4.6.
CYCLING NETWORK MANAGEMENT

April 18, 2018

SUMMARY OF THE AUDIT

OBJECTIVE

To ensure that the city's management practices are adequate for ensuring the proper maintenance and safety of the cycling network and its upgrade and development in accordance with the priorities approved by the relevant authorities and the needs of cyclists.

RESULTS

Since 2008, significant efforts have been made to develop the cycling network approved by the urban agglomeration council. At the end of 2017, there were still approximately 430 km of the cycling network to be developed in order to reach the target of 1,280 km (33%) in addition to new strategic orientations adopted by the authorities that must now be taken into consideration. These include the "*VISION ZÉRO décès et blessé grave*" and the commitment to increase the practice of cycling in metropolitan Montréal. Against this backdrop, we believe that improvements should be made with regard to the following key aspects:

- The new priorities recently approved by the authorities, along with the safety and land use planning requirements and the needs of cyclists, are not reflected in the *Plan du réseau cyclable* currently in effect;
- The people in charge do not have all the required data on the cycling network (state and compliance with standards), bicycle path traffic and the type and number of accidents involving cyclists, making it difficult to plan its development and upgrade;
- Development and upgrade projects are selected based almost exclusively on the number of kilometres. Additional criteria will need to be established to determine the priority projects that meet the strategic orientations of authorities;
- No service levels or minimum maintenance standards for the existing cycling network have been established and approved by the authorities;
- No permanent mechanisms have been put in place to evaluate the level of client satisfaction with the development, upgrade, safety and maintenance of the network;
- Accounting reporting mechanisms must be put in place following the adoption of the *Plan-cadre vélo* and upon approval of the "*VISION ZÉRO décès et blessé grave*" action plan to demonstrate the achievement of the established objectives.

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

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

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

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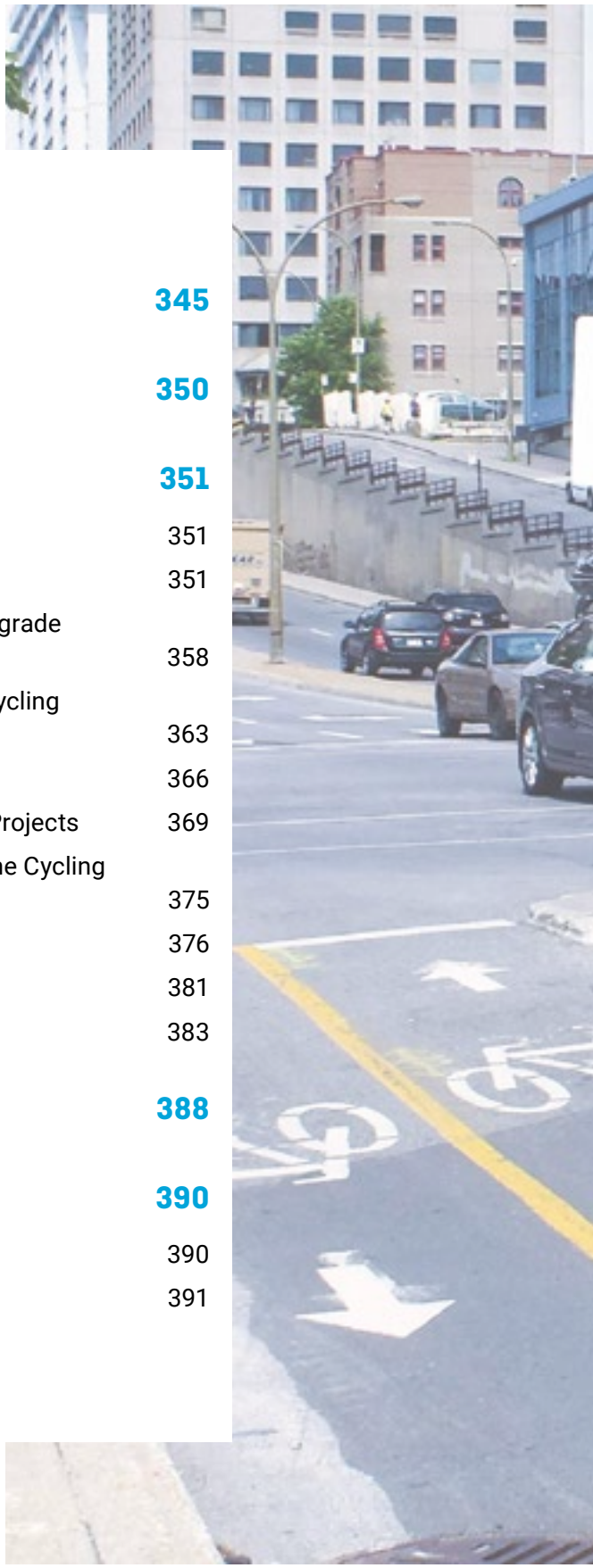

LIST OF ACRONYMS

CMM
Communauté métropolitaine de Montréal

MTMDET
Ministère des Transports, de la Mobilité durable et de l'Électrification des transports

MTQ
Ministère des Transports du Québec

PMAD
Plan métropolitain d'aménagement et de développement

SCA
Service de la concertation des arrondissements

TCWP
Three-Year Capital Works Program

1. BACKGROUND

The cycling network of Ville de Montréal (the city) and agglomeration was developed in stages through initiatives by the city and the Government of Québec. The first bikeways were introduced in Montréal in the 1970s. This was followed by a second phase of development in the 1980s, which was initiated by the *Programme d'aide à l'aménagement de voies cyclables* implemented by the Ministère des Transports du Québec (MTQ). The launch of Route verte in 1995 marked the start of a third phase of development, which involved connecting several main routes of the city's cycling network and developing new ones.

In recent years, a new phase of development firmly focused on transportation was put in place with the implementation of the city's *Plan de transport* adopted by the urban agglomeration council in June 2008. This strategic plan proposed 21 development programs to be carried out in the decade that followed. One such program involved the development of a cycling network, while another focused on transportation safety:

- Development program 13 / Double the cycling network within seven years (2008-2014):
  - City's strategic orientation: To become a foremost *Plan du réseau cyclable* and benchmark recognized for its cycling network;
  - Priority actions:
    - › Pursue the development of new bikeways as indicated in the *Plan du réseau cyclable* presented in the *Plan de transport* (400 km to 800 km);
    - › Develop a winter cycling network;
    - › Upgrade the current cycling network.
- Development program 17 / Enhance transportation safety:
  - City's strategic orientation: To reduce accidents by 40% in the next ten years, as the first step of the "*VISION ZÉRO décès et blessé grave*";
  - Priority actions:
    - › Set up a *Bureau de la sécurité des déplacements* (office of travel safety) in 2008;
    - › Modify street design.

In the years that followed, the city was required to comply with the strategic orientations adopted by the Communauté métropolitaine de Montréal (CMM) on land use planning, transportation and the environment. In its *Plan métropolitain d'aménagement et de développement* (PMAD), which came into effect in March 2012, the CMM was aiming to make Montréal "un Grand Montréal avec des réseaux et des équipements de transports performants et structurants". Its objective was to promote active mobility across the city and, as such, it focused on defining a *Réseau de vélo métropolitain*. To comply with the PMAD, among other reasons, the urban agglomeration council adopted the *Schéma d'aménagement du territoire de l'agglomération de Montréal* in January 2015. This plan aligns with

the city's strategic documents, including the *Plan de transport* adopted in June 2008. The main orientations of the plan include the development of the cycling network as follows:

- Promoting an excellent living environment. One of the objectives is to design neighbourhoods in a way that promotes an active lifestyle among residents, encourages walking and cycling as modes of transportation and reduces reliance on automobiles. To do so, the plan recommends the development of a cycling network linking different centres of interest and ensuring its integration into the public transit system. It also recommends the development of infrastructure that promote greater safety for pedestrians and cyclists;
- Improving accessibility based on the needs of different sectors. One of the objectives is to increase and improve the public transit and active transportation offer[1] and promote complementary modes of transportation so that by 2021, 55% of all morning rush hour trips by residents are done using public transit and active transportation. To this end, the plan recommends:
  - The development of local mobility plans for boroughs and municipalities that reflect the orientations of the land use development plan and of the *Plan de transport* at the local level;
  - The integration of infrastructure that encourage the use of public transit and active transportation during major road restoration or construction projects.
- Ensuring the accessibility to the downtown core at all times through effective public transit and active transportation measures.

Simultaneously, in 2014, the *Plan du réseau cyclable*[2] included in the *Plan de transport* was reviewed. Also during the same period, the municipal administration focused on the objective of developing 50 km of bikeways annually. In January 2015, the urban agglomeration council adopted an amendment to the 2008 *Plan de transport* following the update of the current and planned *Plan du réseau cyclable*. The existing network spanned 680 km and the projected network covered 600 km, for a total of 1,280 km. At the time of producing our audit report, it is this current and planned *Plan du réseau cyclable* which is in effect.

In June 2016, the urban agglomeration council adopted the *Sustainable Montréal 2016-2020 Plan*, which includes achieving a 1,000 km cycling network by 2020 in order to reduce greenhouse gas emissions and dependence on fossil fuels. Since that time, other orientations have been adopted by the authorities. These will have an impact on the development planning of the cycling network and the design of bikeways since they include performance indicators other than the number of kilometres achieved. For instance, in September 2016, city council formally committed to the "*VISION ZÉRO décès et blessé grave*" approach

1 Active transportation: any mode of transportation involving an expenditure of energy by human beings (walking, cycling, inline skating).

2 It refers to a map of the current and planned cycling network.

intended to protect vulnerable users, including pedestrians and cyclists. The new approach focuses the efforts of all stakeholders towards the same goal: safety.

In September 2017, the urban agglomeration council approved a first strategic plan entitled "*Plan-cadre vélo*", which outlines the city's intention to promote cycling as a mode of transportation on the Island of Montréal and increase cycling's modal share[3] by 15% in central neighbourhoods[4] in the next 15 years.

Recently, in November 2017, the CMM approved the *Plan directeur du Réseau vélo métropolitain*. The network is expected to cross 78 of the 82 municipalities of Greater Montréal. It will be composed of 70 routes, for a total of 1,600 km, in addition to the cycling and walking trail between Oka and Mont-Saint-Hilaire. The metropolitan cycling network will be complementary to the local networks and to the *Route verte*. It is expected to position Greater Montréal as a leading cycling region in North America by 2031. The targets focus on increasing cycling's modal share from 1.8% in 2011 to 3.8% by 2031. In coming years, the city will definitely need to take this plan into account when developing the cycling network.

All these orientations taken since the adoption of the *Plan de transport* reflect the growing popularity of cycling in recent years.

Here are a few statistics to illustrate:

- According to a 2015 survey by Vélo Québec on the state of cycling, the agglomeration of Montréal has more than one million cyclists ages 3 to 74 (representing almost half of the population). Of this number, close to half – or 536,000 cyclists – regularly use their bicycle to go to work, get to school, visit friends or go elsewhere. In other words, cycling has now become much more than a leisure activity; it is a mode of transportation for day-to-day life;
- According to data from the latest *Origine-Destination*[5] surveys conducted in Montréal by the Agence métropolitaine de transport, the modal share of cycling trips has considerably increased in recent years when compared to overall trips. In 2013, 2.5% of trips were made using a bicycle in the Montréal agglomeration. 1 in 40 trips to work, school or elsewhere is made by bicycle. It should be noted that given the four distinct seasons that exist in Québec, the modal share of cycling fluctuates based on the month of the year;

3 The modal share of public transit indicates the overall use made of public transit compared to other urban modes of transportation available. The measure is generally obtained from a survey conducted as part of a study on urban transportation. The *Origine-Destination* survey, which is carried out at regular intervals by the Agence métropolitaine de transport, evaluates the share of the different modes of urban transportation. Urban transportation refers to trips made by car, public transit, active transportation and other motorized vehicles.

