying his needs and expectations about the level of detail and format required for the input data. The STM maintained that the supplier should have advised it of the importance of obtaining field surveys at the start of the project so that the necessary adjustments could be made.

B) Interfaces

To allow for the design and development of a solution adapted to the numerous systems with which the integrated control system would need to interface, the necessary interfaces should also have been determined at the start of the project.

As per the contract, the supplier was the interface leader. The STM, however, was responsible for awarding installation subcontracts for the equipment that would interact with the integrated control system in the various sectors, in particular internal communication, telephone and radio communication, the public address system, display devices and video surveillance.

The STM blamed the supplier for not properly performing its role of interface leader. The supplier, in turn, blamed the STM for delaying its choice of subcontractors for the integrated control system. The increasing number of types of interfaces needed to develop the integrated control system was also raised as a major element of the litigation.

3.1.2.4. MARCH 2006 AGREEMENT

The STM faced an impasse. It did not want to compromise the opening of the Laval metro line. A negotiating committee was formed in November 2005 to attempt to resolve most of the claims and to review the scope and timeframe of the work. Multiple meetings were held. The shared goal of completing the project to the satisfaction of all parties finally led to an agreement in principle in December 2005, without either party admitting blame. The agreement was approved by the STM's board of directors through Resolution CA-2006-070 adopted on March 23, 2006.

The parties settled all the supplier's claims for past and future work based on the revised schedule for \$14,900,000. The new timeframe now required the integrated control system for Line 2, including the Laval stations, to be up and running by March 2007 and the other lines by August 2007.

A contract amendment was approved, revising the scope and schedule of the work. This change increased the initial cost of the contract by \$13.9M, with \$1.0M available for contingencies.

Conclusion

Given that the *Act respecting public transit authorities* (R.S.Q., c. S-30.01) requires the STM to go to public tender for all contracts of \$100,000, one wonders if this substantial increase in the cost of the contract contravened the call for tenders process or adversely affected other bids.

It should be recalled that the prices of the four bids were between \$35.5M and \$48.2M for a completion date of 31 months from the time of the awarding of the contract. The call for tenders documents also required the supplier to be compensated for any delay in delivering the integrated control system if he was not responsible. Finally, provision was made for changes to the contract during the course of the work, including additional work for which a price would be set by mutual agreement.

In this case, the largest portion of the compensation that the STM and the supplier agreed to in the March 2006 agreement in principle seems to have stemmed from delays of over 17 months in completing the contract. It is also apparent from analysing the file that there is no proof that, in reaching this agreement, the parties intended to circumvent the rules regarding the awarding of contracts. On the contrary, the agreement was the result of a contentious issue between the parties in which each one attributed responsibility for the delays and additional work to the other. The STM could probably maintain that the contract terms and conditions and circumstances allowed it to enter into such an agreement for past and future work.

Some might raise the objection, however, that changing the delivery schedules at this major stage of the project constituted a change to one of the essential conditions of the call for tenders and, consequently, the fulfillment conditions and cost of the contract. It could be maintained that the situation required the STM to terminate the contract with the existing supplier and return to a call for tenders for future work with more realistic completion conditions. In the current context, it would probably have been much more difficult to reach an agreement with the supplier for past work done. This in turn would have made it more difficult to meet the deadlines for opening the extension of the line to Laval.

We would also add that it would have been appropriate to involve the STM's claims dispute office in the negotiation process with the supplier and the assessment of options.

3.1.3. PROJECT DEVELOPMENT AND MARCH 2010 “AGREEMENT IN PRINCIPLE FOR CHANGES TO THE CONTRACT”

3.1.3.1. DEADLINE

In spite of the March 2006 agreement, by July 2006 it became apparent to the STM that there was insufficient progress to meet the deadline agreed to in December 2005. For other reasons, the question of deferring the opening of the Laval line to April 2007 also arose, along with the need to operate it from the existing control centre with minimal functionalities while awaiting the switch to the new control centre in August 2007. The date for the new integrated control system to be up and running for the other lines was postponed to January 2008.

The deadline slipped by again in summer 2006. The supplier announced that work would be completed by April 2008. Nevertheless, the Laval line opened in April 2007, but was operated provisionally through the existing control centre with reduced functions. In summer 2007, deadlines continued to be pushed back.

After the failure of switchover tests for Line 2 (Laval) in summer 2008, work delivery was again postponed to April 2009, and the operation of the integrated control system for the other lines was moved back to December 2010.

3.1.3.2. SUPPLIER’S CLAIMS

The March 2006 agreement made provisions for the supplier to request additional delays and compensation in the event of the STM’s failure to deliver input data or to complete an activity within the planned timeframe.

On the strength of this clause, the supplier issued a new compensation claim in February 2007 for \$12,400,000 based on the revised schedule. This claim was in addition to other claims for additional work totalling \$17,300,000. In summer 2007, the claim had reached \$21,400,000. The supplier essentially justified the claim by the mitigation solution developed for the opening of the three Laval stations and development difficulties encountered due to delays in the STM’s production of input data.

In the absence of convincing proof, the STM decided not to respond to the claim. In September 2007, it consulted an external law firm to evaluate its options. Based on the options presented,

the STM chose to continue the current arrangements while imposing tighter management oversight. The law firm recommended that the STM determine a strict, realistic and plausible cost estimate and timeframe for completion of the project to replace the integrated control system. As they explained:

[TRANSLATION] “Underestimating costs at the start of a project generally leads to major delays in the planned completion schedule. Acceleration measures adopted to try to meet an unrealistic deadline exacerbate the situation, leading to systemic problems. Delays will force management to accelerate the roll-out of the project, which will unleash retroactive effects that, in turn, will increase all the costs.”

In March 2008, the supplier issued a new compensation claim for \$11,700,000. The STM maintained its negotiating strategy and again ignored the request.

In October 2008, the STM commissioned an external firm of independent experts to carry out a technical audit on the implantation of control centres in the rail industry. A summary of their report found that the supplier:

- underestimated his bid and failed to appreciate the complexity of the project
- underestimated the development work involved by focusing instead on meeting contractual obligations with an off-the-shelf product being parametrized
- neglected the importance of clarifying the requirements with the STM
- failed to properly manage the risks of the project

Tests carried out on the operations of Line 2 in July 2009 remained inconclusive. The supplier threatened to terminate the contract with the STM if he was not compensated and demanded that a new business arrangement be negotiated.

Faced with this ultimatum and the serious risks of a lawsuit, the STM decided to put together a negotiating committee in October 2009 to reach a business arrangement with the supplier and to find a solution for completing the project to replace the integrated control system.

3.1.3.3. MARCH 2010 “AGREEMENT IN PRINCIPLE ON CHANGES TO THE CONTRACT”

The parties negotiated for several months and finally reached agreement in February 2010. The [TRANSLATION] “Agreement in Principle on Changes to the Contract”, (hereafter called “the Agreement”), was approved by the STM’s board of directors on March 10, 2010.

The aim of the agreement was essentially twofold: to settle the business of the supplier's compensation claims up to February 28, 2010, and to pursue the contract with the same supplier using a controlled compensation method. In this kind of contract, the supplier is paid on the basis of charges agreed to and justified under the terms of an agreement.

The Agreement also provided for the STM to terminate the contract if the performance tests scheduled for September 2010 failed to validate the system's capacity.

A lump-sum of \$84,500,000 was agreed on to cover the **full cost of the contract** from when it was awarded in June 2003 to the transition date of **February 28, 2010**. The supplier maintained he had incurred costs in the order of \$133,000,000. Following is a breakdown of the \$84,500,000:

- Cost of the initial contract in June 2003: \$36,100,000, including the contingency fund (Resolution CA-2003-120)
- Exercise of Option 1 (three additional computer workstations) in April 2005: \$61,413 (Resolution CA-2005-071)
- Compensation agreed to in March 2006: \$13,900,000 (Resolution CA-2006-070 and contract amendment)
- Exercise of Option 2 (part of the equipment for the backup control centre) in December 2006: \$637,740
- AMT commitment: \$2,800,000
- Compensation agreed to in March 2010 for the period following the 2006 agreement up to February 28, 2010: \$31,000,000 (contract amendment)

The STM estimated the following budget for the Agreement reached to **continue the project after March 1, 2010**:

- Provision of \$36,100,000 to pay the supplier using a controlled compensation method
- Contingency fund of \$7,200,000 (20% of the value of work under the controlled compensation method)
- Transfer of office space leases to the STM, valued at \$337,570

If we add the above-mentioned \$31,000,000 in compensation to this amount, the result is **\$74,600,000 plus taxes, or \$84,200,000, which represents the cost under the Agreement reached and approved by Resolution 2010-066.**

It should be noted that, during negotiations, the STM consciously excluded the possibility of a lump-sum settlement until the supplier, who was no longer able to ensure that the work would be completed and fulfilled in December 2010. The STM put little credibility in this new timeframe and feared the removal of some essential functions and finding itself in the same situation as it had been after the March 2006 agreement.

In the end, the new integrated control system with reduced functionalities is scheduled to be operational in fall 2012.

Conclusion

It was evident from the start that the Agreement in Principle to change the contract not only exponentially increased the value of the contract awarded in June 2003 but also changed the nature of that contract. While under a lump-sum contract, the supplier bears all the risks inherent in the costs to do the work, a contract using a controlled compensation method transfers these risks to the work provider. This transfer of responsibility increased pressure on the STM to perform and, to a certain extent, absolved the supplier from responsibility if the project failed. The STM thus incurred costs and work not initially foreseen.

Bidders who participate in such calls for tenders necessarily take into account the type of contract being offered when preparing their bid.

We can state that, under normal circumstances, a change of this kind during the course of a contract would not be legally permissible as it impairs the principle of fairness between bidders.

That said, this was not a normal situation.

Replacement of the integrated control system is a large-scale project whose completion is vital to the installed equipment maintenance program (Réno-Systèmes) adopted by the STM. In fall 2009, the project was completely out of control: the supplier refused to complete the work without a review of its scope and without additional compensation and threatened to sue the STM.

If the parties failed to reach agreement, the STM would have to entrust completion of the work to another supplier. At this stage of the project, after the current supplier had invested six years of work, this option was probably not desirable and threatened operational reliability.

In addition, there was the fear of far greater delays and costs if the situation were not resolved. Added to this were the risks of a legal judgment that would go against the STM and the costs of a trial in a very complex case.

During negotiations, numerous issues were discussed, such as the increasing complexity of the project, its scope, the parties' share of responsibility in delayed deadlines and availability of input data, damages sustained and mitigation measures.

In short, at least from a strictly legal standpoint, the STM had the right to enter into the March 2010 Agreement in Principle.

3.1.4. CHANGES TO THE PAYMENT CLAUSE

3.1.4.1. CLAUSE 22 OF THE CONTRACT

Article 22 of the specific terms and conditions in the call for tenders sets out the payment and billing terms of the contract. It stipulates that the amounts owed the supplier as per the contract are to be paid by the STM according to the following 10 stages of completion:

Table 1—Initial Contract Payment Terms

At acceptance of Stage 1	5% of the total amount of the awarded contract	Stage 1: Preparation (A) • Detailed completion schedule; Quality Plan
At acceptance of Stage 2	10% of the total amount of the awarded contract	Stage 2: Studies (B.1) of the integrated control system
At acceptance of Stage 3	10% of the total amount of the awarded contract	Stage 3: Studies (B.2) of the integrated control system
At acceptance of Stage 4	5% of the total amount of the awarded contract	Stage 4: Studies (B.3) of the integrated control system
At acceptance of Stage 5	5% of the total amount of the awarded contract	Stage 5: Completion (C.1) of the integrated control system
At acceptance of Stage 6	15% of the total amount of the awarded contract	Stage 6: Completion (C.2) of the integrated control system • SACL procurement begins
At acceptance of Stage 7	10% of the total amount of the awarded contract	Stage 7: Completion (C.3) of the integrated control system • SIC and SGCZ procurement; start of SACL installation
At acceptance of Stage 8	10% of the total amount of the awarded contract	Stage 8: Tests and integration (D) of the integrated control system • Integration test and in-plant validation; end of SACL installation
At acceptance of Stage 9	10% of the total amount of the awarded contract	Stage 9: Activation (E) of the integrated control system • End of SIC and SGCZ installation; on-site tests and validation
At acceptance of Stage 10	15% of the total amount of the awarded contract	Stage 10: Integrated control system introduction test • Provisional acceptance
At final handover	5% of the total amount of the awarded contract	Final acceptance

A stage was considered as having been completed when all the deliverables required at this stage were received and approved by the STM.

These provisions required, therefore, that the supplier reach a level of measurable progress in the development of the project to replace the integrated control system before being paid. This allowed the STM to ensure that it had effective control of its cash disbursements and invoice payments.

3.1.4.2. REQUEST FOR CHANGE

Having failed to meet the specified conditions for payment, the supplier was now faced with the refusal of the STM to pay his invoices. He requested, therefore, that the payment schedule be changed to relieve his financial burden.

On March 30, 2004, STM's project manager agreed to change the existing payment schedule, which was based on completion of the various stages, to one of progressive payment based on a 1,200-point work effort progress score spread out over 10 pre-defined completion stages.

Table 2 shows the breakdown of scores after the change.

Table 2—Distribution of the 1,200 Work Effort Points by Stage

STAGE	SCORE
Stage 1: Preparation (A) • Detailed completion schedule and Quality Plan	39
Stage 2: Studies (B.1) of the integrated control system	51
Stage 3: Studies (B.2) of the integrated control system	154
Stage 4: Studies (B.3) of the integrated control system	76
Stage 5: Completion (C.1) of the integrated control system	38
Stage 6: Completion (C.2) of the integrated control system • SACL procurement begins	383
Stage 7: Completion (C.3) of the integrated control system • SIC and SGCZ procurement; start of SACL installation	147
Stage 8: Tests and integration (D) of the integrated control system • Integration test and in-plant validation; end of SACL installation	192
Stage 9: Activation (E) of the integrated control system • End of SIC and SGCZ installation; on-site tests and validation	115
Stage 10: Integrated control system operations test • Provisional acceptance	4
Final acceptance	1
Total	1,200

Our audit concluded that, as of December 2004, the monthly reports produced by the supplier no longer included a progress report based on these 1,200 points. On the other hand, the invoices indicated to project's progress based on the 1,200 points.

Because this change did not incur any additional costs, it was made in the form of a simple contract change.

FINDING

We are of the opinion that this change had significant repercussions on the management of the project, even in the absence of increased costs. In fact, this change had the effect of accelerating the payment of invoices and reducing the STM's control over the progress of work and the receipt of deliverables. The difficulties of verifying invoices based on the 1,200-point work effort score also exacerbated this loss of control.

At the time the contract was awarded, those in charge of the project took pains to indicate the methods of payment in the executive summary line item "credits and budgetary charges" presented to the board of directors. In our opinion, this showed that any change in payment terms would require, at the very least, a higher level of approval than a simple contract change form.

We are of the opinion, however, that this contract change has no real impact on the conditions of the call for tenders. The principle of fairness between bidders did not, therefore, prevent the STM from going ahead and making this change.

Recommendation

We recommend that the Direction exécutive – Gestion des projets majeurs involve the Direction exécutive des affaires juridiques and the Direction exécutive – Finances et contrôle in any contract changes that could have an impact on the ability of the Société de transport de Montréal to control project costs in the event of a contentious situation with the supplier. An evaluation should be carried out to assess the potential risks associated with changing the terms and conditions of a contract.

Action Plan of the Société de Transport de Montréal

"Any changes to the terms and conditions legalizing the business relationship between a supplier and the STM must be approved by the project manager's supervisor, after consultation with the Affaires juridiques and Finances. The procedures for administering the [TRANSLATION] 'Metro

Stationary Equipment' contracts of the Bureau de projets responsible for the project to replace the integrated control system, were amended accordingly in May 2011." (Completed)

Comments of the Société de Transport de Montréal

"The recommendation regarding the administration of contracts had already arisen in the 2010 internal audit. It was deemed appropriate that all changes to the terms and conditions legalizing the business relationship between a supplier and the STM be approved by the project manager's supervisor. Provisions were also made that, when a supplier's situation or recovery plans are not adequately supported and the impact of such a situation threatens budget authorizations or operations, assistance must be systematically sought from the Affaires juridiques department and the need to set up additional committees will be reviewed within the framework of existing committees. The quality referent of the Bureau de projets has already been amended accordingly."

3.1.5. SOURCE CODES

3.1.5.1. INITIAL CONTRACT

The general and specific terms and conditions of the call for tenders documents contained several provisions regarding the supplier's obligation to deliver not only the software required to operate the control centre but also to give the STM access to the software source code. Article 7.3 of the general terms and conditions specifically stated:

[TRANSLATION] "It must also acquire all authorizations, licences and permits that may be required to permit the Owner to use, operate for an ongoing and indefinite period, maintain, repair or change, by whatever means it chooses, the software, including the use of the source code, and any other elements covered by this contract."

Section "D" of the specific terms and conditions outlined certain auxiliary obligations regarding delivery of the source codes (supplier support when changing the source code, training STM staff, retaining guarantees, and the like.)

In other words, the call for tenders documents oblige the supplier to transfer "control" of the source code for all software associated with the deliverables.

3.1.5.2. MARCH 2010 AGREEMENT IN PRINCIPLE

The March 2010 Agreement in Principle between the parties clarified the supplier's obligations by removing certain software (and their source codes) from the list of deliverables. Article 2.9.4 of the Agreement stipulated:

[TRANSLATION] "as required under the Contract, [the supplier] must transfer to the STM, no later than the date of transition, all software licences and sub-licences, including specialized software used in developing the system, their passwords and source codes, with the exception of proprietary software and products belonging to [the supplier] or a third party."

The Agreement did not specify which were the supplier's or third party's software and proprietary products but the December 15, 2010 amended contract includes appropriate details. Article 5.2 of the amended contract requires the supplier to generally agree to supply the STM with a licence *[TRANSLATION] "for the intellectual property incorporated in the deliverables so it can be used to operate and maintain the metro's integrated control system,"* thus complying with the general terms and conditions of the call for tenders. This licence necessarily targets the software excluded from the deliverables under the terms of 2.9.4. The STM would not be the owner of this software, but it would be licensed to use it for the sole purposes of operating and maintaining the metro's integrated control system. The STM would not have access to passwords, source codes and the like, except under certain specific circumstances as set out in the escrow agreement. The main parameters of this agreement were integrated into the amended contract (essentially in the event the supplier failed or defaulted in supplying the software components). The escrow agreement specified that the STM could not use the source codes for any commercial purposes.

While the STM remained the owner of other software (SGCZ, SACL and SIC), the Agreement specified that the supplier could use this software for its own purposes on other projects.

Conclusion

The STM will only have limited access to the source codes of some software. This amendment will deprive it of a certain degree of autonomy in managing the software. The STM should deal directly with the supplier, even if it eventually decides that it is more advantageous to assume responsibility for maintaining the software itself, or to confer this responsibility to a third party. While it is difficult to assess the economic impact of this contract change, it does not appear to cause any material harm to the terms of the original agreement.

More generally speaking, the Agreement clarifies the scope of the STM's rights regarding some software associated with the integrated control system. Its rights are limited to what is necessary for it to operate the integrated control system for its own purposes. The supplier will be able to exploit the software developed for the STM commercially for his own business interests. The initial contract did not contain such provisions. The parties no doubt felt that it would be useful to correct this omission.

3.2. CONTRACT FUNDING

3.2.1. BACKGROUND

The budget adopted for phases 1 and 2 of the Réno-Systèmes program was \$954,700,000. The budget initially allocated to Phase 1 (2001–2005) was \$311,100,000 and to Phase 2 (2006–2010), \$643,600,000. It should be pointed out that replacement of the integrated control system was part of Phase 1 of the program from the start. This phase was reviewed in 2007. Phase 1 became Phase 1-2A and Phase 2 became Phase 2B. The budget for Phase 1 rose to \$471,000,000 while the budget for Phase 2 fell to \$483,700,000. Consequently, the overall budgetary envelope of \$954,700,000 remained unchanged.

3.2.2. REGULATIONS FOR BORROWING AND CHANGES TO THEM

3.2.2.1. BORROWING REGULATION CA-116

On May 9, 2001, the STM's Board of Directors passed Resolution CA-2001-085, adopting [TRANSLATION] Borrowing Regulation CA-116. This regulation authorized the borrowing of \$311,090,000 to fund the first phase of the metro stationary equipment maintenance program. The regulation consisted of three articles and two appendices. Article 1 stated:

[TRANSLATION] "Article 1 – The Société is authorized to borrow, for a maximum term of 20 years, a principal amount not to exceed THREE HUNDRED AND ELEVEN MILLION NINETY THOUSAND DOLLARS (\$311,090,000), to be used exclusively for the purposes mentioned in the preamble and in appendices A and 1 attached as an integral part of this Borrowing Regulation."

Article 2 made provisions for the STM to replenish its general fund with \$8,050,600 from loans made under this regulation. And Article 3 states that the regulation entered into force in accordance with the law.

Appendix 1 consisted of a description of the work included in Phase 1, i.e., the metro's control centre and, specifically, the building in section 2a) and the **integrated control system** identified as the **control system for operating procedures (systems and software)** in section 2b), more fully defined as (i) renewal of the control systems for operating procedures, (ii) acquisition and installation of optical control panels and workstations screens, (iii) the backup centre, (iv) switching posts in the stations, and (v) other operations positions. The costs associated with the integrated control system were estimated at \$25,200,000.

Borrowing Regulation CA-116 was amended for the first time on June 12, 2002 by Regulation R-013 to modify Article 2 and increase the amount that the STM could use from its general funds. On September 4, 2002, Appendix A of Regulation CA-116 was amended to change how expenses related to the control centre building indicated above would be allocated, without affecting the total amount of the Borrowing Regulation.

On November 18, 2003, a new amendment (R-013-2) was adopted to change the scope and timeline of the various projects set out in Regulation CA-116, postponing some Phase 2 projects and moving others forward, thereby increasing the total amount of the loan to \$342,263,000. The amendment integrated the telemetry work of the integrated control system and added engineering studies in preparation for Phase 2. The cost estimate for the integrated control system thus increased to \$52,100,000.

On March 22, 2005, Regulation CA-116 was again amended by Regulation R-013-3. The scope and timeline of various projects were reviewed and some Phase 2 projects were postponed to reduce the total amount of the loan to the initial \$311,090,000. Work on the backup control centre was no longer part of Phase 1, but the estimated cost of the integrated control system was increased slightly to \$52,200,000.

3.2.2.2. BORROWING REGULATION R-058

On the same date, the STM's Board of Directors adopted [TRANSLATION] Borrowing Regulation R-058, authorizing a loan of \$643,600,000 to finance the second phase of the Réno-Systèmes program.

This regulation consisted of four articles and one appendix. Article 2 of the regulation reads, as follows:

[TRANSLATION] “Article 2 – The amount that the Société can borrow, for a maximum term of 20 years, is SIX HUNDRED AND FORTY-THREE MILLION SIX HUNDRED THOUSAND DOLLARS (\$643,600,000), to be used exclusively for the purposes of this regulation and the projects set out in Appendix A attached as an integral part of this regulation.”

The backup control centre was now planned for Phase 2 of the program. An estimate of \$7,300,000 was shown in Appendix 2 to cover this work.

3.2.3. CASH SUBSIDIES

The STM obtained financial assistance under the “Canada-Québec Infrastructure Works 2000 Program,” also called CQIW 2000, to complete Phase 1. An agreement between the STM, AMT and Ministère des Transports was signed to this effect on July 15, 2004.

Under this agreement, the STM received cash subsidies of close to \$142,000,000, i.e., \$103,137,650 from the federal government and \$38,676,625 from the AMT.

3.2.4. ALLOCATION OF CREDITS

Our examination of the resolutions adopted by the STM's Board of Governors revealed how the STM allocated the expenses associated with the contract to replace the integrated control system. These resolutions are summed up as follows:

- Resolution CA-2003-120 (June 3, 2003): Awarding of the contract to replace the integrated control system: \$36,100,000 including contingencies—charged to: Borrowing Regulation CA-116 as amended by Regulation R-013.
- Resolution CA-2005-071 (April 5, 2005): Exercise of the option in the contract to supply and install additional computer workstations in the main control centre for \$61,413, including contingencies—charged to: Borrowing Regulation CA-116 as amended.
- Resolution CA-2006-070 and contract amendment (March 23, 2006): Modification of the contract to replace the integrated control system to review the scope and timeline of the work, representing an additional amount of \$13,900,000—charged to: Borrowing Regulation R-058.
- Resolution CA-2006-278 (2006): Exercise of part of the “backup control centre” option that consists in the partial supply of computer equipment (processing servers) for the future

backup control centre for \$637,740.40, including contingencies—charged to: Borrowing Regulation R-058.

- Resolution CA-2010-066 and contract amendment (March 10, 2010): Agreement in principle on amendments to the integrated control system contract for \$74,600,000, including a lump-sum compensation of \$31,000,000, a provision of \$36,100,000 for continuation of the project under a controlled compensation method, \$337,570 to transfer the rental leases and \$7,200,000 for contingencies on work carried out under a controlled compensation method, for a total of \$84,200,000, taxes included—charged to: Borrowing Regulation R-013-3, cash subsidy portion.

Conclusion

As previously seen, Borrowing Regulation CA-116, as amended by Regulations R-013, R-013-1, R-013-2 and R-013-3, authorizes a loan of \$311,000,000 to fund work on Phase 1 of the Réno-Systèmes program, including the contract to replace the integrated control system. We also noted that Regulation R-058 authorizes a loan of \$643,600,000 for specified work on Phase 2 of the Réno-Systèmes program.

It appears that the \$13,900,000 compensation paid to the supplier through an amendment to the contract to replace the integrated control system at the time of the March 2006 agreement came out of Regulation R-058 credits intended for Phase 2 work. Some might claim that doing so was appropriate, as each phase involved work associated with the integrated control system.

We do not agree. Instead, we believe that these charges contravened the provisions of Regulation R-058. In fact, remember that Article 2 of this regulation states that the amount borrowed must be used *[TRANSLATION]* “*exclusively for the purposes of this regulation and the projects set out in Appendix A [...].*”

Careful analysis of the work described in Appendix A of this regulation does not allow for the compensation agreed upon in 2006 to be charged to it. Even admitting that any description of work in such an appendix must be brief in this type of regulation, it is difficult to ascribe to it an interpretation so broad as to include work on the integrated control system that does not appear in this appendix and that was planned and described specifically in the appendix to Borrowing Regulation CA-116 and its amendments.

In our opinion, the 2007 review of the phases (Phase 1-2A and Phase 2B), which was done after the March 2006 agreement, does not support such allocations. The interchangeability clause at

the end of Appendix A of Regulation R-058 cannot be used to justify them either, since it applies only to the expenses mentioned in that appendix.

On the other hand, we agree with charging the costs of the partial supply of computer equipment for the backup control centre to Regulation R-058. In fact, work on the backup control centre has been part of this regulation since it was adopted in March 2005.

In other respects, it is interesting to point out the recent adoption of new amendments to Regulations CA-116 and R-058 in June 2010.

One can read in the preamble to Resolution CA-2010-195, which adopted Regulations R-013-4 and R-058-1, that the Phase 1 work targeted by Regulation CA-116 was completed. As drafted and phrased, and reiterated in the preamble to Regulation R-013-4, this leads to some confusion as the contract to replace the integrated control system is not expected to be completed until fall 2012.

The new appendix to Regulation R-058-1 repeats in full all the work related to the integrated control system described in the appendix to Regulation CA-116. Regulation R-058 now provides for funding the work, the cost of which has risen to \$647,600,000. To avoid any confusion, it would have been more accurate to specify that funding of Phase 1 work through Regulation CA-116 had ended.

Amendments were also made to reduce the borrowing power of Regulation CA-116, given the use of cash subsidies of \$140,000,000.

3.3. PROJECT MANAGEMENT PROBLEMS PRIOR TO THE 2010 AGREEMENT IN PRINCIPLE

Audit Reports and Findings

Year 2004

The June 2004 audit report produced by the STM specified that the audit had been done because of delays in completing the integrated control system. The objective of this audit was to verify that the supplier's project management and completion activities were compliant with the provisions of the supplier's project quality plan (PQP).

The conclusions of this audit, carried out a year after the project initiation, pointed to major problems with project management. The conclusion noted that four requests for corrective action had been issued:

- Various processes applied to the project were not clearly defined and/or understood.
- There was no evidence of any tracking system in place to effectively manage the project.
- Quality activities had not been done for several months.
- A year after the contract had been awarded, six positions on the project team were still vacant and five team members had been replaced.

This first audit highlighted several weaknesses, including the lack of resources allocated to the project by the supplier and the lack of strict quality control and project monitoring process.

Year 2005

In September and October 2005, a second audit was done by the STM to verify once again that project management and other activities for the integrated control system complied with the standards and procedures of the project's quality plan (PQP) framework. The audit dealt this time with two sites, one located in Montréal and the other in Europe. The external site provides state-of-the-art service for developing and adapting new integrated control software, as well as support to the Montréal team. This audit report underscored the strengths and expertise of the external site, especially in the areas of quality control, staff experience and project management follow-up (e.g., the use of a balanced scorecard). The audit also noted signs of improvement at the Montréal site since the last audit of June 2004.

The conclusions of this audit, carried out more than 2½ years after the project start-up, pointed again to major problems with project management. The report concluded by noting:

[TRANSLATION] "Four requests for corrective actions were issued regarding

- *continuous improvement and corrective actions process*
- *suppliers and subcontractors management process*
- *internal staff training process*
- *documentation management process*

Considering these observations, project management and other activities should be analyzed by the project managers in order to put in place an effective corrective action plan. A response, including a firm corrective action plan, is required by November 15, 2005."

Year 2006

In September 2006, the STM asked a group of independent experts in the rail industry and implementation of control centres to audit the integrated control's software development process. This audit was to provide the STM with a reasonable level of assurance regarding the viability of the mitigation solution allowing the three new Laval stations to be operated from the new integrated control system (PL2 operations) with minimal functions.

The experts' report, issued in October 2006—or 10 months after the date initially set to put into operation the integrated control system—once again identified major weaknesses with project management in such areas as human resources, planning and quality control. The report concluded, nevertheless, that the technological foundations were present to permit the opening of the Laval stations.

Year 2007

In 2007, delays in executing the work began mounting again. The STM consulted a law firm about its options regarding the supplier. The lawyers' report again identified major weaknesses with project management.

Page 6 of their report notes:

[TRANSLATION] "The monthly reports do not meet the minimum requirements of proper project management.

For example, the monthly reports do not provide the following information: measurement of progress on work items vs. the established timeline that would allow risk areas to be identified, measurement of the compound amount, cost or delay indicators, cost or anticipated delivery date projections and variance analysis."

The report also pointed to a major knowledge gap in the technological management of the project, mentioning that there was no architect in place to oversee the system's design integrity and who had the authority required to impose compliance and arbitrate between functionality, performance, cost and timeline. One also reads in the report that the supplier possessed leading-edge skills but that these had never been allocated to the project up to the date of their 2007 report.

As mentioned above, the law firm recommended that the STM establish a firm and realistic estimate of the probable timeline and the most likely costs that would be incurred to complete the project to replace the integrated control system.

More than four years after the project start-up, major gaps still remained in the supplier's management of the project.

In spite of the lawyers' recommendations, the STM did not produce this estimate in collaboration with the supplier.

Year 2008

In October 2008, the same independent experts retained in 2006 were mandated to perform an audit. This mandate was to verify if the software development process and methodology used by the supplier were the same as those in use at the time of the first audit. The experts again pointed out weaknesses within the project management to replace the integrated control system as previously mentioned in section 3.1.3.2 of this report. They also noted that the recommendations needed to switch over Line 2, raised in their 2006 report, had not been fully implemented due to the supplier's lack of resources, both in quantity and expertise and underestimation of the work needed to clarify the input data requirements.

FINDING

Analysis of the (internal and external) audit reports and other integrated control system project supporting documentation, such as work schedules, monthly reports and progress reports, show that, prior to the March 2010 agreement, the project had run adrift in cost and timeline management. The mechanisms of both the STM and the supplier for governance and sound project management were inadequate. We noted, however, that in summer 2008, STM senior management intervened with the supplier's senior management to correct the situation. Our audit concluded that one element that would explain the project's struggles was the fact that governance and project management methods neglected the areas of systems engineering and software engineering.

3.4. MANAGEMENT PLAN FOLLOWING THE 2010 AGREEMENT IN PRINCIPLE

Following the March 2010 Agreement in Principle, a new project manager was assigned to the project. This individual implemented a series of corrective actions aimed at resolving the project's problems. The STM allotted new resources, reorganized the work and implemented a new governance framework that included steering committees to manage the project more closely and correct the problems. In April 2010, the project management carried out a detailed analysis of the extent of the work. The revised scope minimized the risk of cost overruns and missed deadlines. This new governance framework also included setting firm and clear delivery milestones, communicating when these milestones were reached to everyone involved and incorporating a formal "go/no-go" milestone to assess whether to continue with the project or not based on objective criteria.

It is important to note, however, that this revised scope included approximately 80% of the performance requirements (805 out of 1,026) stated in the initial contract awarded in 2003, without taking into account the relative effort needed to develop each of these requirements. This reduction in the scope of the work meant developing mitigation procedures to account for the functions that would be partially or totally excluded.

3.5. MANAGEMENT INDICATORS

3.5.1. BACKGROUND

Management indicators help keep managers abreast of the status and progress of the system they are steering, so that they can identify problems and make decisions accordingly. Management indicators are intended to alert managers before a situation deteriorates and ultimately reaches a point of no return. Developing and implementing indicators, therefore, is a way to help managers gauge how a project is performing and whether anticipated results are being achieved.

In the case of the integrated control system project, the main indicators used by management were ones that measured the project progress, cost performance index (CPI) and schedule performance index (SPI).

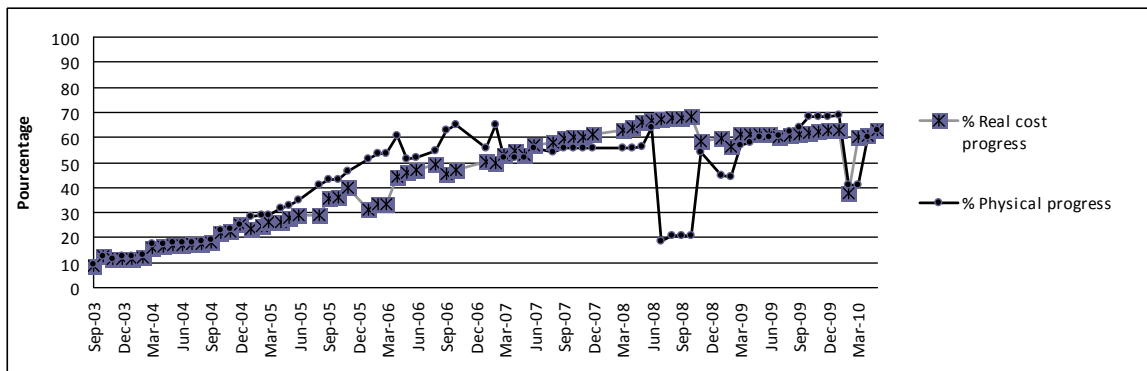
3.5.2. PROJECT PROGRESS INDICATORS AND FINDINGS

Figure 2 shows the evolution of project progress indicator values from September 2003 to May 2010. This graph was created using data provided in the “performance indicators” section of the [TRANSLATION] “Project Progress Report” (Project No. 9295201) produced monthly by the STM:

- The physical progress indicator is designed to show the percentage of project tasks completed at a given moment;
- The real cost progress indicator is calculated by dividing the project-to-date costs in a given month by the “final estimated” cost to complete the project.

In spite of meetings and the detailed analysis of numerous documents, our audit was unable to clearly establish the method and parameters used to determine that a task had been completed.

Figure 2—Project Progress Indicators



FINDINGS: PHYSICAL PROGRESS INDICATOR

Our analysis of Figure 2 led us to certain conclusions about the use of the physical progress indicator for this project:

- From April 2006 to April 2008, the value of this indicator remained at close to 60%, in spite of four years of work on the project.
- The value of this indicator plummeted from 63.9% in June 2008 to 18.8% in July 2008, whereas the scope of the project did not change.
- From July to October 2008, the value of this indicator hovered around 20% and then shot up abruptly to 54.3% in November 2008.

The physical progress indicator, therefore, provided information that was not truly representative and of little value to project managers.

FINDING: REAL COST PROGRESS INDICATORS

Our analysis of Figure 2 concluded that the sudden fluctuations in the project's real cost progress indicator were due to project budget increases in 2005, 2008 and 2010. These major changes to the denominator used to calculate the real cost progress indicator cast doubt on its credibility.

In summary, the two project progress indicators provided STM management with unreliable information about the level of progress of the integrated control system project for the period of September 2003 to May 2010.

3.5.3. COST AND SCHEDULE PERFORMANCE INDICES AND FINDINGS

The cost performance index (CPI) and the schedule performance index (SPI) are recognized management indicators that are widely used to evaluate the performance of a project based on costs and schedules:

- The cost performance index (CPI) shows the relationship between budgeted costs and real costs of work done at a given date: a higher cost performance index ($CPI > 1$) indicates that the amounts spent are below those budgeted.
- The schedule performance index (SPI) is used to determine if a project is ahead of or behind schedule: a higher schedule performance index ($DPI > 1$) indicates that the project is ahead of schedule and that more tasks have been completed than planned at a given date.

Figure 3 shows the evolution of the values of the cost and schedule performance indices for the project for the period of September 2003 to May 2010. This graph was also created from data provided in the “performance indicators” section of the [TRANSLATION] “Project Progress Report” (Project No. 9295201) produced monthly by the STM.

Figure 3—Cost and Schedule Performance Indices

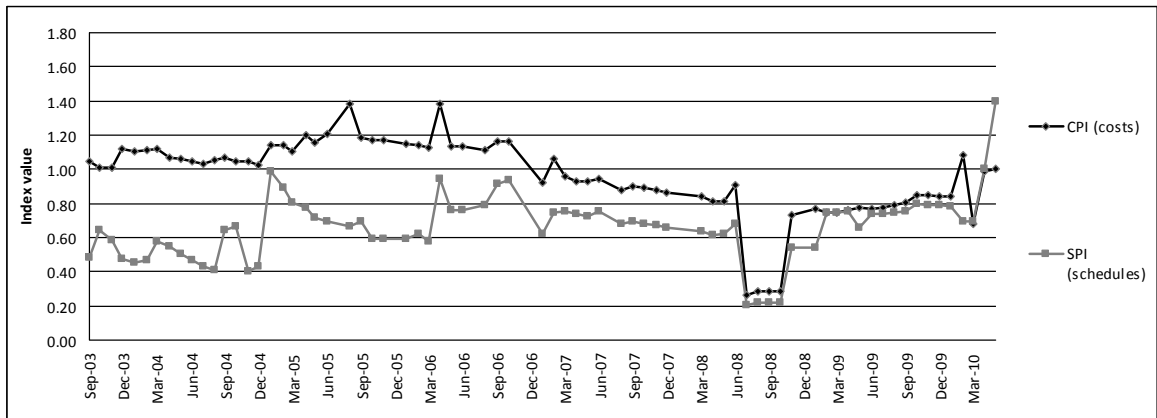


Figure 3 shows that, for the months between September 2003 and October 2006, the integrated control system project was less costly than planned, based on the evolution of the cost performance index (CPI). It is important to note, however, that planned project costs increased by approximately \$20,000,000 in January 2006. The values of this index show that the project became more costly only as of July 2007, although in reality it had been experiencing cost overruns after its first year.

FINDINGS

In Figure 3, the evolution of the schedule performance index (SPI) shows that, from September 2003 to February 2010, project planning fell behind schedule. This indicates that the corrective measures taken by the supplier and STM were ineffectual. In addition, the increase in the value of the schedule performance index from March 2010 (0.69) to May 2010 (1.40) does not appear very credible.

The performance indicators presented in this section are among the most commonly used in project management. However, based on our observations, the percentage of progress, which represents a major input to these indicators, was measured incorrectly and is not representative of the true level of project progress. This skewed the accuracy of these two indicators.

In summary, the cost and schedule performance indicators did not provide credible information that would have allowed STM managers strict monitoring and control of the integrated control system project.

Recommendation

We recommend that the Direction exécutive – Gestion des projets majeurs develop a key progress indicator adapted to systems engineering and software engineering projects, which will make it possible to do an accurate and objective assessment of the overall progress of the integrated control system.

Action Plan of the Société de Transport de Montréal

- *“A physical progress indicator based on the V cycle of software development was put in place for the project. This indicator was used to determine physical progress at December 31, 2010. Action has been taken to document the production process of the physical progress indicator and to use this indicator on a monthly basis; (**Planned completion: November 2011**)*
- *GPM [Gestion des projets majeurs] plans to retain the services of an expert consultant in the management of software engineering projects to:*
 - *report on the nature of the various software development projects being overseen by the GPM;*

- report on practices currently used in software development projects, in such areas as project management, planning, follow-up, progress measurement, management indicators, and estimates of efforts and length of activities needed to complete the projects; **(Planned completion: work plan, November 2011)**
- compare current methods with recognized industry practices and standards;
- recommend upgrading current practices, as necessary, by highlighting the cost/benefit advantages while taking into account their application to maintenance activities and the correction of glitches; and
- in the case of sophisticated indicators, propose a pilot project to implement the recommendations, measure the return on investment and decide whether or not to recommend the deployment of new practices for the projects to which they apply.”
(Planned completion: awarding of an expert contract, December 2011)

Comments of the Société de Transport de Montréal

“A recommendation aimed at putting in place relevant and coherent indicators that reflect the project’s true progress was also made during the 2010 internal audit. The Bureau de projets has already been intensifying its efforts to report systematically on the integrated control system since March 2010 to the following levels of governance:

- *Steering committee of the Réno-Systèmes project*
- *Steering committee of the project with the developer (specific to this project)*
- *Steering committee of the project with the supplier (specific to this project)*
- *Committee overseeing maintenance of assets, major projects and the environment*
- *Steering committee with the MTQ (specific to the Réno-Systèmes project)*
- *STM Board of Directors (specific to this project).*

Generally speaking, the information deals with such items as work progress, problems encountered, risks, follow-up of major milestones, follow-up of critical activities, status of the work vs. level of commitments, expenses incurred and final cost estimates vs. approved budgets.

Follow-up tools, other than those used before March 2010, were developed in the wake of the business agreement reached between the STM and its supplier. These tools are adapted to current work being done on the integrated control system project under the controlled compensation payment method. Indicators have been put in place to systematically follow up such items as the estimation of efforts to complete the project, based on a game plan approved by all parties. Other indicators are also used to measure the following elements:

- *Progress in completing the input data*
- *Follow-up of preparation of mitigation measurements*
- *Freeze on the project's scope*
- *Traceability of functionalities by software version*
- *2010–2011–2012 milestones*
- *Schedule by activity*
- *Status of glitches*
- *Progress of software specifications*
- *Report on test results*
- *Financial statement of controlled payments*
- *Procurement plan*
- *Resource plan*
- *Demobilization plan*
- *Report of mandates*
- *Mapping of risks*

Before integrating the methodology proposed in your report to measure functional size, the STM deemed it appropriate to perform a markup with the help of experts in the field. The markup will also incorporate a review of the method proposed in your audit report. It is important that the methodology that is adopted makes it easy to set significant monthly indicators. The markup will also target the indicators to be put in place for software maintenance activities.”

3.6. INITIAL AND CONTINUING MEASUREMENT OF THE SOFTWARE FUNCTIONAL SIZE

In reading various management reports and detailed project schedules for the period from 2004 to 2010, we observed that the planned completion date had been postponed several times. More specifically, work on the integrated control system, including specifications, design, programming, testing, validation and activation phases at the new control centre, were to be completed in 2006. Development and activation of the new integrated control system therefore represented approximately two-and-a-half years, i.e., 2003 to 2005. In fall 2010, our audit concluded that completion of the work on the integrated control system had now been postponed to fall 2012, representing a development and activation period of more than nine years. In addition, the overall project budget has risen from \$49,000,000 at the start of the project to almost \$200,000,000 at the time of our audit in 2010.