4 Composed of nine boroughs and one related municipality: Ville-Marie, Côtes-des-Neiges–Notre-Dame-de-Grâce, Plateau-Mont-Royal, Sud-Ouest, Mercier–Hochelaga-Maisonneuve, Outremont, Rosemont–La Petite-Patrie, Verdun, Villeray–Saint-Michel–Parc-Extension and Westmount.

5 The *Origine-Destination* surveys and the Statistics Canada census are the two main sources of information used to track the evolution of cycling in Montréal. Data from the *Origine-Destination* surveys have the advantage of including all transportation modes and destinations (work, but also school, shopping and leisure activities).

- Every day, an average of 116,000 cycling trips are made in the Montréal agglomeration. This represents a 57% increase between 2008 and 2013[6]. This growth is closely linked to the development of the cycling network and the implementation of traffic-calming measures;

- According to the CMM, in March 2017, the popularity of cycling and the size of Montréal's cycling network made Montréal and the greater metropolitan area a leader in North America. In North America, Greater Montréal ranks 5th, with Vancouver, among the metropolitan regions boasting the highest share of residents using cycling as a mode of transportation to go to work (1.8%), just behind the regions of Portland (2.4%), Ottawa (2.2%), San Francisco (2%) and Sacramento (1.9%)[7];

- In addition to having one of the highest modal shares for cycling in North America when it comes to commuting from home to work, the agglomeration also has one of the largest cycling networks (approximately 850 km in 2017) and self-service bike-sharing system (540 stations and 6,200 BIXI bicycles)[8];

- According to an index by the Danish Copenhagenize Design Company, which measures the place of cycling in 122 cities with a population of 600,000 or more, Montréal ranks 2nd in North America and 20th in the world of bicycle-friendly cities based on a variety of indicators (2015 index). The ranking uses 13 indicators, some quantitative (e.g., cycling's modal share, proportion of male versus female cyclists), others qualitative (e.g., influence of proponents of cycling culture, consideration given to cycling in urban planning)[9].

In terms of the division of powers in matters related to the management of the cycling network, the following should be noted:

- Under the schedule of the Order in Council (1229-2005) related to the Montréal agglomeration, the urban agglomeration council is responsible for the current and planned cycling network on the Island of Montréal presented in the *Plan de transport*, since it falls under equipment, infrastructures and activities of collective interest. The current and planned cycling network on the Island of Montréal presented in the *Plan de transport* is composed of both on-street and off-street (e.g., in large parks) bikeways. According to the Order in Council, the urban agglomeration council is responsible for the management, funding and use of the revenues generated. According to this Act, as a central municipality, the city has jurisdiction in its own territory and in the territory of any other related municipality[10]. It should be noted that since May 2016, the urban agglomeration council has delegated to city council the development and redevelopment of the city's cycling network identified in the *Plan de transport*. At the city level,

6 *Plan-cadre vélo* (2017), Ville de Montréal et l'état du vélo à Montréal (2015), Vélo Québec.

7 Sources: Statistics Canada, NHS2011; U.S. Census Bureau, ACS 2011, Traitement CMM 2017.

8 Plan-cadre vélo (2017), Ville de Montréal.

9 Sources : Bulletin de la CMM – Perspectives Grand Montréal – mars 2017 (http://copenhagenizeindex.eu/criteria.html).

10 Under the Act respecting the exercise of certain municipal powers in certain urban agglomerations (Bill 75).

the Direction des transports under the Service des infrastructures, de la voirie et des transports is responsible for the cycling network;

- Bikeways not under the jurisdiction of the agglomeration are under the responsibility of each of the related municipalities, including the city, in accordance with the *Municipal Powers Act*. For bikeways located on the city territory, jurisdiction is determined by the *Charter of Ville de Montréal*. Consequently, the responsibility for bikeways located on the arterial network belongs to city council and is assumed by the Service des infrastructures, de la voirie et des transports. In addition, the responsibility for bikeways located on the local network and those that run along certain parks are under the jurisdiction of the relevant borough council;

- Under the *Act respecting the exercise of certain municipal powers in certain urban agglomerations*, the agglomeration council is responsible for the Schéma d'aménagement et de développement de l'agglomération. This plan, carried out in accordance with the *Act respecting land use planning and development*, includes the main orientations on land use and transportation planning. As the central municipality, the city exercises the powers for the agglomeration. This responsibility is assumed by the Direction de l'urbanisme under the Service de la mise en valeur du territoire. In 2014, following the transfer of powers, this Direction was put in charge of updating the city's *Plan de transport*, which will soon result in the production of a *Plan de mobilité* (currently under development);

- The borough councils, the Service des grands parcs, du verdissement et du Mont-Royal and related municipalities share the responsibility for the maintenance of bikeways. The maintenance of bikeways located on the arterial network is delegated in accordance with the *Règlement de délégation de pouvoirs du conseil de Ville sur la délégation de certains pouvoirs relatifs au réseau de voirie artérielle aux conseils d'arrondissements (08-055)*, adopted by city council on December 15, 2008. For bikeways located in large parks and forming part of the current and planned cycling network identified in the *Plan de transport*, maintenance is under the responsibility of the Service des grands parcs, du verdissement et du Mont-Royal, with the exception of bikeways in Parc du Mont-Royal, whose upkeep has been delegated to the Ville-Marie borough. The maintenance of bikeways located on the local network and those in other parks is the responsibility of the relevant borough councils in accordance with the *Charter of Ville de Montréal*. Finally, the maintenance of bikeways located in the territory of related municipalities is under the authority of these municipalities in accordance with the *Municipal Powers Act*[11].

At the Direction des transports, the Division des transports actifs et collectifs is in charge of planning the development and upgrade projects for the Island of Montréal's current and planned cycling network identified in the *Plan de transport*. The Division de la sécurité et de l'aménagement du réseau artériel is also involved since it manages the Bureau de la sécurité des déplacements[12], which is responsible for the "*VISION ZÉRO décès et blessé grave*" approach.

11 (C-47.1).

12 Created in 2013.

At the Direction de l'urbanisme of the Service de la mise en valeur du territoire, the Division de la planification des transports et de la mobilité is in charge of producing the city's *Plan de mobilité*.

Moreover, since the adoption of the *Plan de transport* in June 2008 by the urban agglomeration council, investments of $103.4 million were included in the *Three-Year Capital Works Program* (TCWP) for the *Programme de développement et de mise à niveau du réseau cyclable d'agglomération*. Actual spending reached $81.9 million (from 2008 to 2017) and 421 km of bikeways were developed.

Lastly, in light of the orientations of the CMM, the commitments of the municipal administration and the objectives established, the significant growth of cycling network of recent years is expected to continue. Consequently, the infrastructure must be adequate and safe to meet demand and further promote cycling.

2. PURPOSE AND SCOPE OF THE AUDIT

In accordance with the provisions of the *Cities and Towns Act*, we have conducted a value-for-money audit of cycling network management. This audit was performed in compliance with the Canadian Standards on Assurance Engagement (CSAE) 3001 of the CPA Canada Handbook – Assurance.

The purpose of this audit is to ensure that the city's management practices are adequate for ensuring the proper maintenance and safety of the cycling network and its upgrade and development in accordance with the priorities approved by the relevant authorities and the needs of cyclists.

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

The Auditor General of Ville de Montréal applies the *Canadian Standard on Quality Control* (CSQC 1) of the CPA Canada Handbook – Assurance and, consequently, maintains a comprehensive quality control system that includes documented policies and procedures with respect to compliance with ethical guidelines, professional standards and applicable legal and regulatory requirements. It also complies with regulations on independence and other ethical guidelines of the *Code of ethics of chartered professional accountants*, which is governed by fundamental principles of integrity, professional competence, diligence, confidentiality and professional conduct.

Our audit work focused on the period from January 2016 to September 2017. However, for some aspects, data prior to these years were also considered. Most of the audit

work was carried out between September 2017 and January 2018, but we also took into consideration information given to us until February 2018.

This work was performed primarily with the following business units:

- Le Service des infrastructures, de la voirie et des transports (Direction des transports);
- Le Service de la mise en valeur du territoire (Direction de l'urbanisme);
- The Service de la concertation des arrondissements (SCA) (Direction des travaux publics);
- Plateau-Mont-Royal borough;
- Rivière-des-Prairies–Pointe-aux-Trembles borough;
- Saint-Laurent borough;
- Ville-Marie borough.

Upon completing our audit work, we presented a draft audit report to the managers of each of the audited business units for discussion purposes. The final report was then forwarded to the city manager and to each of the business units involved in the audit in order to obtain action plans and timelines for their implementation. A copy of the final report was also sent to the directeur général adjoint à l'arrondissement de Ville-Marie et à la concertation des arrondissements and the directrice générale adjointe au développement. For information purposes, the final report was also forwarded to the managers of the four boroughs involved in our audit and to the director of the SCA.

3. AUDIT RESULTS

3.1. DEVELOPMENT AND UPGRADE OF THE CYCLING NETWORK

3.1.1. ESTABLISHING THE *PLAN DU RÉSEAU CYCLABLE*

3.1.1.A. BACKGROUND AND FINDINGS

Planning a cycling network involves implementing consistent and sustainable development strategies that meets several requirements, with the main ones being safety, land use planning and the needs of cyclists. There are three steps involved in planning a cycling network at the municipal level.

STEP 1: ASSIGNING RESPONSIBILITIES

Planning the development of a network first entails identifying the stakeholders involved and their working relationships with one another. These working relationships help

make everyone aware of issues pertaining to safety, land use planning and the needs of the community.

STEP 2: CONDUCTING A DIAGNOSIS

The city must provide a status report (a diagnosis) based on a thorough analysis of the issues in order to identify problems and opportunities. Through a review of best practices, we have identified three aspects to be considered and analyzed.

First, the diagnosis must identify the safety issues and problems associated with cycling both on and off the existing cycling network, since both are used by cyclists, in the agglomeration's territory. To assess the suitability of the existing cycling network, factors such as riding comfort, the state of bikeways and problematic intersections must be assessed.

Regarding issues of land use planning, the following factors must be evaluated as part of the diagnosis:

- Population;
- Access to trip generators (places people travel to);
- The network's level of connectivity;
- The existing cycling network's capacity to serve the entire territory;
- Cycling barriers (draw up an inventory of obstacles);
- Routes used: Gain an overview of cycling trip habits using surveys or the *Origine-Destination* studies.

Last but not least, the transportation needs of cyclists need to be taken into account. Surveys among residents can be used to measure the use of the cycling network and obtain other important information about cycling habits. Counts are another way to determine the amount of traffic on a given bikeway.