The initial schedule, which set out the expected completion date for development of the integrated control system, was based on opening the Laval stations in January 2006, among other things, and on the supplier's expertise. This was not supported by a measurement of the functional size of the software to be developed.

FINDING

Our audit revealed that, in spite of repeated delays in the planned date of completion of the work and multiple increases in the project budget, there was never any measurement or monitoring of the functional size of the software to be developed.

Functional size is a measurement of the quantity of functions software provides users. To make an analogy with another field, functional size is equivalent to the surface area of a building. A building with a surface area twice the size of another building provides twice the amount of living space for occupancy. Similarly, software that has twice the functional size of another software will thus provide twice the number of functions to users. International standards define surface area units of measurement. The same holds true for units of measurement of software functional size. The measurement of software functional size is done through a detailed analysis of the deliverables produced during the development cycle.

According to the supplier's report dated October 2009, the number of equipment types that were to be controlled and with which the control centre needed to interface rose from 181 in the call for tenders to 688. Measuring the functional size of the software at the start of the project and at regular intervals would have made it possible to objectively evaluate its real impact on the scope of the project, and update schedules accordingly and factor them into decision-making.

The measurement of software functional size keeps track, in an accurate and detailed way, of all the functions delivered to users by the software. When a software requirements document does not contain enough detail to measure functional size, the software engineer must analyze other documents, possible even the programming code, to be able to complete the measurement. If the functions have been inserted into the programming code without being specified in the software requirements document, the software engineer will need to measure these as well and included them in the functional size of the software.

Measuring functional size is dictated by internationally recognized standards. The process is founded on a history of use within the software development industry of more than 30 years and is supported by a broad-based community around the world. It is also supported by a software repository containing data from thousands of software development and maintenance projects (www.isbsg.org).

It is important to differentiate between the concept of project size and functional size of the software to be developed. The size of a project is determined by taking into account the effort

(person-days), costs and duration (calendar months) needed to complete the work as well as the number of people assigned to the project. Functional size (measured in number of functional size measurement units) represents the number of data movements in the functions delivered by the software to users.

Consequently, it becomes very difficult to assess the effort (person-days) and duration (calendar months) needed to complete a software development project without knowing the functional size of the software to be developed. A history of productivity data (number of hours needed to deliver a functional size measurement unit) and delivery speed (number of functional size measurement units delivered per period) is also required to establish robust estimates of effort and time.

FINDINGS

In our opinion, it was rash to request fixed price bids for the entire integrated control system based on performance estimates, since these were too abstract to allow suppliers to produce realistic bids. Functional size measurement is essential for estimating and strictly monitoring a software development project such as the integrated control system. We did not find any such measurement for the integrated control system project. This lack considerably increased the risk of not being able to monitor and strictly control future maintenance of the integrated control software.

The absence of this measurement also significantly increased the risk that management indicators being used for the integrated control system project would continue to provide data that was not very credible or valuable to decision-making.

Recommendation

We recommend that the Direction exécutive – Gestion des projets majeurs develop a measurement program for its integrated control system project in which functional size plays a key role.

Action Plan of the Société de Transport de Montréal

“The GPM plans to retain the services of an expert consultant in the management of software engineering projects to make appropriate recommendations, as stated in the action plan of the section 3.5 recommendation.”

Following a markup that will be done as part of the section 3.5 recommendation, the method retained will also be applied to maintenance activities.” (Planned completion: see the action plan in section 3.5)

Comments of the Société de Transport de Montréal

See the comments in section 3.5.

We are aware that the integrated control system project is at an advanced stage. The context in which this recommendation is made, therefore, is that: 1) the current integrated control system project is not complete; 2) subsequent phases are being planned; and 3) the integrated control system will be operational and require software maintenance for many years. Consequently, this measurement program should be immediately developed and implemented in order to accumulate the necessary history for decision-making in years to come.

Specifically, in order to build a history of productivity data (number of hours needed to deliver a functional size measurement unit) and delivery speed (number of functional size measurement units delivered per period), the measurement program must first concentrate on the components that are currently under development or soon to be developed. Secondly, it would be reasonable to focus on components that are most likely to require major changes during subsequent phases of the project or during the years of software maintenance.

This measurement program would determine the following, in particular:

- Human resources required to implement the program.
- Internal standards and procedures needed to ensure that the software engineers measure functional size in a consistent way.
- Timesheet procedures to ensure the reliability of productivity and delivery speed ratios.
- Software components to be measured in order to build a history of productivity and delivery speed. This history could later be used to estimate, monitor and control the many software deliverables that would need to be developed during subsequent phases. This history would also be used to monitor software maintenance activities.

3.7. PROGRESS OF THE PROJECT

The progress assessments that we received from the supplier and STM stakeholders in charge of the project contained major differences in the completion level of the project.

In systems and software engineering, the progress of a project is assessed on how well it meets the client's specific requirements (here called performance requirements), system requirements and software requirements at the different phases of the project (e.g., specifications, design, programming, testing and implementation). These three requirement levels are client's needs detailed in a more specific way. Performance requirements can be broken down into system requirements that, in turn, can be broken down into software requirements. In the integrated control system project, we found 1,000 performance requirements broken down into approximately 2,000 system requirements that, in turn, were broken down into approximately 3,000 software requirements. Clearly, this is a large-scale project.

In systems and software engineering, progress can be traced through the deliverables that are required to complete the various phases of the project. For example, traceability helps identify which design, programming and test deliverables were produced to meet a specific performance requirement. By way of example, traceability can track which software requirement is associated with a particular programming module. In this project, traceability links between performance requirements, system requirements and software requirements right up to programming and test deliverables are available.

FINDING

Our audit concluded that traceability links were not used to monitor the project's progress. The Bureau du vérificateur général recommended in January 2011 that the STM use traceability as the basis for calculating the progress level for 2010.

A second approach to assessing the level of progress more precisely and in a complementary way to the one mentioned above would be to base calculations on the number of software functional size units having traversed the different phases of the project. This second approach would require the development and implementation of a measurement program as described and recommended in the previous section.

FINDING

The absence of progress indicators based on traceability links and software functional size measurements increases the risk of basing decisions about project monitoring on incomplete and subjective information.

Recommendation

We recommend that the Direction exécutive – Gestion des projets majeurs evaluate the progress of the integrated control system project based on the functional size level of software delivered to date:

- **Step 1:**
 - **Establish traceability links:** this step is based on the progress made in meeting the client’s specific needs (called performance requirements in this project), system requirements and software requirements at various stages of the project.
- **Step 2:**
 - **Establish software functional size:** this step will keep track of potentially major variations in functional size from one requirement to another and also make it possible to evaluate the functional size associated with input data, which is not measurable in the software requirements.

Action Plan of the Société de Transport de Montréal

“The GPM plans to retain the services of an expert consultant in the management of software engineering projects to make appropriate recommendations, as stated in the action plan of the section 3.5 recommendation.” (Planned completion: see the action plan in section 3.5)

Comments of the Société de Transport de Montréal

See comments in section 3.5.

3.8. PROCESS TO ASSESS THE LENGTH OF ACTIVITIES AND WORK

The process in place to assess the duration (calendar months) and work (people-days) required to perform the activities involved in replacing the integrated control system were clearly shown to be inadequate in past years.

FINDINGS

In our audit ending December 31, 2010, we concluded that there was no formal process, documented and implemented, to produce estimates of the duration and work effort required to perform the activities of this project.

We also concluded that the estimates that were actually done on the duration and work effort needed were based in large part on the judgment of the stakeholders who set the estimates. These estimates were not based on quantitative models built upon reliable referents, such as histories of productivity data (number of hours needed to deliver a functional size measurement unit) and delivery speed (number of functional size measurement units delivered per period). This historical information could come from the integrated control system project itself or other similar projects.

The absence of a formal process for setting estimates based on historical productivity and delivery speed increases the risk that current and future estimates will again be shown to be erroneous. Based on this fact in particular, and on the project's history of estimate overruns, this risk is also real for the estimated completion date, now planned for fall 2012.

Recommendation

We recommend that the Direction exécutive – Gestion des projets majeurs develop and implement a strict process to estimate the work effort and duration needed to complete the tasks of the current project, correct any anomalies and for the evolution of the integrated control system through the maintenance phases.

Action Plan of the Société de Transport de Montréal

"The GPM plans to retain the services of an expert consultant in the management of software engineering projects to make appropriate recommendations, as cited in the action plan of the section 3.5 recommendation. (Planned completion: see the action plan in section 3.5)

A process to estimate timelines and efforts is already in place as part of completion of the integrated control system project. This process will first be documented then upgraded, if necessary, following the markup mentioned in the section 3.5 recommendation." (Planned completion: September 2011 [documentation])

Comments of the Société de Transport de Montréal

“Estimating timelines and efforts was a major problem even before the start of the project. However, the March 2010 integration of the supplier’s and STM’s teams, who worked in an environment free from business concerns, helped put better processes in place. The results of the project, falling as they did within the forecasts, are clearly convincing.

It is important now, as a first step, to document the current process in order to ensure its systematic application. Secondly, the markup discussed in the section 3.5 will no doubt help improve the methodology in place.”

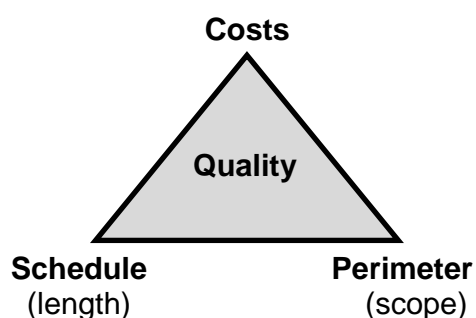
A report produced using this process would especially include the following:

- description of the stages in the estimation process
- list of all the input documents used for each activity in the estimation process
- list of persons working on the estimation process
- detailed list of software functions to be developed
- list of the historical productivity and delivery ratios used, as well as the arguments for choosing these ratios, supporting documents, including areas of uncertainty, and arguments for choosing a specific estimation value from among the areas of uncertainty

3.9. INTERNAL AND EXTERNAL QUALITY AND QUALITY IN USE

Sound project management depends on achieving the following four objectives: staying within budgeted costs, meeting schedules, delivering the functions described in the estimate and achieving an acceptable quality of deliverables. Project management that is too focused on costs and schedules runs the risk of delivering a project that does not comply with the expected software functionalities or that fails to meet quality objectives.

Figure 4—Project Management Objectives



In software engineering, the majority of software costs usually come about during the maintenance phase to correct anomalies, make improvements and account for technological changes, rather than during the initial development phase. The integrated control system will be in operation for many years. Up to now, we have dealt in length with the schedule and costs.

This section deals with another component of project management, i.e., quality assurance and control. ISO/IEC 9126-1 standard “Information Technology – Software Engineering – Product Quality, Part 1: Quality Model” defines three levels of quality: internal quality, external quality and quality in use. Internal quality ensures that interim deliverables produced at each stage of the development cycle comply with the quality criteria, standards and procedures established at the start of the project. External quality determines if the software produces the expected results in the test environment. Quality in use ensures that the software meets the users’ expectations in the real environment. The quality process put in place for a project must cover these three levels of software quality.

Software engineering also recognizes that one important way of reducing missed deadlines and cost overruns in a software development project is to implement internal quality assurance and control. A low level of internal quality generally leads to substantial delays and costs to rework faulty or incomplete deliverables, which leads to redoing work already completed during the software development cycle.

FINDING

The quality process put in place in this project was essentially based on tests and therefore covered external and operational quality. We found no evidence of systematic activities within sub-projects to ensure the internal quality of the various deliverables. Such activities could include structured and systematic peer reviews of interim deliverables, statistical and dynamic analyses of the programming code, cause-and-effect analyses of anomalies uncovered during testing and software configuration audits.

In a software development project, internal quality assurance and control of interim deliverables is all the more important when pressure is applied on the supplier and internal development team to meet deadlines and cost constraints. The lack of evidence of any systematic internal quality activities is worrisome.

This lack of any internal quality activities also represents a risk once the initial system is delivered. It increases the likelihood of having to invest heavily in time, effort and costs to correct anomalies and change and add new functions in future years. The system's reliability, the ability to make changes to it and, hence, its sustainability are therefore at risk. This lack of evidence of systematic internal quality activities increases the STM's reliance on the current supplier once the system is up and running.

Recommendation

We recommend that the Direction exécutive – Gestion des projets majeurs ensure that the provisions outlined in the Project Quality Plan (PQP) regarding internal quality are more explicit about the methods, techniques and tools to be used, their frequency of application and the scope of the artefacts governed by these provisions. In addition, these provisions should be strictly applied in order to mitigate the risks resulting from a lack of internal quality of deliverables in both the current project and in future software maintenance.

Action Plan of the Société de Transport de Montréal

“The Project Quality Plan (PQP) for the project to replace the integrated control system will be updated to clarify the internal quality methods, techniques and management tools used, as well as their frequency of application as part of the integrated control system project. Updates to these provisions will be applied to the quality assurance activities of the integrated control system project.” (Planned completion: October 2011)

3.10. INPUT DATA

In the course of our audit, we noted that a major cause mentioned for delays in delivering the software for the replacement of the integrated control system was the large amount of “input data.”

In spite of the fact that the term *input data* appears in a large number of documents produced throughout this project, it is not clearly understood, i.e., not interpreted in the same way by the key stakeholders that we met with as part of our audit.

Our audit of the project to replace the integrated control system shows that one possible definition of *input data* might group together the following elements:

- specifications of the stationary equipment linked to the integrated control system, including data acquisition points
- details about input and output (binary and analog) signals
- descriptions of all integrated control interfaces with external suppliers' equipment and systems with which it must communicate
- descriptions of all integrated control interfaces with the STM's computer systems with which it must communicate
- description of all integrated control operating procedures

FINDINGS

Our audit of how the concept of input data is understood gave us better insight into the problem and led to the following findings:

- **In the years prior to the awarding of the integrated control system contract, STM ground surveys were not thoroughly updated by the various departments, suppliers and stakeholders who replaced, repaired or retrofitted the equipment that interfaced with the integrated control system. These retrofits should have been strictly monitored by the STM.**
- **Different tools are currently used to specify, manage and operate input data.**
- **There is still no central data dictionary to serve as a unique and controlled reference source for the many and varied definitions of *input data*.**

These weaknesses increase the risk that the STM will be unable to maintain, improve or add new functions to the integrated control system at reasonable cost and effort. If left uncorrected, these weaknesses could one day threaten the useful life of the new integrated control system.

Recommendation

We recommend that the Direction exécutive – Gestion des projets majeurs:

- **implement a rigorous process to ensure that the Société de transport de Montréal always has up-to-date input data ground surveys. Agreements between the STM and its contractors should include updating ground surveys in all situations in which the**

equipment that interfaces with the integrated control system is replaced, repaired or retrofitted. These updates should be subject to periodic and rigorous monitoring.

- create and rigorously update a central data dictionary bringing together all input data. This data dictionary should be maintained by a very restricted number of data administrators.

Action Plan of the Société de Transport de Montréal

“Controlling input data is done by controlling the interfaces and scope of the integrated control system project.

In the case of controlling the scope, the project team already has a documented process in place since January 2011 to handle each of the requests for changes to the project. Forms and a register, as well as roles and responsibilities, are well defined. The project’s steering committee reviews all requests for changes.

*There is also another [TRANSLATION] ‘TRCP engineering requests management’ committee in place at the STM. This committee also has a well documented process and is targeted to take over the management of the scope of the project from the project steering committee once it is completed in 2012. **(Planned completion: September 2012)***

*In terms of controlling input data from STM’s contractors, a standardized template of interfaces will be updated to account for constraints linked to the capacity and parameters of the integrated control system once it is operational. This will allow for maintenance of the collection of input data and avoid the need to program new classes of equipment into the system. **(Planned completion: November 2011)***

Since September 2010, all input data for the integrated control system have been frozen and are adequately logged using tools such as equipment databases, input data templates, exchange tables, ground surveys, and functional description files. This referent will be maintained and updated until December 2014.

The STM plans to acquire a centralized input data management tool, especially for the integrated control system, with access limited to the team in charge of controlling the configuration. This tool will interface with existing databases and integrate all the relevant data of the integrated control system, equipment and systems that interface with it. This tool will also make it possible

to keep a history of changes and modifications to input data and will replace the tools put in place by the project managers.” (**Planned completion: December 2014**)

3.11. SAFETY

According to CENELEC standards, safety is defined as [TRANSLATION] “the ability of a product to perform one or more specified tasks under given conditions.” This feature is required of systems designated as critical, in which a faulty operation or an operational failure could result in major physical or monetary losses or injuries, i.e., loss of life. In the rail industry, standards define various safety levels, as well the means by which they are to be implemented when developing and operating these systems.

Based on our meetings and the support documents that we received, the only subsystem of the integrated control system to have operational safety requirements is the zone conditions management system (SGCZ). According to the call for tenders, the SGCZ must have a safety integrity level (SIL) of 3. According to the SGCZ safety file that we received, the supplier developed this system [TRANSLATION] “in compliance with the CEI 61508, EN 50126, EN 50128 and EN 50129 referent standards.” This same file details all the mechanisms put in place to develop the SGCZ to ensure that it meets safety requirements. However, crosschecking the SGCZ safety file prepared by the supplier was not part of this audit.

FINDING

In the course of our audit, we were unable to obtain any documented analysis establishing the fact that the SGCZ was the only integrated control subsystem requiring a level of safety based on rail industry standards. The absence of such an analysis increases the risk that rail industry safety standards for the integrated control system are not being met, given:

- **changes and adjustments made to the integrated control system since the awarding of the contract in 2003;**
- **the important role of subsystems other than the SGCZ in ensuring the safety of persons and goods (e.g., coordinating a speedy evacuation).**

Recommendation

We recommend that the Direction exécutive – Gestion des projets majeurs carry out an independent assessment of the safety of the entire integrated control system to certify that the only component of the integrated control system that requires specific operational safety provisions is the SCGZ. In the event that functions requiring a safety level are identified in a component other than the SCGZ, appropriate measures should be taken.

Action Plan of the Société de Transport de Montréal

“The safety of the metro’s operations depends on several factors that are largely outside the framework of the integrated control software. In order to take stock of the situation, the STM plans to:

- *document all the elements in place that ensure the safe operations of the metro network; (Planned completion: December 2011)*
- *document how the integrated control system’s various functions integrate with the elements in place to ensure the safe operation of the metro network; and (Planned completion: December 2011)*
- *have all safety operations evaluated by an internationally recognized independent expert, chosen by the STM. This expert will be mandated to certify that the SGCZ is, in fact, the only component of the system as part of the project to replace the integrated control system that requires specific provisions regarding software functional reliability, and make appropriate recommendations if this is not the case.” (Planned completion: February 2012)*

Comments of the Société de Transport de Montréal

“The reliability of metro system operations is highly systemic. It depends, in particular, on:

- *all the technologies deployed across the entire system, each having its own intrinsic safety characteristics (e.g. train controls, automatically controlled fans);*
- *the redundancy of a certain number of systems (electrical power, ASSC, servers, internal communication);*
- *the configuration and implementation of systems and equipment surrounding limited zones, the impact of a failure;*
- *the operating practices and procedures that make it possible, in the event of an incident, to return the system to a safer condition, such as halting operations and evacuating passengers;*

- *staff qualifications;*
- *the maintenance of employees' skills; and*
- *the integration of emergency services into the process and, to some extent, into operations (communication links).*

Each of these elements, taken separately, is controlled and well documented. The STM recognizes, however, that systemic elements as a whole are not cross-referenced when it comes to operational safety. We propose, therefore, to remedy the situation and to call on an international independent expert to assess how this can be done.”

3.12. SOLUTION PERFORMANCE AND VIABILITY TESTS

The March 2010 Agreement in Principle was conditional upon the success of performance tests. These tests were to be completed and conclusive no later than September 15, 2010.

A series of tests and simulations were done between June and September 2010 to show that the system was ready to meet the load levels required for the 2012 switchover. Details of the performance and load requirements that needed to be supported by the new solution were described in the appendices of the March 2010 agreement.

To ensure a reasonable level of confidence in the validity of the supplier's test and simulation results, the STM hired a group of specialists to review and analyse the test results. To arrive at a diagnosis as to whether the performance objectives had been reached and areas needing improvement had been identified, the group of experts worked with STM project managers to develop an evaluation framework divided into 15 records.

Whereas the performance tests were carried out with eight trains on a full run on the longest metro line, Line 2 (the orange line), we noted during our audit that:

- these performance tests were essentially aimed at retesting those functions in which 1,000 anomalies had been detected in the summer of 2009;
- the performance tests covered no more than 40% of the functions of the integrated control system.

Consequently, these performance tests were not intended to test all the integrated control system's critical functions.

In one record of the evaluation framework developed jointly by the STM and the group of experts, the September 2010 performance tests were required to meet the following thresholds:

- no blocking conditions
- fewer than 150 major anomalies
- fewer than 350 minor anomalies

Performance tests were conclusive for this anomaly record. More specifically, the range of results for each of the categories was: 0 fatal error, 68 major anomalies and 134 minor anomalies.

The experts noted, however, several reservations about the six other performance records. Based on our discussions, a review of this analysis carried out by these same experts in December 2010 established that these reservations could be lifted, since corrective measures had been accepted and implemented.

The experts' opinions were explicit about the fact that these tests were credible and sufficient to recommend to the STM to continue software development with the same supplier. The following conclusion can be found on page 4 of the experts' report: *[TRANSLATION] "it appears to us that the system as deployed for this phase of the demonstration is structurally mature and contains no weakness that would compromise the achievement of the targeted situation."*

We concluded that the approach used in conducting the performance tests, and the supporting documents that we analyzed, corroborated the experts' conclusion.

FINDING

Given the targeted objectives of the performance tests done in September 2010, and the known coverage limitations of the integrated control system's critical functions, one needs to be cautious about the level of confidence placed in the viability of the system under development, as demonstrated by performance tests.

Recommendation

We recommend that the Direction exécutive – Gestion des projets majeurs ensure that coverage of the system's critical functions be identified and included in the criteria for determining the success of a testing phase and of the operations of the integrated control's subsystems on the various metro lines.