STEP 3: PREPARING THE PLAN

Using the diagnosis, the next important step is to prepare a *Plan du réseau cyclable* by identifying the key routes to be developed or completed in order to connect neighbourhoods and sectors separated by natural or man-made barriers. The key routes serve as roadside cycling corridors that must meet the needs of cyclists based on the density of areas in terms of population and type of housing.

The *Plan du réseau cyclable* is also used to upgrade the existing network by taking into account the issues raised during the diagnosis (regarding safety, land use planning and needs of cyclists).

When planning the cycling network, it is important to use land development planning tools that are consistent with one another. For example:

- The city's land use planning documents (Schéma d'aménagement et de développement du territoire, Plan d'urbanisme and borough chapters);
- The *Plan de transport*, which contains strategic statements on the development of the cycling network;
- The local transportation plans (local *Plan de transport* - to be produced by boroughs and related municipalities as set out in the *Plan de transport*);
- The *Plan-cadre vélo* (formal commitment by the municipal administration in support of cycling);
- The *Plan directeur de gestion des déplacements*.

As mentioned in the introduction of this report, the current and planned *Plan du réseau cyclable* presented in the *Plan de transport* was reviewed during the first 10 months of 2014. The initial version of the *Plan du réseau cyclable* therefore dates back to 2008 when the *Plan de transport* was approved.

During our audit, we looked at the *Plan du réseau cyclable* approved during the review by the urban agglomeration council in January 2015. More specifically, we assessed the degree to which the planning of the cycling network met the established priorities, land use and safety requirements and the needs of cyclists using the three-step process previously described.

Let us being by discussing the assignment of responsibility. The Division des transports actifs et collectifs of the Direction des transports was put in charge of reviewing the *Plan du réseau cyclable*. Meetings were held exclusively with boroughs and related municipalities in order to obtain the approval of a final concept. According to the information obtained, the Direction de l'urbanisme of the Service de la mise en valeur du territoire was not involved in the review process of the *Plan du réseau cyclable*, even though it is responsible for the land use development tools and was newly appointed to review the *Plan de transport* (since March 2014). Moreover, the Division de la sécurité et de l'aménagement du réseau artériel of the Direction des transports was not involved in the cycling network review process, despite its role as the head of security.

Second, regarding the conduct of a diagnosis, when reviewing the *Plan du réseau cyclable*, the authorities at the Direction des transports presented a positive report on the achievements of recent years (from 2008 to 2014), more specifically, the development of 250 km of bikeways added to the network since 2008 and the upgrade of some 10 or so kilometres. During the diagnosis, the Direction des transports also noted the congestion of certain bikeways despite the implementation of several major projects.

We noted that during its review of the *Plan du réseau cyclable*, the Direction des transports did not have available for analysis information on safety issues and problems. During our

audit, in fact, the Direction des transports acknowledged that accident data were not used since they did not provide a comprehensive overview of the situation.

Regarding land use issues, the *Plan du réseau cyclable* was reviewed using the following planning criteria:

- To ensure the continuity and coherence of the current cycling network;
- To plan the development of the cycling network in a concerted manner that promotes cooperation among the boroughs and related municipalities;
- To consider the safety of cycling by taking into account street geometry, speed, traffic flow and visibility;
- To provide access to trip generators, including institutional, commercial, industrial and tourist hubs;
- To ensure the accessibility to major historical, cultural and recreational infrastructure;
- To ensure the integration of cycling into the public transit system by allowing access to metro stations and commuter train stations;
- To reduce travel time for cyclists by creating direct, fast, safe and accessible routes.

We note that the above criteria are generic and do not make reference to a detailed methodological approach that could be used to guide the planning work. During our audit work, we found no evidence of a substantial and documented analysis of land use issues to which could have been integrated the results of the cycling network diagnosis. According to the information obtained, the data used by the Direction to establish a diagnosis were fragmentary.

Lastly, the review process of the *Plan du réseau cyclable* was not based on findings from research surveys for the purpose of evaluating the needs of cyclists nor on counts meant to assess the traffic on existing bikeways According to the information obtained, the last survey conducted among cyclists dated back to 2007 and few counters were installed along the network at that time.

Third, regarding the production of a revised *Plan du réseau cyclable*, the Direction des transports started by considering the *Plan du réseau cyclable* initially presented in the *Plan de transport*. Despite the lack of a comprehensive diagnosis of the cycling network, links that were initially planned were removed and new links were proposed by the Direction des transports, the boroughs and related municipalities.

Following the review exercise, the *Plan du réseau cyclable* (current and planned) presented in the June 2008 *Plan de transport* went from 800 km to 1,280 km, an increase of 480 km. After the review of the original *Plan du réseau cyclable*, a total of 50 km of bikeway was removed and 530 new kilometres were added. In January 2015, upon being approved by

the urban agglomeration council, the *Plan du réseau cyclable* featured 680 km of existing bikeways and 600 km of planned bikeways, for a total of 1,280 km.

Regarding the land use development planning tools previously mentioned, we noted that at the time of the review, some of the documents had already been taken into account during the development of the original *Plan du réseau cyclable* (the *Plan de transport* and the *Plan d'urbanisme*), while others had not yet been produced (the *Plan-cadre vélo*, the local transportation plans for the boroughs, the Schéma d'aménagement et de développement du territoire and the *Plan directeur du réseau cyclable*).

In conclusion, the review of the *Plan du réseau cyclable* carried out by the Direction des transports did not include all the business units that could have contributed to the diagnosis and analysis of the issues at hand. Furthermore, the review did not entail a diagnosis of the state of the situation pertaining to safety, both on and off the network, land use planning and the needs of cyclists. It should be mentioned that the planning tools that could have guided the review process had not yet been completed. As a result, the review of the cycling network emphasized the absolute necessity of developing new bikeways in order to increase of the number of kilometres, given the priority of the municipal administration at that time. The review of the *Plan du réseau cyclable* neglected issues related to the safety of the current bikeways and the need to identify which paths needed to be upgraded[13]. Moreover, the review exercise involving the *Plan du réseau cyclable* did not sufficiently demonstrate how the new planned bikeways were the best options in terms of security, land use planning and cyclists' needs.

That being said, it is this reviewed version of the current and planned *Plan du réseau cyclable* that was approved by the urban agglomeration council in January 2015 and guided the project programming ever since. While not officially approved, the scheduled timeline for the development of the planned kilometres was approximately 10 to 12 years, depending on the hypotheses selected.

Since that time, however, decision makers have made a commitment to the safety of cyclists and pedestrians by committing to the "*VISION ZÉRO décès et blessé grave*" approach in September 2016. In September 2017, they also adopted the *Plan-cadre vélo*, which features 10 strategic orientations aiming to provide more efficient, innovative infrastructure adapted to the new reality of urban transportation. The goal is to encourage cycling in metropolitan Montréal and, more specifically, to increase the cycling's modal share to 15% in the central boroughs over the next 15 years. In addition, the orientations recently approved by the CMM in its *Plan directeur du Réseau vélo métropolitain* (November 2017) will also need to be taken into consideration by the city, more specifically the objective of achieving a modal share of 3.8% for the entire metropolitan area by 2031. This objective could have an impact on all boroughs of the city. All these new orientations adopted after the last review of the *Plan du réseau cyclable* no doubt have an impact on the *Plan du réseau cyclable*. Consequently, we believe that a new review of the current and

13 Upgrade projects reflected issues raised by the diagnosis related to safety, land use planning and the needs of cyclists.

planned *Plan du réseau cyclable* should be done by way of integrating the new priorities of the municipal administration and requirements related to safety, land use planning and the needs of cyclists.

Given that several actions in the *Plan-cadre vélo* are to be carried out over a 15-year period, and that many pertain to the development of the cycling network, we believe that the notion of priority should be included in the next review of the *Plan du réseau cyclable* (e.g., planned routes to be built in the short, medium and long term). During our audit, in fact, we noted that the revised *Plan du réseau cyclable* presented in the current *Plan de transport* set out, at the time of its adoption, a target of 600 km of bikeways, but made no reference to any medium or long-term plan to achieve this end.

Moreover, at the time of our audit, the Direction de l'urbanisme du Service de la mise en valeur du territoire was working on updating the *Plan de transport*, which is to result in the city's *Plan de mobilité*. We believe that the *Plan du réseau cyclable* should also be reviewed in collaboration with this department.

Given the recent orientations adopted by the authorities and those to come in the *Plan de mobilité*, we believe that the responsibilities among the various business units of the Direction des transports, the Direction de l'urbanisme of boroughs and related municipalities should be clearly defined to make judicious use of the expertise of each unit and ensure the contribution of all parties in reaching the objectives established by the authorities.

RECOMMENDATIONS

3.1.1.B.	**We recommend that the Service des infrastructures, de la voirie et des transports and the Service de la mise en valeur du territoire clearly define and communicate their respective responsibilities during the review of the current and planned *Plan du réseau cyclable* included in the *Plan de transport* and during the development of the city's *Plan de mobilité* allowing each to play an effective role in achieving the objectives established.**
3.1.1.C.	**We recommend that during the next review of the current and planned *Plan du réseau cyclable* included in the *Plan de transport*, the Service des infrastructures, de la voirie et des transports ensure that all aspects related to safety, land use planning and the needs of cyclists are taken into consideration in order to meet all the priorities approved by the authorities.**
3.1.1.D.	**We recommend that the Service des infrastructures, de la voirie et des transports set a timeline for the priorities of the revised *Plan du réseau cyclable* presented in the *Plan de transport* in order to facilitate the implementation of the projects by all stakeholders involved and, in turn, the achievement of the established objectives.**

BUSINESS UNITS' RESPONSES

3.1.1.B. ***Service des infrastructures, de la voirie et des transports et Service de la mise en valeur du territoire***

[TRANSLATION] The Direction générale adjointe au développement, which includes the Service des infrastructures, de la voirie et des transports and the Service de la mise en valeur du territoire, initiated discussion on a review of the role and responsibilities of the Direction des transports and the Direction de l'urbanisme regarding transport and mobility planning. The goal of the current exercise is to develop and implement strategic orientations for transport and mobility planning (vision, mission, objectives). It will entail a review of management practices (work, communication and decision-making processes) and a clear division of responsibilities between the Service des infrastructures, de la voirie et des transports and the Service de la mise en valeur du territoire.

The responsibilities will be shared with the central business units and the boroughs. These will be set out in a clear service offering provided by both departments and include concrete examples. This will make it possible to review the management of transport and mobility planning as a whole, including the Plan du réseau cyclable. During the review of the Plan du réseau cyclable, an action plan will be developed. It will include SMART objectives with process and performance indicators and a clear action plan showing collaboration among the various units. ***(Planned completion: March 2019)***

3.1.1.C. ***Service des infrastructures, de la voirie et des transports***

[TRANSLATION] All aspects relating to safety, land use planning and the needs of cyclists are taken into consideration in the various studies initiated by the city currently under way, including the study on the development of a Bicycle accessibility plan for downtown.

The Service des infrastructures, de la voirie et des transports will make sure it takes these aspects into account when next reviewing the current and planned Plan du réseau cyclable of the Montréal agglomeration, which will also include the planning of the Réseau express vélo. In the meantime, these issues will be taken into account in all similar studies conducted elsewhere in the Montréal agglomeration. ***(Planned completion: June 2018)***

3.1.1.D. ***Service des infrastructures, de la voirie et des transports***

[TRANSLATION] Given the current administration's focus on building a Réseau express vélo in coming years (most of which will be located downtown), the cycling infrastructure projects to be developed will need to be prioritized and included in the deployment strategy of the new network. This strategy will take into consideration other required planning initiatives, such as the update of the current and planned Plan du réseau cyclable of the Montréal agglomeration. This priority-setting exercise will also provide target completion dates for each of the major projects identified. ***(Planned completion: October 2019)***

3.1.2. DATA USED IN THE PLANNING OF THE DEVELOPMENT AND UPGRADE OF THE CYCLING NETWORK

3.1.2.A. BACKGROUND AND FINDINGS

Access to reliable and up-to-date information is important when it comes to conducting various diagnoses used in the planning of the cycling network. For example, traffic information for a given bikeway can help target the needs of cyclists and ensure better safety. As another example, it is also important to consult data on the state of bikeways and their compliance with existing standards in order to plan upgrade projects. Data on the state of the network refer to the issue of riding comfort, while data on non-compliance with existing standards raise the issue of harmonization. In both cases, best practices relate to the safety of cyclists. Finally, it is important to have data on accidents involving cyclists, both on and off the cycling network, in order to gain an overall picture of the situation. The focus should be on information related to the location of serious or fatal accidents, but the analysis should also include all accident data in order to obtain a more comprehensive picture of the situation, so that effective safety measures may be planned and implemented.

During our audit, we wanted to evaluate the extent to which the people in charge had access to reliable data on the following three aspects which could be analyzed and used to plan the development and upgrade work.

DATA ON BIKEWAY TRAFFIC

At the time of our audit, there were 23 permanent counters on the cycling network, most of which were located in central boroughs. This type of data is useful for confirming the development potential of certain bikeways or checking winter traffic at a given location. While these data were not used during the 2014 review of the current and planned *Plan du réseau cyclable*, the Direction des transports informed us that they would be used to a

greater extent following the adoption of the *Plan-cadre vélo* by the urban agglomeration council in September 2017. Let us recall that the objective of this plan is to increase bicycle use in metropolitan Montréal and, more specifically, cycling's modal share to 15% in central neighbourhoods. We believe that the Direction des transports has taken measures to obtain the data needed to measure traffic. However, we are of the view that it will need to demonstrate that the counter data are actually used when planning the development and operation of the cycling network, especially since the measures announced under the *Plan-cadre vélo* includes the deployment of bike traffic counters with displays.

DATA ON THE STATE OF THE NETWORK AND ITS COMPLIANCE WITH STANDARDS

Our audit work revealed that the Direction des transports did not have data enabling it to gain an overall picture of the state of the cycling network and its level of compliance with standards. Since the adoption of the *Plan de transport* by the urban agglomeration council, the Direction des transports has focused primarily on the development of new bikeways, but did not need to use these data for upgrading purposes, since measurable objectives had only been set for development projects. The Direction des transports recognizes the need to have such data available for the purpose of upgrading the cycling network and, as such, actions were recently taken in this regard. However, much work remains to be done.

Regarding the state of bikeways, the Direction des transports has participated financially in the production of a "Guide d'auscultation des voies cyclables" and a "Guide de gestion et d'entretien de voies cyclables" in partnership with the CERIU[14]. Both guides will soon be published.

Regarding compliance with the standards of the existing cycling network, the Direction des transports does not have any data for the network as a whole. Currently, the applicable regulatory framework consists of standards established by the Ministère des Transports, de la Mobilité durable et de l'Électrification des transports (MTMDET). These standards pertain to the design of bikeways, signage and markings. Some are mandatory (design of the infrastructure), while others are not (signage and markings). The Direction des transports recognizes all the standards set by the MTMDET. In addition, given the expertise it has acquired over the years, combined with the best practices set out in the Vélo Québec guide entitled *"Aménagement en faveur des piétons et des cyclistes"*[15], the Direction des transports has set its own internal standards adapted to the Montréal context. The Direction des transports is currently working on the development of a "Guide d'aménagement durable des rues." This guide on the sustainable development of streets, harnesses expertise from various fields involved in developing the public space to identify the best planning practices. One of the sections of the guide deals with the design of bikeways. It should be available in 2018.

14 Centre d'expertise et de recherche en infrastructures urbaines.

15 Vélo Québec is now working on a updated version of the *"Aménagement en faveur des piétons et des cyclistes"* guide.

In conclusion, actions are under way, but to have a strong program on the upgrade of the cycling network, we believe that the Direction des transports needs to establish a methodology to collect, compile and analyze data on the state of bikeways and their level of compliance or non-compliance with the standards. This should meet one of the measures of the *Plan-cadre vélo* adopted in 2017 regarding the continuous improvement of the network (compliance with standards). In the meantime, as long as the Direction des transports does not have an overall picture of the state of its bicycle paths and their level of compliance with the standards, we believe that it will be very difficult to establish and monitor performance objectives for these aspects. Consequently, this situation will make it more difficult to reach the objective of increasing cycling's modal share and improving the safety of cyclists as part of the city council's commitment to the "*VISION ZÉRO décès et blessé grave*" approach.

DATA ON ACCIDENTS INVOLVING CYCLISTS

The Bureau de la sécurité des déplacements, reporting to the Division de la sécurité et de l'aménagement du réseau artériel under the Direction des transports, is responsible for the development and operation of the data management tools on safety used by all city departments. At the time of our audit, accident reports produced by police for the agglomeration as a whole were recorded in the Société de l'assurance automobile du Québec (SAAQ) database and were then forwarded to the Bureau de la sécurité des déplacements for geo-localization. It should be noted that this involves all types of accident reports (cars, pedestrians and cyclists).

According to the people interviewed, a great deal of information is available in this database (e.g., data on car dooring[16]), but is not used for planning purposes. The database is currently used by the Bureau de la sécurité des déplacements to respond to specific requests from the boroughs or from other business units (e.g., number of accidents at a given intersection). It would appear that the Bureau de la sécurité des déplacements is constantly in emergency mode and, as such, is not able to establish an overall picture of the safety of the cycling network for the agglomeration in accordance with the mandate it was given in 2013. Without an overall picture of the safety of cyclists, it will be difficult to determine measures and programs aiming to achieve accident reduction targets. Let us specify that in 2010, a picture of road safety on the Island of Montréal was prepared for the Direction des transports. According to the people in charge at the Bureau de la sécurité des déplacements, this document needs to be updated.

Moreover, according to the Bureau de la sécurité des déplacements, while the database does contain a great deal of information, the current data compiled are fragmentary. For example, it is not possible at present to evaluate the performance of different types of cycling infrastructure from a safety standpoint. In another example, the data are limited since they come solely from police reports. Other information could be relevant, such

16 Hitting a cyclist or causing him to fall or colliding with another vehicle by opening a car door without first checking for oncoming traffic.

as data from Santé publique sources pertaining to the severity of injuries or information from auto insurance companies. It would be important to collect all this data related to accidents in order to have a more comprehensive picture of cycling safety.

RECOMMENDATIONS

3.1.2.B. **We recommend that the Service des infrastructures, de la voirie et des transports demonstrate that the counter data from the counters installed on the cycling network are actually used for planning purposes in order to achieve the objectives adopted by the authorities to ensure the development and safety of the cycling network.**

3.1.2.C. **We recommend that the Service des infrastructures, de la voirie et des transports implement a methodology to collect, compile and analyze data on the state of the cycling network and its compliance with the standards in order to have an overall picture of the current cycling network, which could be used to develop an upgrade program in accordance with the orientations adopted by the authorities.**

3.1.2.D. **We recommend that the Service des infrastructures, de la voirie et des transports ensure that the database on road safety includes all information required for the analysis of accidents involving cyclists in order to facilitate the focus on safety when planning and managing the cycling network and support the objectives of the "*VISION ZÉRO décès et blessé grave*" approach.**

3.1.2.E. **We recommend that the Service des infrastructures, de la voirie et des transports develop an updated picture of accident data for Montréal as a whole, more specifically those involving cyclists, in order to determine measures and programs that could help support the goals of the "*VISION ZÉRO décès et blessé grave*" approach adopted by city council in September 2016.**

BUSINESS UNIT'S RESPONSES

3.1.2.B. ***Service des infrastructures, de la voirie et des transports***

[TRANSLATION] The Service des infrastructures, de la voirie et des transports plans on installing approximately twenty new counters in the next few years, in addition to the existing 23. The data collected will be used by the Service des infrastructures, de la voirie et des transports to determine cycling traffic on the current cycling network and the risks associated with congestion in certain sectors.
(Planned completion: November 2018)

On this front, an assessment will be produced twice a year: one dealing with cycling traffic during the summer, the other during the winter (retention rate). ***(Planned completion: May 2019)***

The review of the current and planned Plan du réseau cyclable of the Montréal agglomeration will enable the planning of other cycling routes along parallel corridors in order to maintain the smooth flow of bicycle traffic and avoid the risk of conflicts due to an excess of cyclists. ***(Planned completion: September 2019)***

It should also be noted that a discussion is under way regarding options for a new mobile app for cyclists. The app would be used by cyclists to learn more about their daily route. The data collected could then be used for the planning of Montréal's cycling network. ***(Planned completion: September 2020)***

3.1.2.C. ***Service des infrastructures, de la voirie et des transports***

[TRANSLATION] The "Guide d'auscultation des voies cyclables," produced in October 2017 in partnership with the Centre d'expertise et de recherche en infrastructures urbaines, led to the development of an inspection protocol that is now used to collect and compile data on the state of our bikeways. ***(Planned completion: completed)***

The mandate to inspect the state of the cycling network will involve a quote that will include an assessment of compliance with existing standards. ***(Planned completion: October 2018)***

A second initiative with the Centre d'expertise et de recherche en infrastructures urbaines is now under way. It involves the development of the "Guide de gestion et d'entretien des voies cyclables," which will be used to analyze the data collected on the state of our bikeways in order to plan an upgraded infrastructure program in accordance with the strategic orientations adopted by the authorities. ***(Planned completion: April 2019)***

3.1.2.D. ***Service des infrastructures, de la voirie et des transports***

[TRANSLATION] As part of the development of the "VISION ZÉRO décès et blessé grave" action plan, the Bureau de la sécurité des déplacements, subject to additional resources being made available, will evaluate complementary sources of information (data on hospital admissions, ambulances and incidents) along with data from accident reports produced by the Service de police de la Ville de Montréal in order to enhance the database on accidents involving cyclists and thereby facilitate the integration of safety into the planning of the cycling network management.

As part of the consultations held by the Société de l'assurance automobile du Québec on Bill 165, the city included in its brief a request to review the definition of accident to include collisions with parked vehicles, such as cases of car dooring. This would further help to enhance the accident database. When the Bill was assented to on April 18, 2018, this recommendation was not retained by the provincial government. ***(Planned completion: June 2020)***

3.1.2.E. ***Service des infrastructures, de la voirie et des transports***

[TRANSLATION] As part of the development of the "VISION ZÉRO décès et blessé grave" action plan, the Bureau de la sécurité des déplacements, subject to additional resources being made available, will compile information on all collisions including those involving cyclists, in order to have an up-to-date overview and identify situations with a high risk for fatalities or serious injuries, for the purpose of determining the measures and programs that will achieve the commitments made under the "VISION ZÉRO décès et blessé grave" approach.
(Planned completion: October 2019)

3.1.3. ANNUAL DEVELOPMENT AND UPGRADE PROGRAMMING OF CYCLING NETWORK PROJECTS

3.1.3.A. BACKGROUND AND FINDINGS

During our audit, we wanted to ensure that the development and upgrade of the network were subject to annual planning in accordance with established priorities and requirements in terms of safety, land use planning and the needs of cyclists.