Action Plan of the Société de Transport de Montréal

“The system’s critical functions are already known and systematically tested. They form an integral part of the decision-making criteria regarding the success of a testing phase and decisions to start up the integrated control’s subsystems. The process for managing critical functions will be formalized and the critical functions will be clearly identified in the project documents.” (Planned completion: October 2011)

Comments of the Société de Transport de Montréal

“The critical operating functions are well known and are already tested systematically. The operator is very aware of this and requires that all tests be validated before taking control of the system and operating it with passengers. The operator personally collaborates in preparing the tests’ content and delegates a certain number of representatives to conduct these tests.

However, the formal process of specifically taking charge of the critical functions will be formalized and documented in the project’s referent.”

4. GENERAL COMMENTS OF THE SOCIÉTÉ DE TRANSPORT DE MONTRÉAL

The STM has carefully noted the recommendations stemming from the audit of the integrated control system carried out between July 2010 and May 2011. The recommendations of the Bureau du vérificateur général of the Ville de Montréal rest on a set of findings about activities of the project to replace the integrated control system of the metro, which began in 2003. These recommendations have been well received, especially since they corroborate similar findings of an internal audit carried out on the same subject in 2010.

The integrated control system is a very complex system that integrates several of the metro’s old and new technologies. This system is connected to more than 140,000 interface points (electrical power, signalling, and others) that ensure that the metro runs smoothly. This project will enable the STM to carry out an essential technological update, equip itself with expansion capability and improve the efficiency of the metro operations.

In the wake of problems encountered, a recovery plan was implemented in March 2010. This plan has proven to be an appropriate one since the project is currently proceeding satisfactorily: conclusive tests have been carried out overnight on all the network’s lines and during operations on Lines 2 and 4; progressive switchovers of operations to the new system will begin at the end

of the month and be completed in 2012; the work schedule and budget adopted in 2010 are being met. Stages completed to date and cost estimates to finish the project put the final cost at \$188.6M, which is lower than the approved budget of \$196.8M (before taxes).

The adoption of an ambitious schedule in 2003 and underestimation of the complexity of the project by all stakeholders largely explain the overruns in the budget and work schedule originally adopted. It should be reminded that, at that time, the opening of the metro extension to Laval was mainly conditional on the schedule, since the control centre's current systems could not be extended to take on this extension. The main software systems, dating from 1988, had largely exceeded their useful life. It was essential for the STM to replace them. Given the complexity of this vast system, the budget adopted in 2010 corresponds more closely to the value of the project. Certification of the STM's financial statements for 2010 by external accountants attests to the revised cost of the project.

The recognition in your report of the legality of the business agreement reached between the STM and its supplier corroborates the opinion of our lawyers. Today we are able to measure the tangible results made possible by this agreement. Moreover the indicators put in place since the integration of the STM's and supplier's teams have helped to communicate the status of the project to all levels of governance. Some of these changes were noted in your report. We recognize, however, that putting in place an integrated indicator that applies to the entire life of the system would definitely have added value.

Executing such a project was never without its risks. While we are currently confident of the final results, prudence dictates that we sustain and strengthen our oversight. International experts have been called on periodically to confirm that the project is unfolding properly and to make appropriate recommendations, when necessary.

The safety of metro operations has always been central to our operational concerns. The metro system is entirely underground and is characterized, in particular, by a highly technological environment. The STM updates its operational safety and security plan to comply with the requirements of Transport Canada and the APTA (American Public Transportation Association). In addition, the STM opens itself up voluntarily to system audits, including safety audits, conducted every three years by the APTA. The integrated control system is one of the many elements that contribute to the metro's safe operation.

While implementation of several corrective actions began in 2010, we recognize that other actions need to be planned both for completion of the project, and for its maintenance. Other projects at the STM will benefit from your recommendations.

Bureau du
vérificateur
général

Public Self-Serve Bicycle Project (BIXI)

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1. INTRODUCTION

In 2007, Ville de Montréal (the city) mandated the Société en commandite Stationnement de Montréal (the SCSM) with implementing and operating a self-serve bicycle system in Montréal. This project was part of the 2007 city transportation plan [TRANSLATION] “Reinventing Montréal” to optimize commutes and make Montréal a perfect example of efficiency in terms of urban transportation. This transportation plan notably mentioned that the city [TRANSLATION] “recognizes the bicycle as an essential component of the current transportation system and will break new ground through innovative measures to encourage active commuting.” Accordingly, the plan proposed implementation of a public self-serve bicycle system. In accordance with the priorities of this transportation plan, the city wished to implement such a system for the benefit of its citizens.

It was therefore on May 12, 2009, that the public self-serve bicycle system, known today as BIXI, was launched. Keen interest for BIXI was immediate and definitely added a new facet to Montrealers’ quality of life. This public transportation system has won awards for its innovation. Its success is such that major international cities are looking to acquire this type of public facility.

In the paragraphs that follow, we will put the public self-serve bicycle project into context by presenting the relations between the city and the SCSM and then the series of events that led to the implementation of the BIXI project. To facilitate comprehension of this report, we have included in the schedule an organization chart illustrating the organizational structure of the BIXI project (Appendix 5.1) and a table detailing the timeline of events for this project (schedule 5.2).

1.1. RELATIONS BETWEEN THE VILLE DE MONTRÉAL AND THE SOCIÉTÉ EN COMMANDITE STATIONNEMENT DE MONTRÉAL

It is important to present the business relations between the city and the SCSM in this section, as they are one of the cornerstones of our findings.

In the mid 1990s, the city mandated the Board of Trade of Metropolitan Montreal (BTMM) to manage its paid parking (on- and off-street), an activity that had, up until then, been administered from within the city administrative structure. To formalize this transfer, the city and the BTMM signed a 30-year agreement.

According to the original agreement concluded January 1, 1995, the BTMM, through its authorized agent, the SCSM, guaranteed the city payment of an annual compensation of at least

\$10,200,000, adjustable according to the terms of the agreement. In consideration for its services, the BTMM would receive \$400,000 per year.

Essentially, the SCSM is responsible for collecting revenue and paying the operating fees and compensation to the city. If any profits are left following these activities, a portion is paid to the Fonds Ville-Marie (formerly called the Economic Development Fund), which is administered by the BTMM, and an amount is allotted to the reserve fund for investment in paid parking. The SCSM's residual profits must be paid to the city in the form of royalties. As a result of these methods of compensation and distribution, the SCSM's yearly income is always equal to zero. According to the SCSM's financial statements as of December 31, 2009, the sums due to the city amounted to \$37,600,000.

In 1995, the value of the transfer of activities was set at \$76,800,000, \$60,000,000 for the concession and \$16,800,000 for the equipment and parking lots. Remember that, according to the agreement, the SCSM cannot relinquish these assets without the city's consent. Moreover, the rights acquired by the SCSM and the BTMM remain non-transferable for the term of the agreement.

The details of the financial structure for this transfer were as follows:

- Loan of \$40,000,000 from a financial institution, repayable at \$1,300,000 per year plus interest, secured by the city.
- Mortgage of \$16,800,000 from a financial institution, secured by the tangible assets (the city relinquished its first priority interest).
- Debenture of \$20,000,000 payable to the city, plus interest at an annual rate of 9%, repayable at \$2,000,000 per year as of 2005.

In 1995, the transaction required modifying the Charter of the Ville de Montréal (the Charter) to allow the city to assign paid parking activities to the BTMM, among other things. Consequently, on March 10, 1994, the Québec government duly approved the required modifications to the Charter. These changes made to support the will of the parties are currently reflected in Article 2 of schedule C of the Charter. This article stipulates, among other things, that:

- the city can assign paid-parking activity (on- and off-street) to the BTMM;
- the city is authorized to secure a maximum of \$40,000,000 of the loan taken out by the SCSM—this amount is reduced annually with debt repayment based on capital repayments;
- the rights conferred on the SCSM with regard to parking spaces in the public domain are not liable to seizure, except by the city, and inalienable, except if the alienation is the city's favour;

- the city reserves the right to set parking fees and dictate the geographic locations where paid parking is authorized;
- the SCSM is subject to Article 573 of the *Cities and Towns Act* (CTA)—this article concerns the rules for awarding contracts.

Furthermore, the legislative framework, as required in agreements of the time, stipulates that Article 107.7 of the CTA applies to the control exercised by the auditor general of the Ville de Montréal.

All of the guidelines presented, whether contractual or legal, indicate the limited powers of the BTMM, its agent, the SCSM and the city. In reading this succinct analysis, we can only conclude that the SCSM cannot grow, and its mandate is limited to the management of paid parking, while the city cannot deviate from what the legislator has allowed it to do.

1.2. IMPLEMENTATION OF THE BIXI PROJECT

On October 3, 2007, the city's executive committee adopted resolution CE07 1555 (hereafter the "October 2007 resolution"), whereby it was resolved to mandate the SCSM with implementing a public self-serve bicycle system in Montréal with the city and a group of eight community economic development corporations (CDEC), the Société de développement économique Ville-Marie and Équiterre.

This decision was inspired by two premises: the first was related to the expertise acquired by the SCSM in developing the Payez-Partez computer-based parking meters, while the second involved the fact that there would be no cost for the city. The first phase of the project provided for the installation 300 stations accommodating 2,400 bicycles.

The SCSM therefore started up the BIXI project in 2007. At the beginning, this organization managed the mandate in-house. Subsequently, on July 28, 2008, the SCSM decided to create a non-profit organization for the bicycle project. According to the minutes of SCSM proceedings, the purpose of this decision was to isolate the costs related to the BIXI project while retaining control. In September 2008, the Public Bike System Company (PBSC) was born. On December 31, 2008, it acquired all the assets related to the project from the SCSM for \$3,600,000, to be paid gradually as the PBSC had the necessary liquid assets.

The SCSM continued to play a leading role in the project, however, because it, and not the PBSC, was mandated by the city's executive committee, through resolution CE09 1215 dated

July 2, 2009, to implement phase II of the public self-serve bicycle system, that is, the addition of 100 new stations and 2,000 bicycles. Another major demonstration of the SCSM's involvement in the project after having created the PBSC is the fact that it funded all the activities of the PBSC and had to pledge all of its assets as collateral.

As of January 31, 2011, the audited financial statements of the PBSC show an operating income of \$1,500,000 (2010: operating loss of \$6,900,000) and an accumulated deficit of \$6,300,000 (2010: accumulated deficit of \$7,800,000).

Since the adoption of the October 2007 resolution, no partnership agreement has been concluded between the SCSM and the city. The latter apparently did not sign any partnership agreement with anyone in relation to this project. Also, as we will discuss later in this report, the SCSM's purpose was not modified and the 1995 agreement was not amended to include implementation of the public self-serve bicycle system. In short, the mandate given to the SCSM was not accompanied by any restrictions, management parameters or accountability rules, and, consequently, by any guidelines for the governance of the BIXI project.

However, City Council resolution CM10 0944 dated December 14, 2010 makes the business relationship between the PBSC and the city clear: this decision concerns a memorandum of understanding between the two parties and lays out the financial securities necessary to reach the objectives. Specifically, City Council authorizes the city to give a financial guarantee of \$104,000,000 for PBSC loans from a financial institution in addition to setting management and accountability rules PBSC must follow. All of this is, of course, conditional on the approval of the Ministère des Affaires Municipales, des Régions et de l'Occupation du Territoire (MAMROT).

On May 12, 2011, the MAMROT stated its intention to allow the city to financially assist the PBSC in carrying out its activities. On May 17, city council approved a loan of \$37,000,000 to the PBSC and financial guarantees in the order of \$71,000,000. We would like to point out that this report was drafted before this date. Some of our recommendations were, in fact, taken into consideration in the new memorandum of understanding approved by city council on May 17. Rather than adjusted all of the findings and recommendations in this report, we have presented these corrective measures as actions taken by the administration to improve certain weaknesses. The council decisions of May 17, 2011, cancel those of December 14, 2010.

2. AUDIT SCOPE

The 1995 agreement confers on the auditor general the authority to conduct audits on the SCSM. Thus, in 2010, the operating losses of the PBSC and the accumulated deficits stirred our interest and prompted us to act.

We set the following objectives for our audit:

- Ensure compliance with the agreements linking the group (SCSM and PBSC) and the city.
- Assess the financial repercussions to the city of implementing and operating BIXI.
- Evaluate the management and governance mechanisms of the BIXI project.

In addition to the financial repercussions associated with the BIXI project for the city, the following concerns were addressed:

- The legal aspects of the implementation, operation and financial framework of the BIXI project, as they are the basis of all action taken.
- Governance of the agreements and the BIXI project from three perspectives: the city, the SCSM and the PBSC. Specifically, the aspects of transparency, control and accountability guided our approach.

Our audit consisted primarily of interviews with managers of the SCSM, the PBSC and the city, and examining various documents, particularly the minutes of proceedings of these organizations, as well as the city decision records relating to the BIXI project. In addition, we consulted a legal expert for questions pertaining to legal aspects.

This audit took place over the period of July to December 2010, i.e., before City Council confirmed the memorandum of understanding with the PBSC on December 14, 2010 and agreed to guarantee the loans and financial resources taken out (decision record No. 1100872004) by this company. It should be specified that our audit did not cover assessing the management of daily operations of the public self-serve bicycle system in Montréal or the management of marketing the concept in cities other than Montréal.

As previously mentioned, the MAMROT's intervention and the decisions of the May 2011 City Council meeting render a new perspective to our report. This is why we paid close attention to developments with BIXI in 2011, especially to the financial aspect. The report now takes into account our understanding of the impact of the latest decisions (those of May 2011) on the city's finances. It was simpler to deal with the evolution of this dossier in this manner rather than

rewrite the report or produce an addendum. Section 3.2 “Financial Impact of the BIXI project for the Ville de Montréal” comprehensively deals with the financial aspects. This way of presenting supplementary information will make it easier for the reader to follow the evolution of the dossier, as this ultimately represents the consequences of the action taken and the predictable outcome for taxpayers.

We believe that the observations and recommendations stemming from this report can help support and refine the corrective measures already taken and guide the definition and implementation of other relevant action.

3. FINDINGS AND RECOMMENDATIONS

3.1. LEGAL ASPECTS OF THE BIXI PROJECT

The SCSM, in accordance with the 1995 agreement on paid parking and concession financing mechanisms, must comply with certain financial and legal provisions. For its part, the city has committed to enforcing the application of municipal rules in addition to designating two people to act as directors on the SCSM board of directors.

3.1.1. LEGAL ASPECTS OF IMPLEMENTING AND OPERATING THE PUBLIC SELF-SERVE BICYCLE SERVICE

3.1.1.1. AUTHORITY OF THE VILLE DE MONTRÉAL TO DEVELOP AND OPERATE A PUBLIC SELF-SERVE BICYCLE SYSTEM

Public interest is a core element of city jurisdictions:

[TRANSLATION] “A city ensures public peace and harmony by adopting regulations and providing services in the public interest. The purpose of a city is to provide services to a group of people in a certain location to improve health, well-being, safety and good government.”¹

¹ Jean Héту and Yvon Duplessis in collaboration with Lise Vézina, *Droit municipal: Principes généraux et contentieux* (2nd ed., vol. 1, CCH Wolters Kluwer; 2010, p. 7002–2003; 114957 Canada Itée (Spraytech, Société d’arrosage) c. Ville de Hudson, (2001) 2 R.C.S. 241, 263.

FINDING

Based on the results of our audit, the city possesses the necessary powers to implement a public self-serve bicycle system on its territory as long as it is a service offered for municipal purposes and not commercial ones.

This service can be considered a “public service.” The city’s general powers for managing its public property and specific jurisdiction over transportation, set out in Article 87 of the Charter, can extend to active transportation such as the bicycle, as detailed in its transportation plan.

3.1.1.2. AUTHORITY OF THE VILLE DE MONTRÉAL TO ASSIGN THE IMPLEMENTATION AND OPERATION OF THE BIXI PROJECT TO THE SOCIÉTÉ EN COMMANDITE STATIONNEMENT DE MONTRÉAL

We must first ascertain if the city has the power to entrust a third party with the development, implementation and operation of a public self-serve bicycle system on its territory. As indicated by authorities, it is not a matter of determining whether there exists any legislation that prohibits the city from delegating such a mandate to a third party, but rather of searching to see if there exists any legislation authorizing it to do so:

[TRANSLATION] “Our courts have repeatedly stated that cities only possess the authority granted to them by the provincial government. As a legal creation, a city only possesses the powers that have been expressly delegated to it or that result directly from such delegated powers. [...] A city does not have any inherent power. [...] Therefore, we must not look for legislation prohibiting a city in engaging in such an act, but rather we should determine whether there exists a provision in the provincial legislation authorizing the city to do such a thing.”²

Article 1 of schedule C of the Charter deals with the various types of agreements into which the city may enter. This article states the following:

[TRANSLATION] “The city may enter into any agreement to assign, in whole or in part, the administration, operation or management, on its behalf, of goods that it owns or is authorized to use as well as the programs or services that fall under its jurisdiction, with the exception of those related to traffic, peace, public order, decency, and good morals.”

² See P.G.Q. c. Ville de Montréal et al. C.S. REJB 2004-68778, p. 5; Ville de Saint-Timothée c. Ville de Salaberry-de-Valleyfield, C.S. REJB 2001-26713, p. 6; R. c. Greenbaum (1993) 1 R.C.S. 674, p. 687; see also Jean Héту and Yvon Duplessis, foreword, note 1, p. 281.

This is to say that the city can enter into a service contract with a third party to assign it the implementation and the operation of an active transportation service. This third party, however, will have to act on behalf of the city and not for its own purposes. Moreover, the rules for awarding contracts set out in CTA Article 573 and those following that pertain to public tenders will apply if the contract involves an expenditure of \$100,000 or more.

In practice, though, it is difficult to qualify the “mandate” awarded to the SCSM as a contract in the sense of Article 1 of schedule C of the Charter.

The October 2007 resolution from which the project originated and the related decision summary refer to a mandate for implementing a public self-serve bicycle system without specifying the implementation modalities. The decision summary describes at most the SCSM's commitment to “collaborate” with the city and other organizations. Reference is made to the creation of an “oversight committee,” with no details of actual powers and governance model. There is also mention of formal agreements entered into between the city and its partners, while according to the information obtained, no formal agreement was ever signed between the city and the SCSM in relation to the BIXI project. Such an agreement would likely have made it possible to define the scope of the SCSM's mandate and its obligations toward the city as well as determine the role of the latter in implementing the elements of its transportation plan.

FINDING

The city may enter into a service contract with a third party to assign it the implementation and operation of an active transportation service. However, this third party will have to act on behalf of the city and not for its own purposes. Moreover, the rules for awarding contracts set out in CTA Article 573 and following pertaining to public tenders will apply if the contract involves an expenditure of \$100,000 or more. In practice, however, it is difficult to qualify the “mandate” awarded to the SCSM as a contract in the sense of Article 1 of schedule C of the Charter. In particular, no agreement between the city and the SCSM in relation to the BIXI project has been signed.

The absence of contracts and decision documents pertaining to the operation and price setting of the public self-serve bicycle system, apart from authorization from boroughs for the location of stations, leads us to believe that, from a legal standpoint, the city gave up its authority over the project.

In fact, in light of the information obtained, the mandate given the SCSM appears to be a delegation of powers according to which the city authorizes a third party to use a portion of public property to operate a public service in its place, giving it permission to regulate and set the price for use of this service. Analogies can also be found between this mandate and the privatization of public parking operations in Montréal, which was duly authorized by an amendment to the Charter and concluded through the 1995 agreement. The decision summary actually refers to this agreement and to the broadening of the SCSM's mandate. In short, we do not find, in the elements examined, the characteristics of a true service contract assigning the operation of a public service on behalf of the city.

FINDING

Article 1 of schedule C of the Charter cannot, in our opinion, be interpreted as authorizing the city to grant a mandate such as the one that was given to the SCSM. Given the above, it is not unreasonable to conclude that the city went beyond its authority.

3.1.1.3. IMPLEMENTATION AND OPERATION OF THE BIXI PROJECT IN ACCORDANCE WITH THE 1995 AGREEMENT BETWEEN THE SOCIÉTÉ EN COMMANDITE STATIONNEMENT DE MONTRÉAL AND THE VILLE DE MONTRÉAL

The concession granted to the SCSM in 1995 is limited to the use of space on public property for paid parking only (Article II of the agreement). Moreover, the activities of the SCSM are contractually limited to those that are necessary to follow-up on the 1995 agreement (article XV-A of the agreement). Strictly from a contractual standpoint, the October 2007 resolution can unquestionably be interpreted as consent from the city to the broadening of the original mandate given to the SCSM. It goes without saying that the city could not claim that its co-contractor failed to meet its obligations simply because it was involved in activities that were not provided for under the terms of the original agreement. The problem resides rather in the city's legal capacity to authorize such a broadening of the SCSM's initial mandate, which was limited to the use of space on public property for paid parking only. The original concession granted to the SCSM was made possible through a formal amendment to the Charter. This amendment applied to a specific activity, i.e., paid parking, and nothing else. Remember that according to Article 2 of schedule C of the Charter, the city "*retains in respect of the parking spaces [...] every power conferred on it by the Charter or any other act.*"

The delegation of powers in favour of the SCSM must therefore be interpreted in a restrictive manner and as limited to the parking activity and not the public self-serve bicycle operation. The unconditional concession of a right to use a portion of the public domain to operate a paid active transportation service should therefore have been preceded by a new amendment to the Charter.

FINDING

Neither the 1995 agreement between the SCSM and the city nor the Charter allow the SCSM to implement and operate BIXI project activities. The concession granted to the SCSM is limited to the use of spaces on public property for paid parking only (Article II of the agreement). An amendment to the 1995 agreement between the SCSM and the city and to the Charter was therefore necessary.

3.1.1.4. AUTHORITY OF THE VILLE DE MONTRÉAL TO MARKET AND EXPORT THE BIXI CONCEPT OUTSIDE CANADA

Article 4 of schedule C of the Charter states:

“The city may, for all purposes within its jurisdiction and, in particular, for the purpose of promoting the cultural, economic and social development of the city and its citizens, negotiate or enter into an agreement with an agency representing or administering local or regional Canadian or foreign communities.”