Given the adoption of a revised *Plan du réseau cyclable* by the urban agglomeration council, the projected bikeways (600 km) were to be included in the programming over a period of 10 to 12 years, depending on the hypothesis used. Since one of the priorities of the *Plan de transport* was to bring up to standards the existing cycling network, upgrade projects were also to be included in this programming. In our view, the selection of planned projects should be carried out based on priorities selected according to objective criteria.

When producing the annual programming of bikeway development and upgrade projects, the Direction des transports (the Division des transports actifs et collectifs) establishes an annual for a two-year period (e.g., 2016-2017 plan). The project selection process is done two years prior to the targeted period (e.g., the project selection process for 2016-2017 started in 2014).

The annual project programming basically focuses on completing the *Plan du réseau cyclable* adopted by the urban agglomeration council. Since 2014, the municipal administration has set the goal of developing 50 km of new bikeways every year. To do so,

the Direction des transports (the Division des transports actifs et collectifs) identifies projects, which include requests from boroughs, related municipalities, policymakers and Vélo Québec. In terms of upgrades to the network, projects are included in the programming at the request of boroughs or related municipalities, but the proportion is very low since no objectives have been set in this regard. The feasibility of potential development and upgrade projects is assessed based on knowledge of road conditions, traffic, signage, parking, geometry and recorded accident and also reflect the need to coordinate and integrate these projects with other initiatives. Only those projects that can be completed within a two-year window are retained and included in the *[TRANSLATION]* "initial programming".

The selected projects are subsequently analyzed to determine the implementation options available (e.g., integrating the bicycle path project to an infrastructure project, going forward with the bicycle path project only or making a temporary bicycle path until a project is ready for implementation). The projects selected are included into the *[TRANSLATION]* "preliminary programming".

Before including projects into the final programming announced to the public, the Direction des transports (the Division des transports actifs et collectifs) is required to clearly define the projects selected. Studies involving input from other business units may be required, as the case may be. For example: surveying (the Division de la géomatique of the Direction des infrastructures), soil characterization (the Division expertise et soutien technique of the Direction des infrastructures), environmental studies, some impact studies (the Division de l'exploitation du réseau artériel – the Direction des transports). It is also during this phase that the Direction des transports (the Division des transports actifs et collectifs) selects the type of cycling infrastructure (see Appendix 5.2) according to recognized standards and prepares the various plans required (traffic lights, marking, lighting, geometry). Depending on the type of infrastructure selected or type of project to be integrated into other similar works, some projects will be submitted to the Direction des infrastructures, while others will be carried out by the Direction des transports (e.g., designated paving projects that only involve marking). The final programming of bicycle path projects will include the projects confirmed by the Direction des infrastructures and those to be carried out by the Direction des transports.

In light of the process we have described, we note that the main selection criterion for development projects is mileage, combined with the feasibility of the project over a short period of time. We are of the view that the projects selected as part of the 2016-2017 programming reflected the priorities of the administration since mileage was the only objective used. However, the Direction des transports (the Division des transports actifs et collectifs) used no other criterion to prioritize its final selection. Regarding upgrade projects, we note here too that no selection criteria are used to guide the identification and choice of projects.

The cycling network development and upgrade projects to be included into the annual programming were not selected and prioritized using safety as a criterion. According to the information obtained, the Direction des transports (the Bureau de la sécurité des

déplacements) does not offer support when it comes to selecting projects from those presented in the revised *Plan du réseau cyclable*, or for prioritizing these projects based on security requirements or on the choice of infrastructure. Accident data are therefore not used when selecting the priority projects. However, the Direction des transports (the Division des transports actifs et collectifs) consults accident data once the projects have been included in the annual programming.

Based on the information obtained, the cycling network development and upgrade projects to be included into the annual programming were not selected and prioritized using safety, land use planning or the needs of cyclists as criteria.

Given that the revised *Plan du réseau cyclable* is still in force and that new measures related to the need to increase cycling's modal share in central boroughs have been retained following the adoption of the *Plan-cadre vélo*, we believe that criteria other than mileage should be used. Consequently, we are of the view that the identification and choice of projects selected for the next annual programming should reflect objective criteria related to safety, land use planning and the increase of cycling's modal share in order to align with the orientations of the municipal administration.

RECOMMENDATION

3.1.3.B. **We recommend that the Service des infrastructures, de la voirie et des transports establish objective criteria based on safety, land use planning and increase of cycling's modal share to determine the projects to be selected and included in the annual programing of development and upgrade projects for the cycling network in keeping with the orientations of the municipal administration.**

BUSINESS UNIT'S RESPONSE

3.1.3.B. ***Service des infrastructures, de la voirie et des transports***

[TRANSLATION] To comply with the new strategic orientations of the municipal administration, the Service des infrastructures, de la voirie et des transports will establish new criteria and objectives to guide the choice of projects that will be included in the annual development and upgraded infrastructure programming for the cycling network, in keeping with these recommendations:

- *3.1.1.D. the priority time table of the Plan vélo;*
- *3.1.2.C. data on the state of the network and its compliance with standards;*
- *3.1.2.E. updated overview of accident data;*
- *3.2.C. estimated project costs.* ***(Planned completion: September 2019)***

3.2. SUMMARY COST ESTIMATES FOR PLANNING PURPOSES

3.2.A. BACKGROUND AND FINDINGS

When establishing the programming, all potential bicycle path projects (development and upgrades) should be accompanied by a summary cost estimate to determine their order of magnitude. The cost factor could even be a criterion to consider when selecting projects.

To better understand the purpose of a summary cost estimate in the planning process and distinguish it from a detailed estimate, here is a brief description of the process. It should be noted that the two types of estimates do not have the same degree of detail nor the same purpose.

- To start, the Direction des transports (the Division des transports actifs et collectifs) is responsible for the "*Programme de développement et de mise à niveau du réseau cyclable de l'agglomération*[17]" included in the TCWP. It oversees the budget, timeline and tracking of projects. To this end, when planning a project, it prepares a summary cost estimate in order to determine the required budget. This summary cost estimate is based on the type of bicycle path infrastructure involved, related work needed and overall cost per kilometre. The amount of the summary estimate is included in the information sent to the Direction des infrastructures, once it is tasked with preparing the plans and specifications.
- Detailed cost estimates are prepared by the Direction des infrastructures. Under the current process, a detailed estimate is produced when the plans and specifications are being prepared, which is before the calls for tenders are announced. They are used to validate the project budget. Another detailed estimate known as the "control estimate" is prepared during the call for tenders. It is compared with the bids received and used to award the contract.

It should be noted that the process of establishing the detailed estimate was not the subject of this audit. Our audit focused only on the summary cost estimates prepared by the Direction des transports (the Division des transports actifs et collectifs). We evaluated whether such cost estimates had been produced during the planning phase, so that they could be used to prioritize one project over another and plan the distribution of the program's budget envelope.

During our audit, the people interviewed reported that summary estimates were not always prepared and that the overall reference costs used were based on historical costs from 2003 to 2007. Given that we examined projects included in the programming for 2016-2017 and 2017-2018, we are of the view that the overall cost schedule did not correspond to the market value. This may have an impact on the usefulness of the summary estimates. Although a new version of overall costs based on 2016 figures was made available

17 In 2018, the program is entitled "*Réseau express vélo et développement du réseau cyclable*".

in January 2018, we believe that the Direction des transports (the Division des transports actifs et collectifs) should have used actual market costs for the programs audited.

Using files of the project programming for the years 2016-2017 and 2017-2018, we examined six projects involving one of the four boroughs selected. Here are our findings:

- The project programming files did not always indicate the summary cost estimate (two in six cases);
- There was no documentation (electronic or paper) to indicate the date of the estimate or demonstrate the use of the overall cost schedule (justifications when the estimate does not match the established cost schedule), units of measure (e.g., length of the section evaluated) or the assumptions considered;
- Of the summary estimate amounts listed in the mandates sent to the Direction des infrastructures, some were underestimated compared to the costs set out in the overall cost schedules. We were unable to obtain a satisfactory explanation for these gaps (three in four cases):
- Of the summary estimate amounts listed in the mandates sent to the Direction des infrastructures, some were significantly underestimated compared to the control estimate used to evaluate bids (two in four cases with a gap greater than 100%).

In conclusion, we note that summary cost estimates are not always prepared. When they are, they are not documented, and, as a result, it is not possible to track the overall costs and assumptions used. In addition, while the summary estimates established at the draft project phase do not provide the same level of accuracy as detailed estimated, the under-evaluations of the summary estimates compared to the detailed estimates indicate that they were not based on overall costs that correspond with the market value or that certain assumptions had not been taken into consideration. Consequently, we believe that at the planning phase, the Direction des transports (the Division des transports actifs et collectifs) is not able to prioritize one project over another based on cost.

We also noted that the summary cost estimates were not used for planning the budget envelope. Rather, we found that the exercise involved the *[TRANSLATION]* “over-programming” of projects to reach the 50 km objective. For projects already confirmed following the awarding of contracts during the previous fiscal year, the costs retained matched the contract costs. For other projects selected, the amounts were indicated, but did not match the summary estimates listed in the programming files. The fiscal year thus involved *[TRANSLATION]* “over-programming” in terms of kilometres and budget. To date, this situation has not resulted in any budgetary problems, since certain major projects were not implemented during the year. They were replaced with other cycling infrastructure projects, but the project cost was not the motivating factor for the change, but rather the likelihood of the project being implemented in order to reach the mileage objective (e.g., designated pavement).

Given that more complex, and likely more expensive, projects are planned for the coming years, we believe that the choice of projects should take into account the summary cost factor in order to determine the annual budget envelopes to be allocated and also by way of complying with the priorities of the municipal administration.

RECOMMENDATIONS

3.2.B.	**We recommend that the Service des infrastructures, de la voirie et des transports use an up-to-date cost schedule to establish summary cost estimates for cycling path development and upgrade projects to ensure that they reflect overall planning orientations and market costs.**
3.2.C.	**We recommend that the Service des infrastructures, de la voirie et des transports adopt a guideline on briefly documenting the summary cost estimates at the draft project phase. It would include the underlying assumptions and the date of the evaluation and be used to support the selection of projects at the planning phase.**
3.2.D.	**We recommend that the Service des infrastructures, de la voirie et des transports prepare a summary cost estimate each time a project is selected for the annual programming of cycling network development and upgrade projects in order to ensure that the allocated budget envelope is used appropriately.**

BUSINESS UNIT'S RESPONSES

3.2.B.	***Service des infrastructures, de la voirie et des transports*** *[TRANSLATION] Drawing on the cost schedule currently used to estimate projects and on past experience, it will be possible to update the cost schedule and establish summary estimates for the development and upgraded infrastructure projects of bikeways so that it reflects the overall land use planning requirements and market pricing.* ***(Planned completion: October 2019)***
3.2.C.	***Service des infrastructures, de la voirie et des transports*** *[TRANSLATION] As recommended, the Service des infrastructures, de la voirie et des transports will adopt a guideline presented as an internal notice meant to provide more information on the summary cost estimates at the draft project phase. It will also include the underlying assumptions and the date of the evaluation and will be used to support the selection of projects at the planning phase.* ***(Planned completion: October 2019)***

3.2.D. ***Service des infrastructures, de la voirie et des transports***

[TRANSLATION] Based on recommendations 3.2.B. (cost schedule) and 3.2.C. (guideline), it will then be possible to prepare a summary cost estimate each time a project is selected for the annual programming of cycling network development and upgraded infrastructure projects in order to ensure that the allocated budget envelope is used appropriately. ***(Planned completion: December 2019)***

3.3. TRACKING THE IMPLEMENTATION OF DEVELOPMENT AND UPGRADE PROJECTS

According to the guideline entitled "Clarification des rôles et responsabilités des requérants et exécutants dans le cadre de la planification et de la réalisation des projets/programmes d'immobilisations" adopted by the city manager in May 2015, applicants are responsible for implementing projects/programs as a whole and reporting on them. Applicants are therefore responsible for project/program planning and tracking, as well as for the scope, timeline and tracking of costs (including forecasts).