This provision allows the city to enter into agreements with foreign cities for municipal and not commercial purposes. Article 29.12 of the CTA, on the other hand, authorizes cities, under certain conditions, to enter into an agreement *“the object of which is the supply by the municipality of services, expertise, material, materials or equipment relating to any matter within its jurisdiction, so that they may be employed or used profitably outside Québec.”*

However, the city could not legally engage in a commercial activity for its own benefit, even in connection with the provision of a “public service,” whether on its territory or elsewhere. We are referring here to an activity that is industrial (bicycle manufacturing) or purely commercial (sale of products or provision of a service). As a general rule, a city cannot carry out profitable commercial activities, barring specific legislation³.

³ Foreword, note 1, p. 7003. On the other hand, the law expressly authorizes it to operate certain commercial businesses in specific sectors: art. 221 of the Charter, according to which *“the city may apply for the constitution of a non-profit body to manage and operate one or more tourist information centres and to carry on therein or permit the carrying on therein of commercial activities related to the operation of such centres so as to ensure their financing.”*

FINDING

In other words, the city could not acquire BIXI bicycles to engage in commercial activities, with all that this implies.

City funding comes from taxes and fees and not through trade or industry. These activities go against public interest and the principle of commercial neutrality of public bodies in addition to raising problems in terms of trade regulation (unfair competition, and so on.).

3.1.1.5. INVOLVEMENT OF THE VILLE DE MONTRÉAL DIRECTION DU CONTENTIEUX

On June 5, 2007, the director of transportation of the city's Service des infrastructures, transport et environnement (SITE),⁴ designated by the city's Executive Committee to sit on the Board of Directors of Accesum Inc. (general partner acting on behalf of the SCSM), sent a request for advice to the city's Direction du contentieux.⁵ The subject of this request was: [TRANSLATION] "Advice on the methods for conferring a mandate—Implementation of a public self-serve bicycle system in Montréal."

He then asked two questions. On July 20, 2007, the Direction du contentieux replied. Here are some extracts of the Direction du contentieux's legal opinion:

[TRANSLATION]

"1. Is the implementation of a public self-serve bicycle system in Montréal the responsibility of the central city or the boroughs?"

As you pointed out in you request for a legal opinion, the purpose of implementing a public self-serve bicycle system is to 'enhance citizens' mobility and reduce the modal share of the automobile.' In its 2007 transportation plan, the Ville de Montréal recognizes the bike as 'an essential component of the current transportation system and intends to break new ground with innovative measures to further encourage active transportation' [...].

We are therefore of the opinion that a public self-serve bicycle system represents much more than a recreational sport in the meaning of Article 141 of the Charter of the Ville de Montréal (R.S.Q., chapter C-11.4), which stipulates that the organization of recreational sports and sociocultural activities are under the jurisdiction of the borough councils.

As there is no specific mention in the Charter as to who has jurisdiction relative to such transportation activities (public self-serve bicycle system), we must conclude that the City Council has jurisdiction, in accordance with Article 84 of the Charter. It should be

⁴ Now the Service du développement et des opérations.

⁵ Now the Service des affaires juridiques et de l'évaluation foncière.

specified that this jurisdiction must be exercised for municipal purposes only (i.e., without any commercial aspect).

2. Based on the answer to the first question, and considering the special status of Stationnement de Montréal, must the Ville de Montréal follow a particular procedure to assign the implementation and operation of the project to Stationnement de Montréal?

Article 1 of schedule C of the Charter provides for the possibility of the Ville de Montréal to enter into agreements in which it delegates some of its responsibilities to a third party:

‘1. The city may make any agreement to entrust, in whole or in part, the administration, operation or management, in its name, of the property which it owns or uses and the programs or services within its jurisdiction, with the exception of those concerning traffic, peace, public order, decency and good morals.’

It follows that the Ville de Montréal could enter into a service contract with the Société en commandite Stationnement de Montréal, whose limited partner is the Board of Trade of Metropolitan Montreal, in order to transfer the responsibility for implementing and operating a public self-serve bicycle system on the territory of the Ville de Montréal to it.

It should be noted, however, that the rules for awarding contracts (Article 573 and following of the Cities and Towns Act, R.S.Q., chapter C-19) would apply in the case in point. The Société en commandite Stationnement de Montréal is not a non-profit organization, therefore no exemption provided for in the Act applies. Consequently, only a service contract that includes an expenditure of less than \$25,000 (taxes and discounts considered) can be entered into by mutual agreement. If the value of the contract is between \$25,000 and \$99,999.99, it will have to be granted following an invitation to tender extended to at least two suppliers (Article 573.1). If the cost of the services is \$100,000 or more, it will then be necessary to proceed by public call for tenders (Article 573).

Moreover, it should be noted that an amending declaration would be required when applicable in order to modify the purpose of the partnership indicated in the partnership declaration. According to the information in the Registre des entreprises du Québec, the purpose of the Société en commandite Stationnement de Montréal limited partnership is to [TRANSLATION] ‘acquire, own, manage, operate, administer spaces where parking is subject to payment of a fee set by the Ville de Montréal and provide all services related to the parking of vehicles.’

Thus, the responsibilities that the Ville de Montréal would like to assign exceed its function. A declaration of amendment will therefore be mandatory to update the function carried out by the Société en commandite Stationnement de Montréal, in accordance with Article 2194 of the Civil Code of Québec and Article 34 of the Act respecting the Legal publicity of sole proprietorships, partnerships and legal persons (R.S.Q., chapter P-45).”

The minutes of the September 6, 2007 meeting of the Board of Directors of Accesum Inc., acting on behalf of the SCSM, report on the discussions with the city. More specifically, it identifies two scenarios for implementing the public self-serve bicycle system:

- Modifying the 1995 agreement and a modification request to the Québec government to amend the Charter. To be clear: *[TRANSLATION] “This solution has the great disadvantage of giving a third party the power to decide whether or not to authorize the city’s desired changes and creates delays that would paralyze SCSM activities.”*
- Creating a non-profit organization (company registered under part III) to offer the service. The city would like to proceed with this scenario, which would avoid administrative details and allow it to assign this mandate without the intervention of the Québec government.

One of the directors designated by the city’s Executive Committee adds that *[TRANSLATION] “The decision summary is set to be presented to the Executive Committee at the September 26 meeting, and the option of a non-profit organization is the one that has been retained by city.”*

Following the option apparently chosen by the city, on July 28, 2008, the Board of Directors of the SCSM authorized the constitution of a non-profit organization, the PBSC.

FINDING

The question about the procedure for assigning the mandate to implement and operate a public self-serve bicycle system to the SCSM was asked before the October 2007 resolution.

Both the city’s Direction du contentieux texts and the SCSM Board of Directors minutes follow the same lines as our analysis, namely:

- **The city has the powers to implement a public self-serve bicycle service.**
- **The city’s jurisdiction is, however, limited to municipal purposes only (without any commercial aspect).**
- **The SCSM was not authorized to develop and operate BIXI. Legislative changes were necessary to start up the public self-serve bicycle project (e.g., amendments to the Charter and to the purpose of the SCSM stated in the partnership declaration). In fact, while the decision summary (in support of the October 2007 resolution) clearly states the necessity to amend the function of the SCSM set forth in the partnership declaration, the information obtained indicates that this amendment was never obtained and no action was ever taken to this effect.**

FINDINGS

The choice to constitute the PBSC, made on September 6, 2007, was a way of doing indirectly what the city and the SCSM could not do directly. It should also be noted that the October 2007 decision summary, drafted by the city SITE Direction des transports, made no reference to the creation of such an organization.

In light of what was stated in this section, we conclude that project stakeholders (i.e., management, members of the Board of the SCSM, city officers and Executive Committee) were informed of the legal difficulties related to the implementation of the public self-serve bicycle system.

Recommendation

To ensure its operations are in compliance, we recommend that the city's Executive Committee take the necessary measures to sort out the legal situation with regard to the Société en commandite Stationnement de Montréal implementing and operating public self-serve bicycles on behalf of the city. To do so, we recommend that the city obtain the appropriate legislative amendments.

Action Plan of the Executive Committee

“With the financing plan adopted by City Council in May 2011 and the approval by the Ministre des Affaires municipales, des Régions et de l'Occupation du territoire of the security provided by the city for the financial commitments of the Public Bike System Company, the business ties between the Public Bike System Company and the Société en commandite Stationnement de Montréal are terminated. No legislative modification is necessary.

An agreement protocol now dictates the business relations between the city and the Public Bike System Company, a non-profit organization.”

Comments of the Auditor General

As we mentioned in section 2 of our report, our audit took place from July to December, i.e., before the MAMROT's intervention and before City Council ratified the agreement protocol with the Public Bike System Company.

Moreover, we are not able to confirm that all the actions taken by the city since our audit, including the MAMROT's intervention, have ensured the legality of the public self-serve bicycle project operation for the future.

3.1.2. LEGAL ASPECTS OF THE BIXI PROJECT FINANCIAL FRAMEWORK

3.1.2.1. ACTUAL FINANCIAL IMPACT OF THE BIXI PROJECT ON THE VILLE DE MONTRÉAL

The city does not directly fund PBSC activities. They have been funded by the SCSM since 2009 through a \$30,000,000 loan secured by a junior mortgage and the co-signing of a \$17,000,000 loan to the PBSC and the SCSM with a financial institution. The \$30,000,000 is to finance current PBSC activities and pay the purchase price set in the asset sale contract dated December 31, 2008. The \$17,000,000 loan is to finance the annual payment of compensations and royalties due to the city and the current operations of the BIXI project.

FINDING

Given the financing structure of SCSM activities, there is no doubt that the city indirectly funds the activities of the PBSC, since the SCSM's ability to financially support the activities of the PBSC is largely dependent to the financing provided to the SCSM by the city in accordance with the 1995 agreement. It should be reminded that the city funds the activities of the SCSM in many different ways.

FINDING

On one hand, the city secures a portion of the loans taken out from a financial institution (\$40,000,000) and directly finances, by means of a debenture (\$20,000,000), a portion of the purchase price for fixed assets acquired by the SCSM as per the 1995 agreement (hereafter the "fixed assets"). Consequently, it facilitates the funding of the SCSM's activities by authorizing it to mortgage a portion of these fixed assets in favour of the financial institution (\$16,800,000, reduced to \$16,000,000 through a subsequent amendment).

FINDING

On the other hand, the additional financial burden assumed by the SCSM as part of the financing of PBSC activities inevitably has repercussions on the city. It should be understood that the financial structure of the 1995 agreement provides for a profit sharing method that does not allow the SCSM to generate surplus for its activities. All profits (after the payment of operating costs, debt, and so on) must be paid to the city, in the form of compensation or royalties. The compensation can be compared to a fixed rent in return for the concession. The royalties can be compared to a percentage of the actual profits generated by the agreement. Nobody would dispute the fact that the SCSM had to use and still uses a portion of its own funds, insofar as the financing granted by the financial institution to the PBSC on August 31, 2009 is conditional on the SCSM having exhausted the \$16,000,000 credit that was granted to it by the same financial institution for the execution of the 1995 agreement.

Whether the SCSM used a portion of its bank financing to fund the project or, more likely, whether it became unable to pay the compensation and the royalties to the city within the allotted time frame for the same reason, the result is the same: the city assumes the funding for the PBSC's activities, either by tolerating the delays in paying the amounts owed to it as compensation, or by taking less of the royalties that would have otherwise been payable to it at the end of every SCSM fiscal year. It should be mentioned that the compensation and annual royalties are payable to the city on April 1, following the end of the fiscal year. However, we noted that the SCSM finished paying the \$37,600,000 due to the city as at December 2009 in October 2010.

FINDING

The city indirectly supports the PBSC by accepting that a portion of the funds coming from a financial institution (i.e., \$1,000,000 secured by a senior mortgage on the fixed assets for the 1995 agreement) be used to fund the activities of the PBSC. The expenses incurred by the SCSM for the PBSC also compromise the SCSM's ability to honour its financial commitments toward the city.

3.1.2.2. AUTHORITY OF THE VILLE DE MONTRÉAL WITH REGARD TO FINANCING THE BIXI PROJECT

Given the above, we wanted to determine if the city had the necessary authority to finance the BIXI project. Article 1 of the *Municipal Aid Prohibition Act* (MAPA) prohibits cities from assisting industrial or commercial establishments. This act stipulates:

“1. Notwithstanding any contrary or incompatible provision in any general or special Act, no municipality shall, directly or indirectly, assist any industrial or commercial establishment, otherwise than in the manner provided in the Act respecting municipal industrial immovables (chapter I-0.1), or, without in any way limiting the generality of the foregoing words, grant assistance, more particularly in any of the following ways, to wit:

- (1) by taking or subscribing for shares in any business corporation created for such object;*
- (2) by giving or lending money or other security, or in giving the use or ownership of any immovable;*
- (3) by guaranteeing, by endorsement or otherwise, any sum of money borrowed;*
- (4) by granting any exemption from taxation to any industrial or commercial establishment.”*

Because the city indirectly funds the activities of the PBSC, we had to determine if the PBSC can be considered as an industrial or commercial establishment since the city cannot finance, directly or indirectly, this type of establishment, unless it can turn to a specific provision of the law that diverges from the LISM⁶. Insofar as the PBSC operates a company that buys and sells goods (bicycles, pay stations, and so on) and develops services, not only for its own needs but also for the purpose of exporting them outside the territory, it is not unreasonable to claim that it operates a commercial establishment in the meaning of the LISM. In this context, we are of the opinion that the city should have obtained an additional amendment to the Charter authorizing it to finance the SCSM or the PBSC as was the case for the financing of the SCSM's paid parking activities.

FINDING

Due to the commercial nature of the PBSC's operations, the city could not fund, directly or indirectly, the activities of the PBSC without the Charter being amended, which was not the case during the implementation of the BIXI project.

⁶ According to Article 2 of schedule C of the Charter dealing with financing SCSM activities with regard to paid parking.

3.1.2.3. ASSETS PLEDGED AS COLLATERAL IN ACCORDANCE WITH THE 1995 AGREEMENT AND THE CHARTER OF THE VILLE DE MONTRÉAL

According to the terms of the loan agreement between the SCSM, the PBSC and a financial institution, the borrowers (the SCSM and PBSC) pledge up to \$20,000,000 as collateral on the universality of their movable assets, both present and future, tangible and intangible. This includes not only all PBSC assets assigned by the SCSM, but also a portion of the SCSM's own assets, i.e., the movable assets that are part of the fixed assets acquired through the 1995 agreement. While these assets can be mortgaged without the city's consent according to the terms of the agreement (Article VIII-C-1), a mortgage can only be granted up to the total purchase price of these fixed assets (\$16,000,000). However, the fixed assets were already mortgaged for up to \$16,000,000 (mortgage dated April 28, 1995).

It is worth noting that the mortgage, while it covers intangible assets, does not extend to the operating rights of the SCSM as "concession holder" of the paid parking spaces on the streets. These rights are, in fact, declared unseizable and inalienable according to Article 2 of schedule C of the Charter. They therefore cannot be mortgaged.

FINDING

The SCSM was not authorized to grant a new \$20,000,000 mortgage on these same assets unless it had prior consent of the city, which was not the case.

3.1.2.4. RESPONSIBILITY FOR THE LOSSES AND DEBTS RESULTING FROM THE OPERATION OF THE BIXI PROJECT

The PBSC is liable for all debts and losses resulting from its activities. The SCSM is liable according to the terms of the loan granted jointly with the PBSC. The same goes for any balance that may be owed to it according to the \$30,000,000 loan deed and the other advances granted.

FINDING

The potential losses of the SCSM for its involvement in financing the activities of the PBSC could compromise its ability to honour its commitments toward the city.

Moreover, given the transfer by the SCSM of the assets and activities related to the public self-serve bicycle project to the PBSC, only the latter can profit from the project's potential operating

profits. In other words, the city is currently covering a portion of the risks of the project, but the PBSC will retain all the profits. In this respect, the memorandum of understanding approved by City Council on December 14, 2010, provides for the situation to be rectified. It is stated that the letters patent of the PBSC will be modified so that the remainder of the assets of the PBSC will be given to the city in case of dissolution or liquidation. It should be noted that, currently, the letters patent of the PBSC stipulate that this remainder should be given to an organization carrying out a similar activity.

FINDING

Currently, there is still a risk that the city would not have access to all the financial benefits.

Recommendation

We recommend that the city’s Executive Committee establish a management framework for partnership agreements mainly to properly frame the powers, roles and responsibilities of the parties involved. This framework should especially cover risk sharing, projected benefits, costs, as well as social, financial and legal implications.

Action Plan of the Executive Committee

“The governance framework for city asset management projects and programs also serves as a guide for future projects carried out in collaboration with our partners. It will be applied based on the characteristics of the partnership model.”

3.2. FINANCIAL IMPACT OF THE BIXI PROJECT ON THE VILLE DE MONTRÉAL

3.2.1. DUAL MODE PAY STATIONS

Due to its expertise in developing the Payez-Partez computer-based parking meters, among other things, the SCSM was mandated by the city to implement the BIXI public self-serve bicycle system in Montréal. Over the course of its development, it was determined that the project would include new, dual mode pay stations, with technology that would incorporate functionalities for both BIXI bicycles and paid parking. According to the information obtained, these stations, while more expensive to purchase than a station exclusively for use with bicycles, had the benefit of

improving the streetscape in addition to promising savings for cost sharing between the PBSC and the SCSM.

The implementation of the dual technology mode was to be done in two steps. The first segment consisted in developing, in 2009, the functionalities allowing the PBSC to collect the revenue related to the use of the BIXI bicycles. Following this, the activation of the parking component, planned for 2010, had to satisfy the needs of the SCSM's clientele.

The cost of a dual mode pay station was estimated at \$16,000, according to PBSC management. The system presently used by the SCSM (parking component only) is said to cost around \$13,000, while a single mode pay station specifically meeting the needs of the BIXI project should have cost \$6,000.

The SCSM purchased the dual mode pay stations from the PBSC on December 16, 2009 for \$6,600,000, approximately \$16,000 per station. It should be mentioned that SCSM financial statements show a cost of \$6,400,000 for the dual mode pay stations, while the contract was, in fact, concluded at a cost of \$6,600,000. For the purposes of this report, we have retained the figures from the contract signed by the parties.

A service agreement specifies that the PBSC will pay rent to the SCSM for use of the dual mode pay stations. This annual charge is for a period of ten years. It is calculated as follows: $\$6.6\text{M} \times \$6,000 \div \$16,000 \times 1/10 \text{ years} = \0.248M per year. For its part, the SCSM assumes the difference, i.e., \$412,000 per year ($\$6.6\text{M} \times \$10,000 \div \$16,000 \times 1/10 \text{ years}$), which represents 62.4% of the total cost of \$6,600,000.

These proportions come from the [TRANSLATION] "service agreement for pay stations" between the SCSM and PBSC dated December 16, 2009. It is signed by the Chair of the SCSM Board of Directors (who was also simultaneously Chair of the PBSC Board of Directors) and by the President and CEO of the PBSC (who is the former Executive Vice-President of the SCSM). These same stakeholders also signed, on the same day, the contract to sell the dual mode pay stations to the SCSM for \$6,600,000.

The chosen method of distribution is peculiar, especially if we consider that the development of a computer application to read the transactions related to paid parking was never undertaken. Moreover, according to section 3.3.2.3 of this report, our understanding is that this application was not ordered. Therefore, the SCSM purchased goods that did not meet its operating needs. This situation will cause the city to lose \$4,120,000 in royalties, i.e., \$412,000 per year. Our

assessment is confirmed in the PBSC's audited financial statements dated January 31, 2011, in which it is stated that on March 1, 2011, it committed to buying back the SCSM's pay stations for \$3,000,000. The SCSM therefore assumes a loss of \$3,600,000 (\$6,600,000 – \$3,000,000), over and above the amortization accumulated since the purchase of the stations.

According to a study conducted by the SCSM, there are several reasons justifying the fact that the parking component of the station was not developed and that it probably never will be, namely:

- The geographic distribution of the pay stations makes it difficult to simultaneously serve SCSM clientele and that of the PBSC. Only 86 pay points out of the BIXI project's 395 could currently, if the station was functional, serve the SCSM parking clientele.
- The computer system development would be complex and costly.
- The weight and size of the dual mode pay station are incompatible with the configuration of SCSM trucks.
- The coin bank would not be compatible with the one used by the SCSM.

Certain PBSC assessments differ from those made by the SCSM, namely that the PBSC estimates that 160 to 200 pay points out of 395, instead of the 86 assessed by the SCSM, could serve parking clientele. However, they could not provide us with any documented analysis addressing this aspect and the costs involved in the computer system development required, in order to invalidate the facts that came out of the SCSM study.

The PBSC is a company controlled by the SCSM. As previously mentioned, several stakeholders are involved in both organizations. It is therefore very unlikely that the problems related to the adaptation of this pay station to the needs of the SCSM were not known at the outset. In short, the acquisition of the dual mode pay stations is a related-party transaction in which the buyer and seller have a close relationship. The successive accounting choices for the non-functional dual mode pay stations (purchase, transfer, cost allocation) are difficult to explain.

In an effort to provide more transparency in the actual costs associated with the BIXI project, the previous comments require that the \$6,600,000 in assets be accounted for in PBSC books and that it assume 100% of the costs to purchase and operate the dual mode pay station, which has now become [TRANSLATION] "BIXI single mode." Currently, this asset is accounted for in SCSM books and, in return, the underlying adjustments of the transfer of this asset between the two companies are made against the advance granted by the SCSM to the PBSC.

FINDINGS

- The SCSM purchased non-functional dual mode pay stations to serve its operational needs and its clientele for \$6,600,000, while these are essentially used only for the operations of the PBSC.
- Disregarding the accumulated amortization, the SCSM is currently assuming a loss of \$3,600,000 now that the PBSC has bought back the pay stations for \$3,000,000.
- The royalties owed to the city will be cut by \$3,600,000, which corresponds to the deletion of this asset.
- The contracts signed and the subsequent reporting unduly distort the financial situation of both companies (advantage for the PBSC).

Recommendation

We recommend that the city's Executive Committee urge City Council to require that the financial statements of the Public Bike System Company and the Société en commandite Stationnement de Montréal be adjusted to reflect the actual cost of the BIXI project.