Project/program performers are responsible for ensuring compliance with the terms of the project agreement, including the funds made available to them. As such, they are accountable for the quality, progress and cost (including the forecasts) and the implementation of the project assigned to them.

Accountability reporting for the contract signed by an applicant and performer will be based on the terms of the agreement, including the nature of the project/program, timeline, costs of the work and any other important factors included in the agreement.

For the task at hand, we used the *Programme de développement et de mise à niveau du réseau cyclable d'agglomération*. During the audit, we wanted to evaluate the tracking and control mechanisms implemented to ensure the sound management of cycling network development and upgrade projects in terms of timelines, costs and project implementation as planned.

TIMELINES

First, we will address the mechanisms implemented by the Direction des transports to track the timeline for the completion of the revised current and planned *Plan du réseau cyclable* adopted by the urban agglomeration council in January 2015. Given that the challenges associated with adding new cycling infrastructure had become increasingly difficult due to their complexity and costs, the *Plan du réseau cyclable* needed to be revised to open the network up to new projects. Let us recall that at the time of its adoption, the network totalled 1,280 km, including 600 km of existing lanes and 600 km of new

planned lanes. Although in January 2015, the urban agglomeration council did not present an official timeline for the completion of the cycling network, the municipal administration set an objective of developing 50 km of bikeways per year. Given this annual objective, the overall timeline spanned 12 years[18] (until 2027), but on the condition that the pace of implementation (in terms of kilometres) be maintained. In June 2016, the urban agglomeration council had just officially addressed the timeline for the development of the cycling network through its *Sustainable Montréal 2016-2020 Plan*. In fact, to reduce greenhouse gas emissions and our fossil fuel dependency, the Plan featured the addition of 270 km to the cycling network during the 2016-2020 period, for a total of 1,000 km by 2020.

Given the annual development objective set by the municipal administration, the following table (Table 1) presents the implementation targets included in the budget documents of the Direction des transports for 2015 to 2017.

To reach the annual objective set for the development of new bikeways and ultimately complete the 1,280 km network, the Direction des transports is *[TRANSLATION]* "over-programming" projects that can be implemented over a two-year period. In fact, the programming includes a series of projects totalling more than 50 km. If some projects cannot be completed for one reason or another, there is the possibility of replacement projects to ensure that the 50 km objective is reached, as follows:

- For 2016-2017: 91 projects were listed in the project portfolio totalling a potential 98.8 km, while the programming announced featured 63 projects for a total of 76.4 km;
- For 2017-2018: 128 projects were listed in the project portfolio totalling a potential 157.6 km, while the programming announced featured 58 projects for a total of 81.9 km.

The following table presents the results obtained following the measures taken by the Direction des transports to reach the annual development objective.

18 Total projected kilometres in January 2015-annual objective: 600 km/50 km.

TABLE 1 – STATUS REPORT ON THE DEVELOPMENT OF THE CYCLING NETWORK (IN KILOMETRES) 2015 TO 2017

	2015	2016	2017 (EIGHT MONTHS)
Development target[A]	50	50	58
Completion of new infrastructure	41.6	51.2	15.1
Upgraded infrastructure	9.9	6.4	2.9
Projects under way			33.2
Planned projects			6.8
TOTAL COMPLETED	**51.5**	**57.6**	**58.0**

[A] Source: Budget documents for the Service des infrastructures, de la voirie et des transports.

For the three years, we note that the Direction des transports reached its targets. However, since the results include upgrades, we observe that the annual development objective set by the municipal administration (50 km/year) was not reached in 2015 but was reached in 2016. The 2017 results cannot be compared since they are based on the first eight months of the year and the projects had yet to be completed.

These results indicate that the 2016 annual development objective was attained due to the *[TRANSLATION]* "over-programming" of projects. In our view, however, it is also because when the revised *Plan du réseau cyclable* in the *Plan de transport* was adopted, 600 km of 1,280 km (47%) could be developed. It is also because the Direction des transports opted for temporary projects, such as pavement markings (e.g., designated shared roadways, bike lanes) until the implementation of major projects. We believe, however, that it will become increasingly difficult to use *[TRANSLATION]* "over-programming" as a way of reaching the annual development objective. On the one hand, the proportion of new bikeways to be developed will go down, and on the other, cycling projects will be increasingly complex to develop. As a result, it will become more and more difficult to reach the annual development objective of 50 km if other resources are not added and this could delay the overall timeline for the completion of the cycling network approved by the urban agglomeration council. Consequently, in order to track the overall timeline governing the completion of the cycling network, we believe it would be advisable to prepare a long-term plan for projected cycling network projects and establish priorities in this overall timeline. It should be noted that section 3.1.1 of this report features a recommendation on the concept of priority setting.

Moreover, regarding upgrades to the next existing cycling network, while a few projects are already included in the annual programming, we have noted that they are not tracked

on any timeline to ensure the achievement of the objectives established. In order to set such an objective, the Direction des transports must first have on hand data on the state and level of compliance with the standards of the current cycling network. The issue of lack of data to assess the state of the existing cycling network and its level of compliance with the standards has already been addressed in section 3.1.2.

COSTS

Second, we will address the mechanisms implemented by the Direction des transports to track the costs of the *Programme de développement et de mise à niveau du réseau cyclable d'agglomération*. To do so, we have compared the real costs of the *Programme de développement et de mise à niveau du réseau d'agglomération* incurred to date with the amount it should have cost to complete the review of the cycling network, as per the estimates established by the Direction des transports.

To start, regarding the cost estimates, the *Plan de transport* adopted in 2008 set out $50 million to complete 400 km of new bikeways over seven years (2008-2014) and bring the cycling network up to 800 km, for a cost of $125,000 per kilometre. The *Plan de transport* also included a sum of $23 million to upgrade the cycling network over a period of 10 years ($15.5 million from 2008 to 2017 and $7.5 million after 2017). Moreover, in January 2015, when the revised current and planned *Plan du réseau cyclable* presented in the *Plan de transport* was adopted, an estimated sum of $150 million earmarked for the development of the remaining 600 km, for a total of $250,000 per kilometre, were presented to decision makers without, however, mentioning an official timeline.

Regarding allocated budgets and real costs since the creation of the program - from January 1, 2008 to December 1, 2017 - the sums approved in the TCWP reached $103.4 million and real expenses were $81.9 million. During this period, 421 km of bikeways were added for a total cycling network spanning 846 km at the end of 2017. Another 434 km needed to be added to complete the revised cycling network approved by the urban agglomeration council (34% of 1,280 km). We have attempted to reconcile the initial estimates with the actual expenditures. Based on cost estimates, the addition of the new kilometres should have cost $71.6 million, but it cost $81.9 million. We note, however, that these results are not quite comparable, since the actual expenditures includes the upgrade of 32 km of existing bikeways. In fact, the tracking mechanisms in place do not allow us to distinguish the development costs from the upgrade costs. In our view, this situation fails to provide the information needed to assess the sums invested to date for the development of new bikeways compared to those invested for their upgrade. Since the upgrade of the existing cycling network is included in the *Plan-cadre vélo*, the implementation of such projects can be expected to become more and more important in coming years. Consequently, we believe that measures should be taken to allow managers to distinguish costs associated with each program component.

Moreover, given that the number of kilometres that need to be developed and considering the strategic orientations involving the development of the cycling network have changed

since the review of the current and planned *Plan du réseau cyclable* integrated to the *Plan de transport*, we believe that the investments required to complete the cycling network of the agglomeration should be periodically estimated in order to be capable of making best decisions at the right time. In fact, the *Plan-cadre vélo* focuses on the development of protected bikeways and other types of new infrastructure (e.g., vélorues) to improve the safety and comfort of cyclists, which risks increasing the ratio of infrastructure that are more complex and expensive to build.

PROJECT IMPLEMENTATION

Third, we will address the mechanisms implemented by the Direction des transports (the Division des transports actifs et collectifs) to track the implementation of projects included in the *Programme de développement et de mise à niveau du réseau cyclable d'agglomération*. To do so, we examined the management tools used to plan the programming, track projects and control costs.

The management tools used are Excel files that have several tabs and require the entry of the same data multiple times. Many users enter data into the files, yet the author and data entry date are not included. Since this is a collective work tool for the Direction des transports (the Division des transports actifs et collectifs), all employees should have the same mode of functioning. We believe that the current situation involves an elevated risk for errors. In our opinion, project tracking files should be protected and their access should be restricted in order to avoid data entry errors and omissions.

Moreover, every year, a new Excel file is created for the annual programming (e.g., annual 2016-2017 programming). It features the list of projects comprising the *[TRANSLATION]* "over-programming" and the corresponding implementation schedules (for both development and upgrade projects). For each of the projects, the borough or related municipality, location, type of cycling infrastructure and number of kilometres are provided. Throughout the implementation, project managers report on the status of the project (e.g., completed, under way, delayed, struggling, abandoned).

During our audit, we noted that the tool used did not facilitate the tracking of the timeline, costs or progress of the project. In terms of timelines, we noted that the tool did not include the actual project start and end dates. In addition, it could not track the various projects assigned to the Direction des infrastructures, Direction des transports business units or Rosemont–La Petite-Patrie borough for pavement marking jobs.

In terms of cost tracking, we noted that the actual project costs were not included in the management tool. In our view, this situation does not provide a detailed history used to distinguish development costs from upgrade costs, conduct analyses or report on the management of the projects. Mechanisms should be put in place to ensure that the actual project costs are compiled in the project management tool.

In conclusion, we are of the view that the tool used does not facilitate the management of the projects, nor does it enable the production of management reports that could be used to monitory the timeline, costs and execution of the work.

RECOMMENDATIONS

3.3.A.	**We recommend that the Service des infrastructures, de la voirie et des transports periodically estimate the investments needed to fulfil the strategic orientations of the authorities (e.g., remaining kilometres, "*VISION ZÉRO décès et blessé grave*" approach, *Plan-cadre vélo*, etc.), for both development and upgrade projects, to ensure that the right decisions at the right time.**
3.3.B.	**We recommend that the Service des infrastructures, de la voirie et des transports implement mechanisms to compile the actual project costs in a program management software tool in order to have a detailed history that can be used to distinguish development costs from upgrade costs, conduct analyses and report on the project cost management.**
3.3.C.	**We recommend that the Service des infrastructures, de la voirie et des transports acquire a secure project tracking tool that would include all relevant data and facilitate the tracking of timelines and costs and the production of management in order to be able to report of project implementation.**

BUSINESS UNIT'S RESPONSES

3.3.A.	***Service des infrastructures, de la voirie et des transports*** *[TRANSLATION] In 2017, the administration adopted the Plan du réseau cyclable, which focused on identifying the actions needed to increase cycling's modal share and improve mobility on the territory. This plan will be upgraded to include the new Réseau express vélo and will be accompanied by a deployment strategy that will include the resources and investments needed and the implementation schedule.* *The investments needed will subsequently be taken into consideration when developing the three-year capital works programs.* ***(Planned completion: March 2020)***
3.3.B.	***Service des infrastructures, de la voirie et des transports*** *[TRANSLATION] In order to have access to a history of costs of development projects compared to upgraded infrastructure projects, a mechanism to separate the actual cost of development projects from upgraded infrastructure projects will be put in place, thus improving the management and control of project costs. Significant headway*

has already been made in compiling actual project costs given the administrative requirements of the provincial government subsidy programs for the development of the cycling network, which the city uses to fund nearly 50% of its projects. ***(Planned completion: December 2019)***

3.3.C. ***Service des infrastructures, de la voirie et des transports***

[TRANSLATION] The Service des infrastructures, de la voirie et des transports will continue to evaluate available options for the acquisition of a secure project tracking tool that would include all relevant data and facilitate the tracking of timelines and costs and the production of management reports on project implementation status. ***(Planned completion: December 2019)***

3.4. RECOGNIZING EXPERTISE IN THE DEVELOPMENT AND UPGRADE OF THE CYCLING NETWORK

3.4.A. BACKGROUND AND FINDINGS

As mentioned in previous sections, the Division des transports actifs et collectifs of the Direction des transports has been responsible for the development and upgrade of the cycling network since the adoption of the *Plan de transport*. This Division has overseen the development of more than 421 km of bikeways over nearly 10 years. In addition, it is also in charge of updating the *Plan du réseau cyclable* approved in January 2015. More recently, it also produced the *Plan-cadre vélo*, which will provide guidance for the management of the cycling network for the next 15 years. The Division is working on a "Guide de normes internes dans le domaine des aménagements cyclables", which will be included in the "Guide d'aménagement durable des rues de Montréal". Over the years, the Division des transports actifs et collectifs has developed expertise in this area.

During our audit, however, we were told of certain situations arising in recent years. In this respect, some bikeways are constructed as part of capital projects managed by other business units within the Direction des transports (the Division de la sécurité et de l'aménagement du réseau artériel) or the Service des infrastructures, de la voirie et des transports (the Division des grands projets). According to information obtained, projects involving the construction of bikeways are sometimes conducted without first notifying the people in charge at the Division des transports actifs et collectifs. For certain other projects, the business units submit development plans for bikeways to the Division des transports actifs et collectifs, in order to obtain feedback, but subsequently fail to take it into account. Such situations suggest that several business units believe they have expertise in the area of the cycling network, yet they fail to assess the impact on the coherence of the network or compliance with standards recognized by the city (e.g., addition of traffic lights for cyclists). Failing to comply with certain standards can have an impact on the

safety of cyclists. We believe that one unit should be recognized as having the expertise in the development and upgrade of the cycling network.

Moreover, in 2016, following the délégation de pouvoirs du conseil d'agglomération au conseil municipal regarding the development and redevelopment of the current and planned cycling network identified in the *Plan de transport* and located in the Montréal territory, city council acknowledged the authority of the Service des infrastructures, de la voirie et des transports to authorize projects proposed by the boroughs. As a result of this delegation of authority, city council can accept service offers from interested boroughs. Though the authority of the Service des infrastructures, de la voirie et des transports is recognized, we believe that a clear position should be taken on the appointment of a business unit responsible for authorizing the proposed development and redevelopment projects managed by other business units they involve the cycling network in the agglomeration. This would contribute to a consistent work methods and ensure consistency and oversight in terms of complying with the standards recognized by the city.

RECOMMENDATION

3.4.B. **We recommend that the Service des infrastructures, de la voirie et des transports formally recognize a business unit as the expert on the development and upgrade of the cycling network, which would be responsible for authorizing development and redevelopment projects managed by other business units in order to promote compliance with the standards recognized by the city and harmonize the practices throughout the cycling network.**

BUSINESS UNIT'S RESPONSE

3.4.B. ***Service des infrastructures, de la voirie et des transports***

[TRANSLATION] The Service des infrastructures, de la voirie et des transports will assign a business unit to the task of authorizing development and redevelopment projects of the cycling network in compliance with standards recognized by the city and will share the information with its partners. ***(Planned completion: February 2019)***

3.5. CYCLING NETWORK MAINTENANCE

3.5.A. BACKGROUND AND FINDINGS

The proper maintenance of the cycling network will enable us to offer cyclists a safe and comfortable cycling experience.

To date, the only maintenance standards in the area of cycling come from and MTMDET. They focus on signage and pavement marking. Vélo Québec, however, has survey best

practices in this area, leading to the production of a "Guide technique sur l'aménagement des voies cyclables"[19], which deals with several related topics, including the operation of a cycling network. The publication discusses maintenance and snow-clearing activities.

According to this Vélo Québec publication, it is extremely important to implement a maintenance program to ensure the longevity of the cycling network. It references three types of activities: preventing maintenance (e.g., sweeping the pavement), corrective maintenance (e.g., filling cracks in the pavement) and replacement when an asset has reached its useful life. The level of maintenance provided varies based on the type of cycling route, the surrounding environment and traffic. However, a minimum level of maintenance is required necessary to ensure the longevity of the cycling network and the comfort and safety of users. In addition to maintenance activities, snow operations are also necessary. They include clearing snow, spreading abrasives and removing snow.

At the city level, the maintenance of the cycling network is included in the list of maintenance activities for the arterial network delegated to the boroughs councils[20] by a city council by-law. These delegated maintenance activities must be performed in compliance with the instructions of the "Guide d'entretien présenté en annexe du règlement".

Here is a description of the maintenance jobs:

- Minor repairs of public roads;
- Cleaning pavement, sidewalks and public spaces;
- Maintaining signage;
- Marking pavement;
- Clearing snow from pavement, sidewalks and public spaces.

During our audit, we examined to extent to which the maintenance guide produced by the city is used by the boroughs when maintaining the bikeways. We start by noting that the guide recognizes the importance of maintaining the bikeways to ensure the safety of cyclists. We also note, however, that there is no specific description of the type of maintenance work to be done. In this respect, based on the guide, snow-clearing activities include all operations that involve ensuring the safety of drivers, pedestrians and cyclists. The guide also refers to cycling signage intended to ensure the safety of cyclists and markings of all bikeways of the arterial network in order to comply with the latest MTMDET standards.

As previously mentioned in the introduction to this section, best practices provide that a minimal level of maintenance is required to ensure the longevity of the network and the comfort and safety of users. In the "Guide d'entretien du règlement de délégation de

19 The guide is entitled "Aménagements en faveur des piétons et des cyclistes", last update in 2009.

20 Règlement du conseil de Ville sur la délégation de certains pouvoirs relatifs au réseau de la voirie artérielle aux conseils d'arrondissements (08-055).

pouvoirs," we found the following information that could constitute minimal standards. For example, for pavement marking, the guide stipulates that it will be done annually in April and May and that certain critical locations will be marked in the fall. In terms of street cleaning, the guide specifies that the frequency of cleaning of a main artery is determined as needed and can be defined under a regulation in effect.

On snow-clearing activities for roads and sidewalks, the guide refers to the snow-clearing policy adopted by city council in August 2015, whose levels of service have been adopted. They are determined based on a characterization of streets and their related priority (P1, P2, P3[21]). Minimal standards have also been established for plowing, spreading of melting agents and loading. For example: plowing if snowfall is more than 2.5 cm; loading if snowfall in between 10 cm and 20 cm within 4 days. More specifically, the snow-removal policy sets out that only the bikeways of the *Plan des voies cyclables quatre saisons*[22] are to be accessible. According to the policy, these included painted bike lanes (developed along streets and identified by pavement markings) and protected bike lanes (physically separated from traffic by a barrier, such as a concrete divider). They benefit from the same level of service as the streets on which they are located. This level of service varied based on the priority established in the street characterization plan.

It should be noted that the winter cycling network covers close to 521 km of bikeways[23], including a protected network (about 45 km) that runs through the city (north to south) across six boroughs (Ahuntsic-Cartierville, Villeray–Saint-Michel–Parc-Extension, Rosemont–La Petite-Patrie, Le Plateau-Mont-Royal, Ville-Marie, Côte-des-Neige–Notre-Dame-de-Grâce). It comprises the Boyer/Christophe Colomb, Rachel et Maisonneuve/Peel routes. The rest of the four-season network is composed of bike lanes and designated share roadways that run along the streets of Montréal's boroughs spanning 476 km (97%). According to the snow-clearing policy, the cycling network is located on level P1, P2 and P3 streets, which leads to inconsistent service, more specifically on the protected network. According to the delegation of powers, boroughs can choose the level of snow-clearing service they will offer on given bikeways. This situation can have an impact on the quality and standardization of snow-clearing services.

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21 P1: Street with a combination of several features: major street, very narrow, priority bus routes, reserved lanes, hospital entryway, major commercial street, high traffic flow and presence of sidewalks;
P2: Street with a combination of several features: secondary street, presence of school drop-off zone, local commercial street rue, regular bus route and presence of sidewalks;
P3: Street with a combination of several features: local residential street, industrial sector street, low traffic flow, with or without sidewalks.

22 Plan made public by the Direction des transports.

23 Data for the 2017-2018 season. Includes the Maisonneuve cycling route in the City of Westmount.

The winter maintenance of bikeways was such an issue that at the start of the 2016-2017 season, a working committee under the auspices of the SCA was formed to address snow clearing. Six boroughs (five of which with a protected network), the Service des infrastructures, de la voirie et des transports and the Service des communications were part of the committee. The objectives of the working committee were as follows:

- To ensure the oversight of cycling route maintenance, primarily for the protected network;
- To determine the bikeways to be cleared of snow and establish snow-clearing standards;
- To propose design criteria whose express purpose would be to facilitate snow-clearing operations;
- To evaluate the type of equipment needed for winter maintenance;
- To improve communication with citizens on the state and accessibility of bikeways;
- Assess the incidence of maintenance costs.

Following up on the work of the committee, recommendations were produced on different maintenance-related topics. One of the recommendations focused on establishing service levels and minimal maintenance standards for three categories of cycling itineraries (the protected network, the four-season network and the unplowed network). For the protected network, a P1 level of service was recommended. According to the information obtained, the boroughs with a protected network voluntarily agreed to a harmonized P1 level of service. At the time of our audit, city council had not adopted a position statement on the issues and, as a result, it was not included in the snow-clearing policy. However, the *Plan-cadre vélo* adopted in November 2017 by the urban agglomeration council includes, in its action plan, the establishment of service standards for the winter maintenance of the cycling network (2017-2021 timeline).