Action Plan of the Executive Committee

"Being that the transfer of these pay stations was determined based on factual data and agreed on following discussions and negotiations between these two independent organizations, each led by their respective board of directors, the financial statements of these companies accurately reflect the value of their assets and their financial situation."

Comments of the Auditor General

It should be reminded here that the acquisition of the pay stations by the Société en commandite Stationnement de Montréal at a cost of \$6.6M and their subsequent transfer to the Public Bike System Company for the amount of \$3M are intercorporate transactions (the Public Bike System Company was a company controlled by the Société en commandite Stationnement de Montréal until June 2, 2011), despite the fact that certain directors sat simultaneously on the board of directors of both companies and that the pay stations were never functional. The principle of independence of the entities involved in the transaction cannot, in our opinion, be asserted.

Furthermore, we maintain, for the sake of transparency and accountability, the importance of adjusting the financial statements of both companies so that the actual costs associated with the BIXI be presented in the proper entity.

3.2.2. PUBLIC BIKE SYSTEM COMPANY LOSSES

PBSC financial statements as at January 31, 2010, show an operating loss of \$6,900,000 and an accumulated deficit of \$7,800,000. This accumulated deficit represents a loss for the city, one that should have been included in its 2009 consolidated financial statements. However, the information was not available when the city's financial statements for the fiscal year ended December 31, 2009 were produced.

Since the city, by virtue of its May 2011 resolution, will finance a loan of \$37,000,000, added to providing a guarantee in the order of \$71,000,000 and, consequently, will assume all the financial risks, it seems normal to us that the financial results and debts of the PBSC would be reflected in the city's financial statements. This situation has been sorted out, as PBSC financial statements were consolidated in the city's books as of December 31, 2010. These results should nonetheless be corrected to account for the above-mentioned costs for the dual mode pay station.

FINDING

The city's financial statements for the 2009 fiscal year did not take into account the PBSC's accumulated deficit of \$7,800,000. Statements at December 31, 2010, did include these losses (decision made in January 2011 by the Service des finances of the city).

Furthermore, the agreement approved by City Council on May 17, 2011, between the PBSC and the city specifies that the PBSC will have to send its audited financial statements and auditor's report to the city's Executive Committee within 90 days of the end of its fiscal year. The PBSC's fiscal year currently ends on January 31, which means that it will submit its financial statements at the end of April at the latest. It should be reminded that the PBSC's financial data must be consolidated with those of the city. Consequently, since the city's year end is December 31 and it produces its annual financial report before March 31, it seems clear to us that the requirements stipulated in the May 2011 agreement that we just discussed do not facilitate the integration of the PBSC's financial data with the city's.

FINDING

The PBSC's year-end is January 31 while that of the city is December 31.

Recommendation

We recommend that the city's Executive Committee ask the Public Bike System Company to change its year-end date to December 31 in order to facilitate the integration of its financial data with the city's.

Action Plan of the Executive Committee

"The request to change the date of the financial statements of the Public Bike System Company has been initiated. A resolution to this effect has been adopted by its Board of Directors. The required approval remains to be obtained." (Planned completion: December 2011)

Comments of the Auditor General

The Public Bike System Company responded positively to this recommendation by adopting a resolution to this effect during its June 2011 Board meeting.

3.2.3. FINANCING STRUCTURE PROPOSED ON DECEMBER 14, 2010

The SCSM and PBSC financial difficulties and lack of funding appear very clearly in the SCSM minutes of May 13, 2010. On this date, the SCSM Board of Directors mandated its management to obtain a confirmation from the city for deferment of royalty and compensation amounts due. The Board also asked management to obtain a confirmation from the city as to the financial support for PBSC international operations.

At December 31, 2010, the PBSC owed \$33,200,000 to the SCSM. With the addition of \$6,600,000 for the pay station that is now single mode, the actual amount owed to the SCSM is \$39,800,000. On December 14, 2010, City Council resolved to guarantee the debts and loans from a financial institution required to operate the PBSC, i.e., \$104,000,000 divided as follows:

- Loan of \$25,000,000, five-year term, repayment over 12 years.
- Line of credit of \$5,000,000.

- Operating credit of \$14,000,000 repayable on request.
- Factoring facility of \$60,000,000.

The fixed assets of the PBSC, taking into account the dual mode pay station, total approximately \$27,000,000. These assets are amortized on a straight-line basis over their useful life, which has been set at approximately nine years by PBSC management. As BIXI has been in service for two seasons now, we can therefore assume that the remaining useful life is seven years.

At the end of December 2010, PBSC financing was not completed, the deeds of loans from the financial institution were not signed and the provincial government had not yet authorized the city to secure PBSC debts. Consequently, after two years of operation, there has been no debt repayment. Simple mathematics shows that the PBSC will have to generate surplus liquid assets in the order of \$5,000,000–\$6,000,000 per year over the course of the next seven years, or it will get stuck financing outdated or scrapped assets.

The financial viability of the PBSC essentially rests on the profitability of exporting the BIXI concept and products. Moreover, the PBSC is critically dependent on endorsement from the city for its financial institution. The city therefore takes all the financial risks of the project.

The December 2010 decision summary indicates that authorization by the minister of the MAMROT is required for the city to guarantee the loans of the PBSC. The marketing and funding of this type of activity are not the prerogative of a city. In our opinion, an amendment to the Charter will therefore be necessary.

FINDING

The financing structure presented to City Council leaves little to no room for the unexpected. There is a risk that the PBSC will be short of cash to renew its assets.

3.2.4. MAY 17, 2011 FINANCING STRUCTURE

Our understanding of the structure approved by City Council on December 14, 2010, is in many respects confirmed by the new financing plan adopted at the May 17, 2011, City Council meeting. During this meeting, City Council resolved to finance a loan of \$37,000,000⁷ to the

⁷ This amount represents the advance owed to the SCSM and the devalued cost of the dual (or single) mode pay stations repatriated by the PBSC.

PBSC, in addition to guaranteeing a line of credit, an operating credit and a factoring capability from a financial institution for the total amount of \$71,000,000.

During this most recent meeting, the President of the PBSC Board of Directors, the President and CEO of the PBSC and a director of the latter, who is also senior director and treasurer of the city, came to present their vision of the profitability and financial needs required to continue the company's operations. While asserting that there would essentially be no costs for the city, it was confirmed that the Montréal BIXI operation was in deficit and that export was essential for financial equilibrium or profit. This should, in the long run, provide for repayment of the \$37,000,000 debt (payable at \$3,000,000 per year). It was also revealed that the MAMROT required the PBSC to abandon its export activities. It should be noted that the letter dated May 12, 2011, from the MAMROT pertaining to the authorization of the city's guarantees makes no mention of this obligation. However, the agreement to be concluded between the city and the PBSC covers this requirement. Article 1.11 of this agreement details the disposal conditions:

[TRANSLATION] "The company commits to deploying its best efforts to dispose of its activities outside of Montréal as soon as possible. When such disposal occurs, regardless of the method or process, the Société commits to making sure:

- a) the licensing set out in Article 1.12 is not affected in any way;*
- b) the buyer is compelled to compensate the city, by any means to be determined and deemed acceptable to it, for the deficit in operating the BIXI system on the city's territory, it being understood that the calculation of the deficit will take into account the subscription fee for users of this system, which cannot be inferior to the existing price upon signature of this agreement, indexed annually on the variation of the consumer price index (Montréal) published by Statistics Canada."*

Paradoxically, the PBSC vitally needs the export to ensure its profitability, but it will have to dispose of this activity. The disposal terms and conditions raise several questions about the financial risks of exporting that the city may have to assume.

FINDINGS

Among these concerns are the following:

- **The period covered by the deficit compensation is not defined.**
- **The procedure for with dealing with commitments made by the PBSC to foreign cities is not indicated; for example: who will assume the contractual obligations of the London project if the potential buyer defaults?**
- **The compensation term and condition covers the future and does not deal with the accumulated deficit of \$6,300,000 shown in the January 31, 2011 PBSC financial statements.**
- **The announced exporting profitability could be lower after the disposal; for example, the buyer will have to assume the costs related to its own administrative structure, and the company, if it is private, will be subject to the applicable tax rules.**
- **The operating deficit will be based on Canadian generally accepted accounting principles; however, the only element that can generate surplus liquid assets is the amortization of the PBSC. The PBSC's January 31, 2011, financial results show a charge of \$2,800,000 for this. This amount is inferior to the \$3,000,000 needed to repay the city's loan.**
- **The fact that the financial durability of the Montréal BIXI will remain dependent on the financial performance of the future buyer of the export component means that the city continues to expose itself to financial risks.**

Recommendations

We recommend that the city's Executive Committee approve the parameters of the possible disposal of the Public Bike System Company's export activity. This sale should be made following a call for proposals or public call for tenders to maximize the return. City Council should approve this sale.

We recommend that the city's Executive Committee obtain financial simulations that take into account the various forms that the sale of the Public Bike System Company's export activity could take and, if necessary, that it consult a firm specialized in the matter.

Action Plan of the Executive Committee

“The city administration intends to use all the means at its disposal to maximize spin-offs for the clients of BIXI Montréal and Montréal taxpayers.

The decision will be made by the appropriate authority based on the relevant financial information.” (Planned completion: upon preparation of the sale process)

3.2.4.1. LOAN OF \$37M

On May 17, 2011, City Council approved the following financing structure:

- Long-term loan of \$37M from the city, at an annual rate of 2%, with a repayment of \$3M per year
- Loans and financial tools provided by a financial institution and secured by the city:
 - Operating credit of \$6M repayable on request
 - Line of credit of \$5M to be used for the issuing of letters of credit
 - Factoring facility of \$60M

The decision summary related to these decisions was accompanied by a favourable opinion from the city’s Direction du contentieux with regard to the security, but for reasons that are not known, there was no opinion pertaining to the loan of \$37M.

This loan that will be used to repay the SCSM is made up of the following:

Advance owed to the SCSM dated January 31, 2011	\$33.2M
Promise to purchase for the dual mode pay stations	\$3.0M
Non-itemized amount	<u>\$0.8M</u>
	<u>\$37.0M</u>

In our opinion, this amount should have taken into account the loss assumed by the SCSM for its contribution to the dual mode pay station, which we discussed earlier (section 3.2.1). Because the intercorporate transactions are made against the advance granted by the SCSM to the PBSC, the loan of \$37M to the PBSC, which was mainly meant to repay the SCSM, may have to be scaled up depending on the decisions that will be made with regard to correcting the companies’ financial statements so that they reflect the actual costs of the BIXI project.

Recommendation

We recommend that the city's Executive Committee urge City Council to increase the amount of the \$37M loan based on the decisions that will be made with regard to the adjustments of the companies' financial statements so that they reflect the actual costs of the BIXI project.

Action Plan of the Executive Committee

"As stated, we are of the opinion that the financial statements of the PBSC reflect the true value of their assets and their liabilities and that the financing plan decided on in May 2011 is appropriate."

Comments of the Auditor General

Since the cost attributed to the buying back of the dual mode pay stations by the Public Bike System Company has a direct impact on the balance of the advance that it has to reimburse to the Société en commandite Stationnement de Montréal, and since we believe that the buy back should have been done at the original cost, we maintain our position, which is related to the recommendation presented in section 3.2.1.

Moreover, the 2% interest rate granted by the city to the PBSC is inferior both to that on the market and to the current cost of financing the activities of the PBSC as well as the cost to borrow from the city. In this respect, the average weighted rate of all the city's debts appearing in its December 31, 2010, financial statements was 5.53%.

The first year of the loan, the PBSC therefore should have received a financial benefit through a 3.53% reduction of the interest rate, in relation to the usual average rate of 5.53%, a benefit representing about \$1.3M. This discount or financial aid reduces the operating losses of the Montréal BIXI. It should be reminded that article 1.11 of the agreement concluded between the city and the PBSC stipulates that these losses must be compensated by the future buyer of the export component. When all is said and done, because of the reduced interest rate granted on the \$37M loan to the PBSC, the city is indirectly benefiting the future buyer, who will have to compensate a lower operating deficit for the Montréal BIXI.

FINDING

The 2% interest rate granted to the PBSC will benefit the future buyer of the export component.

FINDING

The fact that certain costs attributable to the Montréal BIXI project were not accounted for in the books of the PBSC will also lead to a reduction in the operating deficit of the Montréal BIXI, which will consequently benefit the future buyer of the export component.

Recommendation

We recommend that the city's Executive Committee urge City Council to increase the interest rate (2%) to be granted on the loan to the Public Bike System Company to a value that is more representative of market conditions.

Action Plan of the Executive Committee

"The interest rate of the loan represents the opportunity cost for the city; this cost reflects the market rate."

Comments of the Auditor General

Given that the implementation of the BIXI project was initially supposed to be carried out without any cost to the city, it is astonishing to see that the loss of earnings resulting from the reduction of the interest rate between what the city has to pay and the rate it charges can be accepted as an "opportunity cost." Moreover, according to our audits, the interest rates negotiated and obtained by the city on its loans in 2010 varied between 3.15% and 5.45%. Another loan was obtained in March at an interest rate of 4.5%.

3.2.5. BIXI TORONTO INC. SUBSIDIARY

With regard to export, the strategic direction of the PBSC consisted, up until recently, of the sale of equipment used in a public self-serve bicycle system. During the public call for tenders, the

City of Toronto stipulated that the successful bidder had to own an establishment in the City of Toronto.

Following the public call for tenders, the PBSC obtained the contract and therefore constituted BIXI Toronto Inc. This company will operate the Toronto BIXI for the City of Toronto. Here are a few details about this project:

- BIXI Toronto Inc. was constituted on February 17, 2011.
- The PBSC holds 100% of the shares issued.
- A financial institution granted a loan of \$4.5M to BIXI Toronto Inc. This loan is secured by the City of Toronto.
- The PBSC anticipates a loss of \$600,000 for BIXI Toronto's first year of operation.

Even though BIXI Toronto Inc. and the PBSC are two separate legal entities, engaging in commercial activities through a subsidiary involves a certain number of risks for the parent company. Given the above, we cannot disregard an additional financial risk that is likely to affect its ability to honour its financial commitments toward the city.

FINDING

The operations of PBSC subsidiary BIXI Toronto Inc. could have negative financial impact for the Ville de Montréal.

3.3. GOVERNANCE

From the outset, we looked for a few definitions to support the results of our audit, but mostly to clearly identify the roles and responsibilities of the members of a board of directors and the management of a business unit.

Thus, governance is defined by the International Federation of Accountants (IFAC) as follows:

“The set of responsibilities and practices exercised by the board and executive management with the goal of providing strategic direction, ensuring that objectives are achieved, ascertaining that risks are managed appropriately and ensuring that the organisation’s resources are used responsibly.”

For its part, the Collège des administrateurs de sociétés describes the set of roles even more clearly; namely, it is explained that governance is divided into two complementary roles

exercised by the Board of Directors and management. The Board of Directors must ensure that the company is acting in accordance not only with its mission, its strategy, its politics, its practices and its values, but also with all the laws and regulations surrounding its functioning. The Board of Directors also has a responsibility with regard to the measuring and monitoring of the organization's performance. Management is ultimately responsible for daily operations. Despite the fact that it must have them approved by the Board of Directors, it must define the organization's mission and strategy with the aim of ensuring the performance of the company. All of management's actions must be taken in accordance with the laws and obligations applicable to the company. Managers have the additional obligations of transparency and accountability toward the Board of Directors.

While the section on the contractual and legal aspects revealed several irregularities in the start-up of the project, it must now be determined whether, in carrying out the project, the city administration took the necessary steps to rectify these problems or to ensure the sound management of public funds.

3.3.1. GOVERNANCE—VILLE DE MONTRÉAL

3.3.1.1. COMPLIANCE WITH THE 1995 AGREEMENT INVOLVING THE VILLE DE MONTRÉAL AND THE SOCIÉTÉ EN COMMANDITE STATIONNEMENT DE MONTRÉAL

The city has the obligation to enforce the 1995 agreement signed with the SCSM, as well as the related legislation. Its enforcement must involve the notions of control and accountability of the management process.

With regard to monitoring and control, the 1995 agreement sets out certain mechanisms, which are reflected in the form of obligations imposed on the buyer, the SCSM. Section VIII of the agreement entitled [TRANSLATION] "Management" includes, among other things, the following articles:

[TRANSLATION]

"G. The Buyer will have to submit to the city and to the Third Parties/lenders, at the end of each quarter, a report outlining the activities of the Buyer as well as any other information that may be reasonably required by the city or the Third Parties/lenders."

FINDING

The SCSM submits to the city quarterly financial data related to the paid parking activities.

[TRANSLATION]

“H. The Buyer must submit to the city once a year, a report on the Buyer’s operating statement as well as the audited financial statements no more than ninety (90) days after each year end.”

FINDING

The SCSM’s financial statements for the 2009 fiscal year were not submitted to the city within the prescribed time frame. The SCSM budgets have, however, been submitted to the city.

[TRANSLATION]

“J. The Buyer agrees to, among other things, provide the city with the documentation that it requires, following its usual administrative practices, so that it may ensure the proper execution of this agreement.”

FINDING

We did not find any evidence of a request made by the city in this respect.

[TRANSLATION]

“L. The city’s Executive Committee will designate two people to act as directors on the Board of Directors of the Buyer’s acting partner, which cannot be made up of more than eight people.”

The minutes of the proceedings of Accesum (general partner acting on behalf of the SCSM) show that this condition was respected. During the period in which the public self-serve bicycle project was developed, i.e., from February 12, 2007 to December 10, 2009, the SCSM’s Board of Directors de the SCSM met 23 times.

FINDING

Out of a total of 23 meetings of this Board of Directors, here is the summary of absences of the directors designated by the city:

- **Director A: 11 absences**
- **Director B: 8 absences**
- **Directors A and B: 4 simultaneous absences**

FINDING

One of the two designated directors is also a member of Accesum Inc.'s audit committee (general partner acting on behalf of the SCSM). He was absent for three of the ten meetings that were held during this period.

We did not find any directive or description of the role of the director designated as representative of the city. Ultimately, in terms of the 1995 agreement, it is the accountability that is lacking, since the terms used (e.g., the city asks, requires, has a right to, and so on.) are generic and impersonal; they do not make any reference to officers, or managers.

To support these statements, the answers received from the city stakeholders involved were rather vague and not very convincing when we questioned them to determine:

- who, at the city, is responsible for applying the 1995 agreement;
- who must report on the actions of the SCSM to the city administration; and
- to whom this accountability reporting must be done.

FINDING

In general, the monitoring and control mechanisms set out in the 1995 agreement appear judicious. What is problematic is that these obligations have not been well defined by the city administration in an actual procedure and, moreover, nobody has been made responsible for the application of the contractual terms and conditions.

Recommendation

In order to ensure compliance with the agreements and protect the interests of the city, we recommend that the city's Executive Committee (where applicable, City Council):

- designate a business unit responsible for the application of the contractual terms and conditions binding the city to the Société en commandite Stationnement de Montréal and that this practice be extended to existing and future agreements with the Société en commandite Stationnement de Montréal or other organizations;
- when an agreement is concluded, elaborate a control and accountability plan in order to monitor its obligations and rights;
- formally determine its expectations and identify the expected accountability mechanisms when it designates or appoints directors to represent the city.

Action Plan of the Executive Committee

“As the department in charge of transportation, the Direction des transports coordinates the activities managed by the SCSM and ensures that it follows the agreement protocol, in collaboration with the Service des finances, which is responsible for following and enforcing all the financial clauses.

These responsibilities will be confirmed and, if necessary, accountability mechanisms will be established in order to further formalize these follow-ups.” (Planned completion: December 2011)

3.3.1.2. GOVERNANCE OF THE VILLE DE MONTRÉAL—BIXI COMPONENT

First, it should be reminded that the decision to implement the public self-serve bicycle system on the Montréal territory comes from a resolution of the city's Executive Committee. It is necessary to read the decision summary (No. 1074368001) attached to resolution CE07 1555 of the Executive Committee, because it puts into perspective the steps to be taken, the role as well as the responsibilities of stakeholders.

Following this same process, the city's Executive Committee (CE09 1215 dated July 2, 2009) entrusted the SCSM with the mandate of implementing phase II of the BIXI public self-serve bicycle system (100 additional pay station and 2,000 additional bikes). This resolution was accompanied by a decision summary, which commented on the financial aspects, among other

things, without, however, referring to the subsequent steps identified during the fall 2007 decision.

The two aforementioned resolutions are the only decisions of the city relating to the start-up of the BIXI project. They follow the priorities of the city's strategic plan and represent the steps of the project choice and its method of execution.

Project Analysis

Since the October 2007 decision record is the starting point of the BIXI project, we wanted to determine the extent to which the decision process, including the arguments presented in the text of this document, was subjected to thorough governance and control by the city.

We therefore asked the city employees involved in the BIXI dossier to provide us with the support documents for the decision summary, in particular the cost-benefit study referred to in the record. It should be reminded that the decisions of elected officials are, to a certain extent, dependent on the quality of the information submitted, which is often limited to the text of a decision summary.

In the case of the study, the decision summary in support of the decision of the Executive Committee provides major strategic information, in particular with regard to the ability of the SCSM to accept the mandate, its financial aspects and the implementation schedule. The following extracts particularly grabbed our attention:

[TRANSLATION] "Financial aspect(s)"

The costs of implementation of the project amount to 15 million dollars. The preliminary estimates made by [Société en commandite] Stationnement de Montréal are based on the implementation of 300 stations that can accommodate 2,400 bikes. The costs include the preliminary studies, the legal fees, the equipment development (design and manufacturing of the pay stations and the bikes), technological research and development. No disbursement is planned for the Ville de Montréal.

The first estimates are based on a use of 35% of the potential use in the high season (170 days) and 13% in the low season (70 days). With a projected fee for use of \$1.25\$/hour, the internal financing of the project would be ensured. It should be specified that these estimates do not take into account possible advertising or sponsorship revenue.

All the costs relating to the implementation of the project will be the responsibility of the [Société en commandite] Stationnement de Montréal. They will be financed through a bank loan, so that the annual royalties normally paid to city will remain intact and will not be compromised in any way.

Schedule and subsequent step(s)

- *Fall 2007: Phase 1—feasibility and cost-benefit studies; research and development of the technology needed for system operation; evaluation of the various bike models that could be used; analysis of the potential sites for the implementation of the stations*
- *Winter 2008: Phase 2—Presentation, testing and evaluation of a first bike model; creation by the Regroupement des CDEC of a social economy enterprise in charge of maintenance operations for the fleet of bikes and equipment*
- *Fall 2008: Phase 3—Start of a pilot project with the implementation of the first 50 stations and the commissioning of 300 bikes*
- *Spring 2009: Phase 4—Implementation of 50 additional stations and 300 more bikes*
- *Spring 2010: Phase 5—Addition of 200 more stations and commissioning of 1,600 bikes”*

FINDING

Regarding the financial aspects discussed in the decision summary, we found that they had been copied from a text written by the communications director of the SCSM. The financial data and the impact on the city’s finances were therefore dictated by the SCSM since they were not subjected to any evaluation by the department responsible for the dossier, at the time the SITE.

This finding was in fact confirmed to us by the stakeholders of this department. Moreover, the same type of text was repeated in the 2009 decision summary pertaining to the addition of bikes and pay stations, still without any assessment.

FINDING

More troubling, all the people from the city interviewed in this dossier (that is, the two directors designated by the city, the political attaché of the Executive Committee member, the Executive Committee member and the signatories of the decision summaries) told us they did not have in their possession any feasibility study, financing structure, risk analysis or cost-benefit study. Nevertheless, all these people were in favour of the implementation of the project without possessing the necessary information to make an informed decision.

In terms of the schedule and subsequent steps presented in the 2007 decision summary, we did not find any actual structured and documented evaluation of these. In fact, the review of the July 2009 decision summary makes no mention of any follow-up with regard to the steps to be taken to pursue the project as announced in 2007.

FINDINGS

- **The 2007 and 2009 decisions of the city's Executive Committee were made relying only on the words of the SCSM or the PBSC, without any validation of the information by a city stakeholder.**
- **The schedule set out in the 2007 decision summary was not supported by a structured and formally documented evaluation. No follow-up was performed in this respect. The July 2009 decision summary regarding phase II makes no mention of these issues.**
- **The fact that the Executive Committee approved this large-scale project without any serious study to support it was definitely not the best way to protect public funds.**

Export of the BIXI Concept

PBSC management as well as a political representative of the city stated to us that the export of the BIXI concept was always part of the BIXI project. According to them, this direction was essential since the BIXI project for Montréal alone was not financially viable without the contribution of additional revenue. This said, no document was submitted to us to support these allegations. According to the information gathered, the first official trace of the export option appears in the October 23, 2008, minutes of the SCSM.

If it was planned, from the beginning of the project, to export the BIXI concept and products, this implies that:

- the city was undertaking a profitable commercial activity without any legislation authorizing it to do so;
- SCSM and PBSC management knew from the start that the Montréal project would be unprofitable;
- the 2007 decision summary was based on the fact that the city could entrust the SCSM with the management of the Montréal BIXI project since there was no cost for the city. The information coming from the SCSM that was not validated by the city was therefore

voluntarily inaccurate since the financial balance dependent on export is not mentioned. Therefore, the operating losses were overlooked; and

- the risks for the city were not identified and evaluated.

Other stakeholders consulted claim that at the beginning, export was not part of the mandate assigned by the city and that they did not know at which point this direction was decided on. What is clear is that both the 2007 and 2009 decision summaries were silent on this avenue. Officially, the city never made any decision about the export of the BIXI concept products. Whether tacitly or implicitly, several city stakeholders supported this direction, either by participating in promotional activities, by voting on decisions of the SCSM and the PBSC or by failing to intervene. In fact:

- in 2009, the strategic choice of the SCSM or the PBSC to export the BIXI concept and products was known by the directors of these companies, the city officers involved in the dossier and the Executive Committee member responsible for the dossier. As early as November 2008, the SCSM Board of Directors ratified the approval of the manufacturing of 10,000 bikes at a cost of \$9.5M, even though at the time, the needs expressed the city were for only 2,400 bikes. The option to export was, therefore, planned from the start;
- there is no mention of the illegal character associated with exporting the BIXI products and concept in the 2009 decision summary;
- in July 2009, phase I of the project was completed and operational; and
- in 2009, both PBSC management and the Direction des transports of the SITE were aware that the Montréal BIXI operation would be unprofitable. Yet, the decision summary supporting the Executive Committee resolution dated July 2, 2009, indicates once again that there will be no cost for the city.

FINDING

It is clear that certain undisclosed information and the lack of serious analyses concealed significant risks for the city. The members of City Council, as they did not make any of the decisions with regard to the start-up of phases I and II of the BIXI project, were not sufficiently informed of the difficulties related to the project and its progression.

Responsibility of the Monitoring and Accountability Committee

Decision record No. 1074368001, in support of the Executive Committee resolution to entrust the SCSM with the mandate of implementing a public self-serve bicycle system in Montréal, reads: *[TRANSLATION]* “A monitoring committee, under the leadership of the *[Société en commandite]* *Stationnement de Montréal*, would be formed to which would be added the *Regroupement des CDEC* and the *Ville de Montréal*. This committee would ensure the completion of all the phases of the project. All the details relating to planning, implementation, operations, control, marketing and financing would be discussed within it.” Since this wording was the basis for the decision of the Executive Committee regarding the granting of the BIXI implementation mandated, we wanted to know if the project had been carried out in accordance with this outline. At the time, our goal was to ensure that sufficient and adequate management structures and processes had actually been put in place, allowing the monitoring committee to manage, control and report on its responsibilities.

First, we asked the two city representatives to provide us with the available documentation in relation to this monitoring committee and then we made the same request to the SCSM representatives.

The city and SCSM representatives then submitted to us the reports of this monitoring committee for the period from October 25, 2007 to September 8, 2008, which were drafted on SCSM letterhead. These reports were accompanied by progress reports detailing the work completed. The project’s overall progress status was also rated in a summary table using one of the following indicators: “V” (under control), “J” (actions required), “R” (major issue).

We also found that the minutes of the SCSM regularly referred to the activities of this committee and that a verbal accountability report was given to the directors.

FINDING

Yet, in reading these documents, we are not able to determine the content of the discussions. The reports in question were drafted in a telegraphic style, only identifying the topics of discussion. Moreover, the members of the monitoring committee present at the meetings are not identified in them. In short, we cannot clearly identify which decisions were made and by whom.

Consequently, we were unable to obtain confirmation that the city and CDEC representatives were actually involved in the project monitoring process as initially planned. To this end, we questioned directors and managers involved in the project about the actual participation of the city and CDEC representatives in this monitoring committee, and none of them were able to identify the members of the monitoring committee.

FINDING

We continue to question the participation of the city and CDECs, as set out in decision summary No. 1074368001. None of the officers consulted had received a mandate for the involvement in the governance of the BIXI project.

Furthermore, with regard to accountability, we understand, in light of the information from PBSC management, the Executive Committee member responsible for transportation (since November 2009), the political attaché involved in the BIXI dossier (since 2007) and one of the directors designated by the city's Executive Committee, that accountability reporting is done in two ways:

- The first is through regular meetings during which the Executive Committee member responsible for the transportation sector meets with the officers of the SITE. The information obtained indicates that the BIXI project was discussed when needed at these meetings.
- The second, less formal way is through discussions in which the President or Executive Vice-President of the SCSM, and subsequently the CEO and Chair of the Board of Directors of the PBSC, speak directly with the city Executive Committee member responsible for transportation regarding the project progression. One of the directors designated by the city also used this process, but in an apparently more sporadic manner. It was stated to us that this way of proceeding helps to properly follow the project tracking. This accountability mechanism is, in fact, reflected in the minutes of both companies.

We also found a document produced by the PBSC entitled [TRANSLATION] "BIXI, Montréal's public self-serve bicycle, presentation to the Executive Committee–Ville de Montréal, September 2009." This document provides the list of export projects (without, however, providing any financial information on this direction) as well as the operating cash flows for phase I and phase II of the Montréal BIXI. It also specifies an operating deficit for year I and an operating surplus for years II and III.

Lastly, apart from these communications of the information related to the progress of the BIXI project, we found that no formal (structured and documented) accountability mechanism was

established in order to periodically inform city authorities as to the progress of the project given the directions taken.

FINDING

According to the information obtained, the various stakeholders responsible for the dossier at the city are verbally informed of the dossier's progress; however, no formal (structured and documented) accountability mechanisms was established in order to periodically inform city authorities as to the progress of the project given the directions taken.

Recommendations

In order to allow the city administration to have an accurate portrait of the situation, we recommend that the Direction générale of the city take the appropriate measures so that, when such an important dossier is presented to the Executive Committee, a declaration form is established in which the business units deemed responsible:

- will indicate that all the aspects of the project have been examined (financial, legal and economic aspects, human resources, planned completion, and so on); and
- will attest to the accuracy, compliance and completeness of the information presented.

We recommend that the city's Executive Committee, in order to be formally informed and thus able to make an informed decision at the appropriate time with regard to all the projects and contracts deemed to be large-scale or related to priorities established by the city administration:

- require that progress reports be produced and that these be periodically presented to it; and
- formally designate the officers assigned to take part in the established monitoring committees and to report to it.

Action Plan of the Direction générale

"A while ago, the city administration adopted and modernized two management tools that structure large-scale projects: the governance framework for city asset management projects and programs and the new guide to preparing decision records. In addition, a process was put in place whereby the Commission sur l'examen des contrats reviews all contracts granted over

\$1M under certain conditions and any contract over \$10M as well as those that are to be examined at the request of the Executive Committee.

These new tools help to gather all the information needed for the various city authorities to make decisions, to clearly identify the responsibilities of the various stakeholders in the file and to structure accountability.”

3.3.2. GOVERNANCE BY THE SOCIÉTÉ EN COMMANDITE STATIONNEMENT DE MONTRÉAL AND THE PUBLIC BIKE SYSTEM COMPANY—BIXI COMPONENT

In observing the success that the BIXI project has known since its implementation, it is clear that the goal of this mandate, i.e., the implementation and operation of a public self-serve bicycle system in Montréal, was achieved. However, management’s responsibility was not limited to this. It had a duty to adhere to the policies established by the Board of Directors involved, not to mention the legal aspect. Moreover, the management of the operations related to this project was to be carried out in a transparent efficient and cost-saving manner. For their part, the boards of directors were to ensure sound management of activities.

It should be reminded that the PBSC is a company controlled by the SCSM: certain people were simultaneously directors and managers of both companies. Moreover, the SCSM finances the operations of the PBSC. In fact, the SCSM was supposed to carry out the BIXI project; the PBSC was only a means used to accomplish the mandate assigned by the city. In these circumstances, the SCSM had an obligation to control the actions of the PBSC, while together the two companies were to have obligations with regard to results and accountability. The close ties, joint responsibility in the execution of the BIXI project and the concomitant action of the two boards of directors call for a mutual analysis of the dossier’s governance.

For the purposes of our analysis, we examined certain processes inherent to the start-up of the project; for example, the preparing of a business plan by the executives in charge of the BIXI project, the approval of the inherent costs of the project by the boards of directors, the awarding of contracts, the decisions related to the export of the concept and products, as well as various other aspects related to the project’s governance that we considered appropriate.

3.3.2.1. BIXI PROJECT BUSINESS PLAN

A large-scale project such as BIXI is normally preceded by a business plan, which must, at the very least, contain:

- the description of the goods and services;
- the market study, including the fee structure and the targeted clientele;
- the description of operations, management method, administrative structure and the implementation schedule;
- the financial data for the first three years (pro forma balance sheet, income statements, cash flow budget);
- the financing structure; and
- the risk analysis.

In this respect, our audit did not reveal such a business plan at the start-up of the project. Both the city representatives as well as management of the SCSM and the PBSC stated to us that they did not have such a document in their possession. Moreover, in the minutes of the SCSM (then responsible for starting up the project) we found no reference to the existence of a business plan.

The only documents that we were able to find relating to the implementation of the BIXI project are three analyses, each entitled [TRANSLATION] “Summary analysis of the profitability of the public self-serve bicycle project in Montréal,” which were produced in May 2007, October 2007 and early 2008. These documents, which are about two pages each, were submitted to us by the Vice-President and CEO of the PBSC and the former Executive Vice-President of the SCSM. It should be mentioned, however, that no evidence of the approval by the SCSM Board of Directors of these project profitability analyses was traced in the minutes.

These rather limited analyses, accompanied by a few basic hypotheses, essentially presented the elements listed in table 1.

Table 1—Summary Analyses of the Profitability of the Public self-serve bicycle Project in Montréal

	Version 1* May 7, 2007	Version 3 October 31, 2007	Version 4 early 2008
Pre-project steps (e.g., legal considerations, non-capitalizable research and development)	\$0.400M	\$0.375M	\$0.375M
Estimated cost of fixed assets	\$12.640M	\$9.775M	\$15.687M
Estimated revenue	\$3.412M	\$3.429M	\$4.174M
Estimated operating costs	\$3.397M	\$3.369M	\$4.263M
Number of bikes	2,500	2,500	3,500
Number of stations	300	300	204

* Version 2 was not provided to us.

FINDING

These evaluations are, in our opinion, too basic to constitute a business plan. They are, at best, a preliminary draft of a potential pre-feasibility study.

FINDING

Moreover, the two companies (the SCSM and the PBSC) did not approve the operating budget, investment plan, or the fee structure expected for the BIXI project.

It is only in July 2008, long after the city's Executive Committee had assigned to the SCSM the mandate of implementing the project, that an external firm was mandated to conduct a market study. While it cannot substitute a complete business plan, this market study identified, among other things, the service area, the target clientele, the fee structure and the expected annual revenue.

FINDINGS

- The preliminary business plan for the start-up of the BIXI project, which should have been produced for such a large-scale project, was not found.
- The summary analyses of the profitability of the public self-serve bicycle project in Montréal produced at the start-up of the project were not approved by the SCSM Board of Directors.
- A market study was conducted in July 2008, long after the city's Executive Committee had assigned to the SCSM the mandate of implementing the project.

3.3.2.2. DECISIONS RELATED TO THE COSTS OF THE MONTRÉAL BIXI

With regard to the level of approval required, the information obtained from PBSC management indicates that it applies the procurement policy in effect within the SCSM, which is dated in March 2008. With regard to the delegation of powers, table 2 presents what this policy sets out.

Table 2—Delegation of Powers of the SCSM

	Goods and Services	Fixed Assets
Requesting manager	\$500 to \$5,000	\$0.01 to \$5,000
Executive vice-president	\$5,001 to \$25,000	\$5,001 to \$25,000
Chair of the Board of Directors	\$25,001 to \$50,000	\$25,001 to \$50,000
Board of Directors	\$50,001 and over	\$50,001 and over

Source: SCSM procurement policy.

Between September 6, 2007, and the 2009 year-end, the boards of directors of both companies (the SCSM and the PBSC) had to manage the BIXI project. In fact, it should be reminded that in 2007, it was the SCSM that started up and managed the BIXI project. Then, in September 2008, the PBSC was created and, in December 2008, it purchased from the SCSM all of the assets related to the project. Subsequently, the SCSM nevertheless continued to play a predominant role in the execution of the project. The major financial decisions were therefore within its jurisdiction. Here is what is indicated in their respective minutes regarding the purchases of fixed assets related to the Montréal BIXI project.

Table 3—Summary of Directors' Decisions—Fixed Asset Component—SCSM

Date of minutes Decision	Item on the Agenda	Amount
September 6, 2007 Authorization—preliminary study	6.11	\$50,000
December 4, 2007 Granting of the contract for the design	3.0	\$379,475
January 16, 2008 Granting of the contract for the market study and location analysis	3.0	\$98,400
May 8, 2008 Ratification of the approval of the contract for the development and procurement of the technological solution (approval by the Board of Directors via fax on April 24, 2008)	6.3	\$600,000
October 23, 2008 Approval of the payment of the licence to the supplier and prototypes	8.3.2	No amount specified
October 28 ,2008 Granting of a sponsorship contract	3.0	(\$250,000)
December 11, 2008 Ratification of the approval of the manufacturing of elements related to the docks (approval by the Board of Directors via fax on November 25, 2008)	7.3.2	\$2,496,900
December 11, 2008 Ratification of the approval of the manufacturing of the bikes (10,000 bikes for \$9,483,555) (approval by the Board of Directors via fax on November 25, 2008)	7.3.3	\$4,741,775*
December 11, 2008 Granting of a manufacturing contract for 1,875 technical platforms	7.3.4	\$1,664,438
December 11, 2008 Information on the fact that a budgetary envelope is required to finalize the work at the warehouse	7.3.5	\$750,000
TOTAL		\$10,530,988

* The members of the Board of Directors, including those designated by the city, approved, following an invitation to tender sent out in October 2008, the purchase of 10,000 bikes, 5,000 of which were to be delivered between March 31 and June 15, 2009. Out of the 10,000 bikes, 5,000 were an option. Considering that the bike fleet for the Montréal BIXI is 5,000 bikes, we considered their share of the contract (\$9.5M) to be \$4,741,775.

Table 4—Summary of Directors' Decisions—Fixed Asset Component—PBSC

Date of minutes Decision	Item on the agenda	Amount
April 21, 2009 Approval of the purchase of rolling stock and equipment	8.0	\$268,238
June 12, 2009 Following discussions with the representative of the city's Executive Committee, it is asked if it is possible to begin phase II immediately	5.1	—
October 1, 2009 Approval of a storage system	12.3	\$90,000
TOTAL		\$358,238

FINDING

We therefore found that the SCSM Board of Directors approved \$10.5M in purchases of fixed assets.

FINDING

For its part, the PBSC Board of Directors only approved \$0.4M in asset purchases. The PBSC's January 31, 2010, financial statements indicate fixed asset purchase costs of \$17.7M, to which we add the cost of the dual mode pay stations, i.e., \$6.6M (which were purchased by the PBSC and then sold in the same year to the SCSM), for a total of \$24.3M in purchases. These financial statements also reported \$3.2M in intangible assets. This would therefore mean that the boards of directors, according to the minutes, only approved \$10.9M (\$10.5M + \$0.4M) of asset acquisition out of a total cost of \$27.5M in purchases, that is, 40%.

FINDING

Although the PBSC representatives state that they apply the SCSM's procurement policy, we found that the acquisition of the dual mode pay stations at a cost of \$6.6M was not subject to any approval on the part of the PBSC Board of Directors, while the policy in question set out that fixed asset expenditures over \$50,001 must be approved by this body.

FINDINGS

- Between September 6, 2007 and October 22, 2009, several investments were made without the approval of the respective boards of directors.
- The rules for the delegation of powers set out in the SCSM's procurement policy, which were also those used by the PBSC, were not followed.

3.3.2.3. AWARDING OF CONTRACTS

With regard to the contract awarding method, table 5 presents what is stipulated in the SCSM's procurement policy.

Table 5—SCSM Contract Awarding Method

Value of Goods and Services	Method of Assignment
\$0.01 to \$5,000	By mutual agreement, at the discretion of the requesting person
\$5,001 to \$15,000	By mutual agreement, at the discretion of the director of the department involved, who justifies his/her choice to the executive vice-president after researching at least three suppliers
Over \$15,000	By invitation to tender, sent out to at least three suppliers approved by the executive vice-president

Source: SCSM procurement policy.

FINDING

We found that this policy does not require a public call for tenders. In fact, the administrative machinery rarely uses the public call for tenders mechanisms of the CTA.

As we will see below, the suppliers chosen for phase I were also those retained for the completion of phase II of the Montréal BIXI and, subsequently, for the execution of the export projects. Yet, the SCSM and, by extension, its agent the PBSC are subject to the contract awarding rules set out in article 573 of the CTA.

Pursuant to article 573 of the CTA, the general rule stipulates that contracts involving amounts under \$25,000 can be granted by mutual agreement, those involving amounts between \$25,000 and \$99,000 can be granted after call for tenders, by way of written invitation sent out to at least two suppliers, and contracts involving amounts of \$100,000 and up can only be granted after a public call for tenders. Add to this general rule the obligation to use, for all professional service contracts involving amounts of \$25,000 and over for which a city agency must send out a public call for tenders or invitation to tender, the two-step bid evaluation and weighting system. In the first step, the quality of the proposal is evaluated based on pre-established criteria in order to determine, where applicable, which bids did not obtain a passing grade (70%). The price of the bids is not considered until the second step.

Contract for the Design of the Public Self-Serve Bicycle System

With regard to the professional service contract granted by the SCSM for the design of a public self-serve bicycle system, we reviewed the public call for tenders record and the awarding procedure applied. This review revealed that the two-step bid evaluation and weighting system set out in article 573 of the CTA was advocated in the beginning. However, we found that these rules were not followed consistently. In fact, it appears that the final selection was not carried out based on a weighted calculation combining the results of the qualitative evaluation of the bid and its price.

More specifically, it is mentioned in section 6.2.2 of the call for tenders record, entitled [TRANSLATION] "Quotation": [TRANSLATION] *The selection committee then proceeds to the opening of Quotations presented in relation to the evaluated proposals (a maximum of five [5]) and evaluates their respective merits in view of the quality of the Proposals submitted.*"

Subsequently, an addendum dated November 20, 2007, was sent to bidders in order to clarify the selection procedure. In this addendum, it is mentioned that: [TRANSLATION] *"The Company is not obligated to accept the lowest Bid and reserves the right to retain any Bid that, in the Company's opinion at its discretion, is the best overall Bid."*

Thus, on December 4, 2007, the successful bidder (company A) was granted a contract valued at \$0.379M.

FINDING

We were able to observe that the price of company A's bid was 50% higher than that of the lowest bidder in contention. Moreover, we found, upon examination of version 3 of the document entitled « Summary analysis of the profitability of the public self-serve bicycle project in Montréal », which we discussed earlier, that the successful bidder had participated in the evaluation of this analysis in regard to, among other things, the evaluation of the cost estimates for the design of the public self-serve bicycle system. In our opinion, this fact call into question the objectivity, transparency and fairness of the awarding process implemented.

FINDING

In our opinion, the “discretionary” aspect of the selection method used defeats the purpose of the public call for tenders. This way of proceeding was not in accordance with the municipal contract awarding rules (article 573 of the CTA).

Contract for the Manufacturing of the Bicycles and Other Equipment

The choice of suppliers invited by the SCSM to present proposals for the manufacturing of the bicycles and other equipment was made with the participation of, among others, the designer retained following the awarding of the professional service contract that we just discussed, i.e., company A. In fact, according to the information obtained, it was retained by the SCSM as a contact for the pre-selection of suppliers to invite.

Following this invitation to tender, the contract for the manufacturing of the bicycles in the amount of \$9.5M was granted on November 25, 2008, to company B, which obtained the highest score and had the lowest price among the three invited bidders.

FINDING

It should be reminded that pursuant to article 573 of the CTA, a contract of such scale should have been awarded following a public call for tenders, which was not the case.

Company B therefore became the bicycle supplier, even though based on the information gathered, it had participated in the design of the prototype. This claim comes from the fact that the system designer’s bid (company A) included costs of \$55,000 payable to company B for the manufacturing of the prototype. Therefore, we can conclude that, in a way, the eventual supplier drafted part of the estimates of the call for tenders for the manufacturing of the bicycles.

Moreover, in version 4 of the document entitled “Summary analysis of the profitability of the public self-serve bicycle project in Montréal,” dated early 2008, it is indicated that company B provided the cost estimate for the 3,500 bicycles.

Therefore, it is clear that company B also benefited from privileged information before submitting its proposal for the manufacturing of the bicycles.

FINDING

The bicycle supplier collaborated in the bicycle design in addition to assisting the SCSM in the evaluation of the project costs several months before the invitation to tender was sent out. Once more, the fairness of the awarding process was in no way ensured. Because of the privileged information that it had, the successful bidder had an undeniable advantage over its competitors.

Contract for the Purchase of Pay Stations

On April 24, 2008, the members of the SCSM Board of Directors approved (by fax) the granting of a contract for the development and procurement of the technology solution in the amount of \$0.6M to company C.

According to the preamble of this contract, the PBSC proceeded by call for tenders for the design and development of the various components of a public self-serve bicycle system, with the exception of the electronic and computer-related aspects. We therefore presume that the electronic and computer-related aspects, which are part of the contract mentioned above, were granted by mutual agreement, whereas the large sums involved (\$0.6M) would instead call for a public call for tenders. Moreover, version 3 of the document entitled [TRANSLATION] "Summary analysis of the profitability of the public self-serve bicycle project in Montréal," dated October 31, 2007, indicates that the SCSM also called on company C to estimate the computer system development costs. This supplier was therefore involved in the BIXI project from the start.

La resolution ratified by the members of the SCSM Board of Directors pertaining to the granting of the contract to company C indicates, among other things, the following:

*[TRANSLATION] "Whereas it was discussed and agreed during the meeting of the Board of Directors on December 13, 2007, that [company C] would be mandated to add a "public self-serve bicycle" feature to the existing operating system, including the user interface, the link protocol, the "back office" and all other elements required to make the system operational;*⁸

Whereas prototypes is set to be delivered on September 15, 2008, a total amount of \$600,000 is required for the technological development, the integration with the current system and the development of prototypes; [...]

⁸ Our underlining.

IT IS RESOLVED:

TO APPROVE the amount of \$600,000 (plus applicable taxes) for all the technological development, for the required software and hardware development [...].”

The contract in question was signed by the Executive Vice-President of the SCSM (the client) as well as by the President and CEO of company C (the supplier) on April 18, 2008, six days before the approval by the members of the SCSM Board of Directors. It should be mentioned, moreover, that we did not find any written record of the discussion pertaining to what was agreed on at the Board of Directors meeting on December 13, 2007, as stipulated in the above-mentioned resolution.

Furthermore, the text of the resolution dated April 24, 2008, provides for the addition of a “*public self-serve bicycle*” feature to the existing system in order to make it more functional, and states that company C must develop and produce the prototype to be integrated into the SCSM’s current system. The contract signed on April 18 does not reflect the content of the resolution in the sense that the description of the product (e.g., electronic device, software and pay stations) makes no reference whatsoever to a feature specific to parking.

What’s more, according to this same contract, the price of the pay stations is established at \$13,000 per unit, without any consideration of an eventual use for parking. However, according to the information obtained, and as mentioned in section 3.2.1 of this report “Dual mode pay stations,” a single mode pay station exclusively meeting the needs of the BIXI project would have cost \$6,000, whereas the cost of a dual mode pay station would have been \$16,000. Furthermore, it should be reminded that it is this proportion of \$6,000 out of \$16,000 that was used to divide the annual expenses (lease) between the SCSM and the PBSC following the acquisition of the dual mode pay stations at a cost of \$6.6M by the SCSM on December 16, 2009. In short, we found that the price of the pay stations (\$13,000) stipulated in the contract is incompatible with the price of \$6,000 stated for a single mode BIXI pay station.

It should be reminded that the resolution dated April 24, 2008, alludes to the development of the dual mode pay station, i.e., a two-part system consisting of: a) BIXI and b) parking.

This resolution stipulates the addition of a “*public self-serve bicycle*” feature to the existing operating system. However, the contract restricts the development of the system to the needs of BIXI exclusively. There is no reference in the contract to the pay stations and systems used by the SCSM for the management of paid parking.

Based on our understanding, the contract signed is much more than a technology development contract. It appears more like a five-year alliance for the development of a single mode pay station, where only part “a) BIXI needs” will be executed. It is also an agreement for the purchase of pay stations, for which the prices had already been agreed on. Moreover, through this supposed development contract, the SCSM acquired a user license limited to the territory of the Greater Montréal area.

Going forward, on December 3, 2008, the PBSC signed a [TRANSLATION] “joint market release agreement.” This contract does not appear in the minutes of either the PBSC or SCSM Board of Directors. Articles 1 and 6, in particular, state:

[TRANSLATION] “1. The parties agree to carry out in a joint and mutually exclusive manner the market release, sale, rental or licensing of the hardware and software for the public self-serve bicycle system developed for Stationnement de Montréal (the “public self-serve bicycle system”), as well as any improvement it in the context of the public self-serve bicycle system for a period of five (5) years for the entire world.”⁹

“6. The parties agree that an essential consideration of this agreement is the achievement of a minimum objective for annual sales from [company C] to PBSC, directly or indirectly, of three hundred (300) pay stations. Consequently, PBSC agrees to buy from [company C], every year beginning upon signing of this agreement and for the term of this agreement, a minimum quantity of 300 pay stations of the public self-serve bicycle system, and [company C] agrees to deliver said pay stations to the PBSC in the reference year (beginning and ending on the anniversary of this agreement) and for the term of the contract.”

This type of agreement is possibly essential to selling the BIXI concept and products outside the Montréal territory. The directors should have therefore approved the export component before signing this contract. It is a major strategic direction fraught with consequences.

⁹ Our underlining.

FINDINGS

- The contract with company C in the amount of \$0.6M was granted by mutual agreement, which is not in accordance with the municipal contract awarding rules.
- The pay station supplier was involved from the beginning of the project. Much like the designer, they possessed information and details that were not made available to the competition.
- In 2009, the so-called dual mode pay stations were purchased by the SCSM at a cost of \$16,000, while the contract states a base price of \$13,000. The difference can be explained by the addition of bicycle components.
- The contract was signed before approval by the SCSM Board of Directors.
- The April 24, 2008, resolution does not reflect the terms of the contract signed on April 18, 2008, namely in that:
 - the dual mode pay station is not the subject of the contract;
 - the price of the pay stations (\$13,000) stipulated in the contract is incompatible with the price of \$6,000 stated for a single mode BIXI pay station; and
 - the commercial direction, including the export, was in the directors' plans even before the finalization of phase I of the Montréal BIXI.

Recommendation

In order to ensure compliance with the laws and regulations and well as the rule of authority in effect, we recommend that the management and boards of directors of the Société en commandite Stationnement de Montréal and the Public Bike System Company take the necessary measures to:

- ensure compliance with the contract awarding rules set out in article 573 of the *Cities and Towns Act*, to which these companies are subject;
- assure potential bidders that the process surrounding the awarding of contracts within these companies benefits from all the transparency, fairness, and objectivity required, as set out in the contract management policy in effect at the city;
- ensure compliance with the decision levels set out in the power delegation policy in effect; and
- ensure, when required, that the authorizations required prior the awarding of contracts are obtained in a timely manner.

Action Plan of the Société en commandite Stationnement de Montréal

“The management and directors have read the recommendation related to the rules for awarding contracts. Below are the actions that have and will be taken to ensure compliance:

- *A summary of the process to follow for awarding city contracts was distributed to the members of the SCSM audit committee well as a summary of the procedures and provisions set out in the Cities and Towns Act (art. 573); **(Planned completion: May 2011)***
- *The members of the Board of Directors were informed by the audit committee about the impacts of applying these procedures and the modifications to be made to the SCSM's internal procurement policy; **(Planned completion: May 2011)***
- *Training for all SCSM managers on the applicable legislative rules, the drafting of call for tenders documents and all the obligations resulting from the contractual process, including the city contract management policy as well as adherence to decision levels set out in the power delegation policy in effect and the authorizations required prior to the awarding of contracts; **(Planned completion: September 2011)***
- *Compliance control checklist maintained by management and report made to the audit committee at each of its meetings; **(Planned completion: August 2011)***
- *Amendment to the internal procurement policy (2008 version) with regard to the SCSM's purchases of goods and services in accordance with the laws and regulations that are applicable to the SCSM and including the standards established in the contract management policy in effect at the city; **(Planned completion: August 2011)***
- *Formal adoption by the Board of Directors of a resolution related to the application of the contract management policy in effect at the city and compliance with the obtaining of the necessary authorizations prior to the awarding of contracts.” **(Planned completion: September 2011)***

Action Plan of the Public Bike System Company

*“Adopt the SCSM procurement policy as modified by the addition of the contract awarding rules provided for in article 573 of the Cities and Towns Act. **(Planned completion: June 2011)***

*Give full effect to the agreement signed with the Ville de Montréal by adopting the contract management policy, as provided for in the agreement concluded in November 2010 and signed on May 31, 2011, adapted to the context of the SCSM.” **(Planned completion: June 2011)***

3.3.2.4. DECISIONS RELATED TO THE EXPORT OF THE BIXI CONCEPT AND PRODUCTS

The moment the PBSC sells goods and services (concept, bicycles, pay stations and expertise), whether by responding to a call for tenders or any other way, this organization becomes a merchant.

Exporting goes beyond the mandate assigned by the city's Executive Committee; however, it is clear that certain city stakeholders were enthusiastic about this prospect. In fact, an elected official participated in promotional activities abroad and the city boasts about the success of BIXI.

The export component appears, according to the minutes of the SCSM, at the end of the 2008 fiscal year, a period that coincides with the beginning of the activities of the PBSC (September 2008). This means that most of the decisions regarding this expansion were those of the PBSC. The minutes state that the solicitation and management of the export component was the doing of the senior management of the PBSC. However, on February 10, 2009, the minutes of the PBSC Board of Directors makes reference to the strong demand for information from foreign cities regarding BIXI. The members of the Board are informed about the work in progress in Québec, Canada, the United States and Europe. Recall that, at this date, the purchase and market development contracts had already been signed.

On June 12, 2009, PBSC management informed its Board of Directors that the PBSC won the call for tenders from the City of Ottawa to carry out a demonstration project (\$70,000 project). Furthermore, management shared information with the members of the Board about the London, Boston, Toronto and Vancouver files.

While, at this meeting, the members of the PBSC Board of Directors accepted the Ottawa-Gatineau project, they nonetheless made it known that they should be informed about projects and that their approval should be required, particularly:

- for bids with minimum and maximum mandates (minima and maxima); and
- when there are cost overruns.

The members also stated that they wanted to receive the pro forma of the Ottawa project and that plans for each project should be presented to them so that they may be properly informed (e.g., framework for each project including all the required information: nature of the project and financial information).

This is the first time that the Board of Directors enforced governance rules in the business management of the PBSC. Subsequently, the Board of Directors approved, among other things, budgets in the order of \$26.5M for the London project. These decisions were based on the fact that the suppliers were the same ones involved in the Montréal project and that they had been selected, according to management, by process of call for tenders.

In the minutes dated September 2, 2010, the last ones of the PBSC examined as part of our audit, we found that budgets and financial reports relating to the export projects were presented to the directors.

FINDING

The PBSC Board of Directors has begun setting management guidelines.

3.3.2.5. OTHER ASPECTS OF GOVERNANCE

Even though the PBSC in a young company, it remains that the management and several directors of this organization had knowledge about the SCSM's way of doing business. Nevertheless, we found that the decisions that are vital to the sound management and smooth-running of a project or to the start-up of any company were not made by the Board of Directors, at least not on September 2, 2010.

In this regard, we found that the SCSM Board of Directors had raised certain weaknesses in the business management of the PBSC. In particular, the minutes of the SCSM Board of Directors indicate the following:

- December 10, 2009: *[TRANSLATION] "Following discussions, it is acknowledged that various operations of each entity lacked structure."*
- March 25, 2010: *[TRANSLATION] "Following the presentation, it is clear that certain inconsistencies occurred in the delegation of power between the Ville de and the Société with regard to the implementation and management of the Public Bike System Company."*

In our opinion, among the initial key decisions in the start-up of a company, a Board of Directors must unquestionably approve at least the following elements:

- the delegation policy
- the remuneration and hiring policy
- the code of ethics

- the budget and fee structure
- the management and approval method for the representation and travel costs of the members of the Board of Directors and management
- the investment plan
- the control process for purchases, sales and salaries
- the accountability method

FINDING

The minutes of the PBSC Board of Directors show very few decisions on these issues. Those of the SCSM Board of Directors do not specify any guideline limiting the powers of the PBSC and do not indicate that an accountability mechanism was put in place.

We observed that either the Chair of the Board of Directors or the management of the two companies reported on the progress of the BIXI project at almost every board meeting. The accountability process was primarily verbal. The minutes nonetheless refer to the steering committee, discussions with the city, the progress of the BIXI project and, at times, the difficulties encountered along the way.

On April 21, 2009, The PBSC Board of Directors approved the constitution of the audit committee, the governance committee, the human resources committee and the sustainable transportation committee. These decisions indicate that concrete actions to improve the governance of the PBSC will be taken. The minutes of the PBSC report on some of the work of these committees:

- meeting of the Board of Directors on January 29, 2010:
 - A policies and procedures manual based on that of the SCSM was to be presented to the human resources committee in the coming weeks.
 - A procurement policy manual was to be presented to the audit committee in the coming weeks.
- meeting of the Board of Directors on February 25, 2010:
 - The Board of Directors approved the group insurance program, the RRSP program and the list of statutory holidays.
 - The Board of Directors approved a resolution for the signing of all new contracts pending the procurement policy.

FINDING

With regard to governance, there are still policies and procedures to be put in place. We can only encourage the members of the Board of Directors to continue their efforts to provide the PBSC with the appropriate rules and procedures to ensure the sound management of operations.

FINDING

The SCSM and PBSC boards of directors gave a lot of freedom to their respective senior managements. The boards of directors of both companies did not put in place the necessary control mechanisms for transparent management and were often informed after the fact.

Recommendation

In order to strengthen the management of operations, we recommend that the Board of Directors of the Public Bike System Company develop the appropriate control and accountability mechanisms, as well as adopt strict and transparent management policies.

Action Plan of the Public Bike System Company

“Conduct a review of the policies, before August 1, 2011, and report to the Board of Directors all modifications required in order to ensure that they are consistent with the agreement entered into with the Ville de Montréal in November 2010 and amended on May 31, 2011. (Planned completion: August 2011)

Change the SCSM year end date from January 31 to December 31 so that it coincides with the fiscal year of the Ville de Montréal.” (Planned completion: June 2011)

4. CONCLUSION

The Montréal BIXI project was carried out within a governance structure that can be described, in some respects, as hybrid, wherein, in certain cases, the decision making and ways of doing things were inspired by those often used by single owner businesses, while in other situations it was partly the unavoidable rules that apply to directors having to report to shareholders that

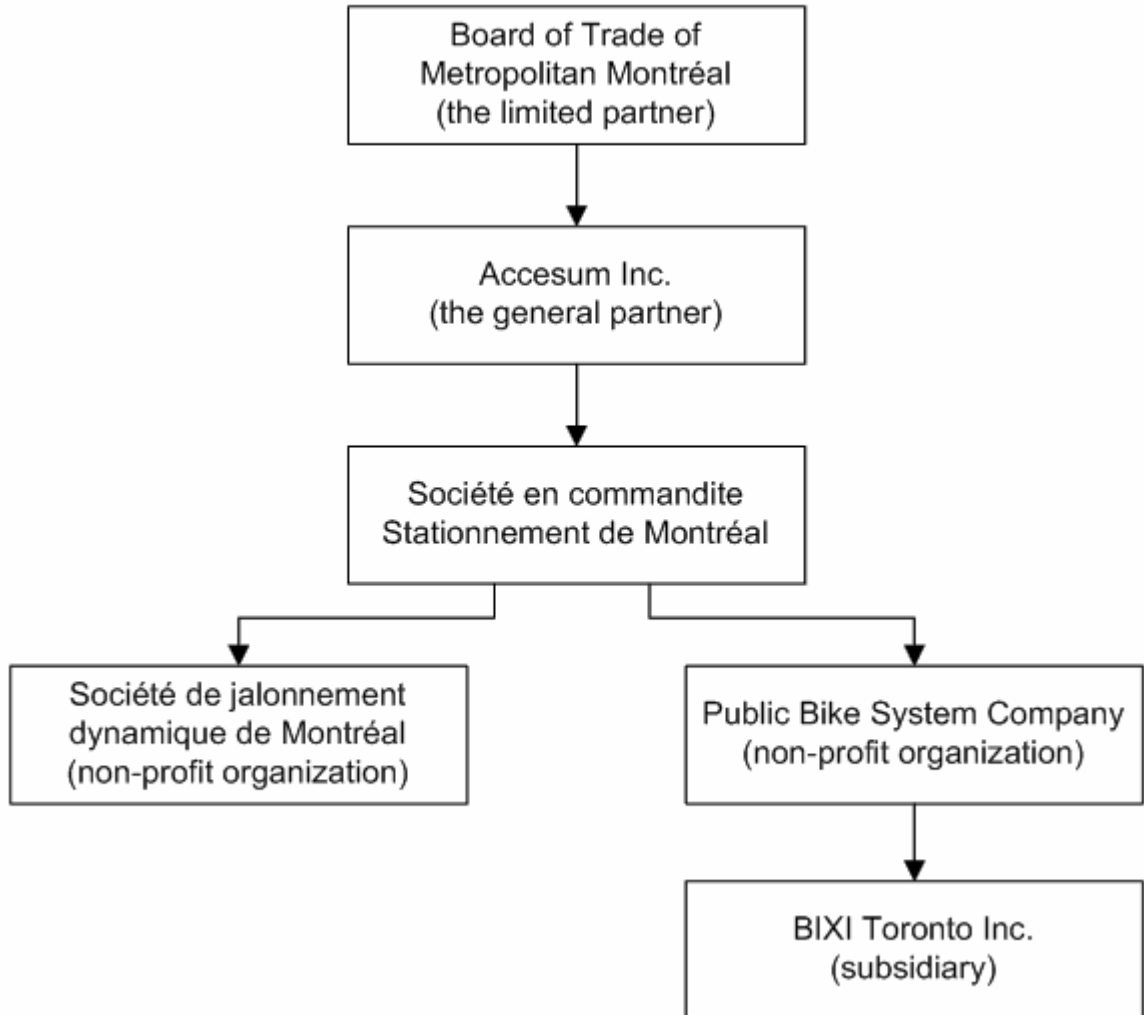
were followed. However, the BIXI project is a public project. Consequently, its planning and execution must absolutely be imbued with a governance framework that is reassuring for the public and respectful of the uses of the public sector.

The general purpose of this report was to ensure that the BIXI project had been managed and controlled in a thorough manner. However, we found that several basic rules of management were neglected or circumvented. Moreover, the city's passivity coupled with the loose actions of the SCSM and PBSC boards of directors raise several questions in many respects.

The significant amounts of money involved, the need to protect the city's corporate image, the potential losses to eventually be assumed by it, its involvement in the financing of both companies and the risks it entails, added to the questionable accounting treatments, the weaknesses found with regard to control and the lack of transparency, are all factors that require that corrective measures be taken as soon as possible.

5. APPENDICES

5.1. ORGANIZATIONAL STRUCTURE—BIXI PROJECT



5.2. TIMELINE OF EVENTS—BIXI PROJECT

DATE	EVENT
March 10, 1994	The Québec government approves the modifications to the Charter in order to allow it to entrust the BTMM with the management of paid parking on its territory.
January 1, 1995	An agreement is concluded between the city and the BTMM (through its agent, the SCSM) for the management and operation of paid parking on city territory.
October 3, 2007	The city's Executive Committee entrusts the SCSM with the mandate to implement a public self-serve bicycle system in Montréal. (Resolution CE07 1555)
September 8, 2008	The PBSC is constituted.
December 31, 2008	The SCSM sells to the PBSC all of its rights and interests in the assets needed to promote and operate the public self-serve bicycle system.
May 12, 2009	The public self-serve bicycle system is officially launched.
July 2, 2009	The city's Executive Committee mandates the SCSM for the implementation of phase II of the public self-serve bicycle system BIXI involving the implementation of 100 additional stations and the addition of 2,000 bicycles. (Resolution CE09 1215)
December 16, 2009	The PBSC sells and transfers all the pay stations to the SCSM at a price of \$6.6M.
December 14, 2010	City Council approves the agreement protocol between the city and the PBSC and secures the loans and lines of credit taken out by the PBSC from a financial institution. (Resolution CM10 0944)
February 17, 2011	A subsidiary of the PBSC, BIXI Toronto Inc., is created.
May 17, 2011	City Council repeals the December 14, 2010, resolution (CM10 0944) and approves: <ul style="list-style-type: none"> • the draft agreement between the city and the PBSC that establishes the payment and repayment conditional of a loan of \$37M from the city to PBSC; • The securities for the loans and financial tools taken out by the PBSC from a financial institution conditional on authorization by the MAMROT. (Resolution CM11 0371)