As part of our audit, we asked the boroughs about their maintenance operations. In the absence of levels of service established for the various seasonal maintenance activities, the boroughs reported that they had each set their own level of service and minimum rules. For example, in the Plateau-Mont-Royal borough, bikeways are cleaned twice a week during the summer compared to once a week in other boroughs. Though the winter maintenance of bikeways does pose a challenge, it is nonetheless important to provide year-round maintenance of the bikeways based on minimum service standards in order to provide a riding experience that is safe and comfortable across the network. Since cycling differs from driving in terms of safety, we are of the view that city council should adopt service levels and minimum maintenance standards for the entire cycling network.

When establishing these levels of service and minimum maintenance standards, we believe that data on safety (e.g., number of accidents) and cycling traffic (e.g., increase in winter use) should be reconciled with maintenance costs. We previously addressed the first two types of data in section 3.1.2. Regarding maintenance costs, the division heads interviewed in the four selected boroughs mentioned not having specific knowledge of

these sums, since they are included in the road and sidewalk maintenance costs. Consequently, they are unable to evaluate how much it costs to maintain the cycling network either during cycling season or in winter. This situation means that the Direction des transports does not have an overview of the operation costs for the cycling network, either during cycling season or in winter. In our opinion, this information combined with data on safety and traffic would be very useful when establishment a position statement on service level and minimum maintenance standards. Knowledge of the maintenance costs would also be useful in the interest of sound management, especially since the development and operation of the cycling network will increase in coming years in order to reach the objectives on safety and traffic. In our opinion, the city manager could ensure that the boroughs are able to evaluate the maintenance costs for the bikeways and forward this information to the Direction des transports enabling it to have an overall picture of operation costs and reconciling these sums with the levels of service.

In addition, still on the topic of the winter maintenance of bikeways, the four selected boroughs acknowledged finding it difficult to maintain certain routes due to their design. These findings were raised during working committee meetings on snow clearing and led to a recommendation on systematically taking into account maintenance needs when designing bikeways in order to prevent this type of issue. According to the Service des infrastructures et des transports, maintenance issues are always taken into consideration when selecting the design of bikeways. During our audit, we were not able to find evidence that these criteria had been taken into consideration.

RECOMMENDATIONS	
3.5.B.	**We recommend that the Service des infrastructures, de la voirie et des transports produce a guide d'entretien du réseau des voies cyclables and refer to it in the *Règlement de délégation de pouvoirs 08-055* to ensure harmonized practices across the boroughs.**
3.5.C.	**We recommend that the city manager take the necessary measures to ensure that the boroughs are able to evaluate the maintenance costs of bikeways by distinguishing the seasonal network from the winter network in order to provide the Service des infrastructures, de la voirie et des transports with an overall picture of operation costs for the cycling network in support of sound decision making when establishing the levels of service and reporting on results achieved.**
3.5.D.	**We recommend that the city manager establish levels of service and minimum standards for the maintenance of the cycling network and that it obtain approval of city council to harmonize maintenance practices across the network to promote cycling and the safety of users in accordance with the strategic orientations adopted by the authorities.**

BUSINESS UNITS' RESPONSES

3.5.B. ***Service des infrastructures, de la voirie et des transports***

[TRANSLATION] The Service des infrastructures, de la voirie et des transports takes note of the recommendation and will produce a four-season maintenance guide for the city's cycling network in accordance with orientation 2 of the Plan du réseau cyclable. A working committee will be created and the boroughs, related municipalities, Service de la concertation des arrondissements and Service du matériel roulant et des ateliers will be invited to participate.
(Planned completion: December 2019)

3.5.C. ***Direction générale***

[TRANSLATION] The Direction générale will task the Service de la performance organisationnelle with the development of a management tool that will enable the boroughs to evaluate the maintenance cost of bikeways directly in the activity management program. ***(Planned completion: August 2019)***

3.5.D. ***Direction générale***

[TRANSLATION] The Direction générale will task the Service des infrastructures, de la voirie et des transports and the Service de la concertation des arrondissements with the establishment of minimum maintenance levels and standards of bikeways. This will be done in collaboration with borough representatives. Based on the division of power, the departments involved will need to have the proposed service standards approved by the authorities.
(Planned completion: January 2019)

3.6. CLIENT SATISFACTION

3.6.A. BACKGROUND AND FINDINGS

Measure client satisfaction is a way to gain insight on strong points and weak points, better understand perceptions and identify areas for improvement. This exercise should be conducted at regular intervals to better respond to client needs. In terms of the cycling network, mechanisms should be put in place to evaluate the level of satisfaction regarding its development, upgrade, safety and maintenance. This evaluation has become even more important since the adoption of the *Plan-cadre vélo* in September 2017, given its goal of increasing cycling's modal share to 15% across the city and, more specifically, in central boroughs in the next 15 years.

During our audit, we examined whether mechanisms had been implemented to determine and evaluate client satisfaction.

In 2007, a survey was conducted among clients, but the findings are no longer relevant given the major development of the cycling network and the increased popularity of cycling since that time. In addition, in 2012, a focus group on the public's perception of safety was held as part of the work of a Commission permanente sur le transport et les travaux publics sur le partage du réseau cyclable montréalais. Since that time, however, no other citizen surveys have been carried out, not even on the actions presented in the *Plan-cadre vélo*. It should be pointed out, however, that by participating in a joint Comité de concertation visant à favoriser la pratique du vélo[24], which was composed of various partners from the cycling community, city officials were able to learn more about the needs of cyclists.

Currently, the only mechanism available to determine client satisfaction is the Service 311, which collects requests and complaints from citizens, including those using the cycling network. These requests and complaints are received about the boroughs, which respond to them, unless they are addressed to the Direction des transports. Although these requests and complaints are not representative of overall client satisfaction, they are not being analyzed in a structured, systematic manner with the view to obtaining a complete picture for the city as a whole to be used to make improvements. We believe that this is a relevant source of information to evaluate client satisfaction.

Our work has revealed that no permanent mechanisms have been put in place to evaluate the level of client satisfaction with the development, upgrade, safety and maintenance of the network. As a result, the Direction des transports does not know if these aspects meet the needs of cyclists.

According to the people interviewed, a satisfaction survey is planned for 2018 as a follow-up to the adoption of the *Plan-cadre vélo* by the urban agglomeration council in September 2017. The purpose of the exercise will be to survey cyclists and non-cyclists in order to better target the projects and interventions to be implemented. We encourage the Direction des transports to pursue its efforts in this direction and to put in place permanent mechanisms to evaluate client satisfaction.

RECOMMENDATION

3.6.B. **We recommend that the Service des infrastructures, de la voirie et des transports put in place mechanisms to periodically evaluate client satisfaction with the cycling network (surveys, reports on citizen requests and complaints) in order to identify the actions**

24 Composed of various partners from the cycling community: the Montréal Bike Coalition, the Commission scolaire de Montréal, the CMM, the Conseil régional de l'environnement de Montréal, the Copenhagenize Design Company-Montréal, the Direction de la santé publique de Montréal, the MTMDET, the Service des infrastructures, de la voirie et des transports, the Service de police de la Ville de Montréal, the Service de transport de Montréal and Vélo Québec.

needed to meet the needs of current and potential cyclists by way of attaining the objectives set by city council as part of its commitment to the "*VISION ZÉRO décès et blessé grave*" and those listed in the *Plan-cadre vélo* approved by the urban agglomeration council in September 2017.

BUSINESS UNIT'S RESPONSE

3.6.B. ***Service des infrastructures, de la voirie et des transports***

[TRANSLATION] The Service des infrastructures, de la voirie et des transports plans on launching a survey in the near future regarding the comfort, satisfaction and sense of security of Montréal cyclists. The goal is to learn more about the cycling clients, their mobility habits, behaviours and bicycle usage. It will also aim to pinpoint the expectations and preferences of cyclists regarding available cycling infrastructure and the type of infrastructure that should be developed in coming years as part of the implementation of the Réseau express vélo. The survey will be followed by a focus group.

After the consultation, a post-mortem will be done to recommend a method for the periodic assessment of client satisfaction. ***(Planned completion: November 2018)***

3.7. ACCOUNTABILITY REPORTING

3.7.A. BACKGROUND AND FINDINGS

When a business unit implements orientations approved by the authorities, it must monitor their progress, evaluate them periodically and report the results. Accountability mechanisms must be in place within the structure so that well-founded decisions can be made at the right time.

Let us recall that since 2015, the objective being pursued, which was established by municipal administration is that of developing 50 km of cycling route every year. This objective is part of the goal of completing the *Plan du réseau cyclable* of 1,280 km. It should also be pointed that other priorities featured in the 2008 *Plan de transport* have been integrated into the activities of the Direction des transports. They include upgrading the current network and the development of the winter cycling network.

During our audit, we therefore examined if periodic accountability reporting mechanisms were used to provide people in charge with sufficient information on these priorities.

First, during our work, we did find mechanisms in place to report on the achieving of annual development objectives. According to the information obtained, statutory meetings are

held at the Direction des transports, to evaluate the performance of executives as well as weekly meetings with the relevant elected officials. In addition, occasional meetings are also held with the Mayor of Montréal to discuss certain priority issues or the results of the annual programming. These meetings did not include any formal follow-up reports.

However, every year during the launch of the programming for the development of bikeways, the Direction des transports also reported on the results from the programming of the previous year. For each borough, the report listed the projects that had been announced and their status. It included a distinction between development and upgrade projects. It also indicated the total of kilometres developed to ascertain the progress made toward the annual development objective.

In addition, as part of the public review of operating budgets and of TCWP, the Service des infrastructures, de la voirie et des transports presents annually to the Commission permanente sur les finances et l'administration its achievements of the year and the objectives for the coming year. For the cycling network, it presented, for the period covered by our audit, the total kilometres developed and the number of kilometres to be developed in the coming year.

In our view, the mechanisms in place enable accountability reporting on the results achieved compared to the established annual development objective of 50 km/year.

Second, our audit also found that an accountability reporting mechanism was also initiated in 2016 at the Bureau des projets et programmes d'immobilisations of the city manager. According to the *Cadre de gouvernance des projets et des programmes de gestion d'actifs municipaux*[25], the *Programme de développement et de mise à niveau du réseau cyclable* of the agglomeration ranks among the city's priority programs. It should be pointed out that the identification of priority programs aims primarily at improving the realization of investments. Based on the current process, the official in charge of a priority program must report to the Comité corporatif de gestion des projets/programmes d'envergure (CCGPE)[26] every year regarding the state of progress and the realization of planned investments. Regarding the *Programme de développement et de mise à niveau du réseau cyclable de l'agglomération*, a first accountability reporting was conducted in May 2017. The Direction des transports first presented the three components of the program:

- The development of the cycling network;
- The upgrade of the existing cycling network to improve the comfort and safety of cyclists;
- The development of a four-season cycling network.

As part of the 2017 presentation, the Direction des transports reported on the progress made in terms of investments and kilometres since the start of the program. According

25 Adopted in April 2010 by city council.

26 This committee is composed of the city manager, the manager of the Bureau des projets d'immobilisations, the three assistant city managers and the manager of the Service des finances

to the presentation, the execution rate (actual expenses/authorized TCWP) was 74% since the program began and 373 km had been completed (from January 1, 2008 to December 31, 2016). In 2016 alone, the execution rate was 78% with a total of 58 km completed. Although the document presents the average execution rate, we note an absence of explanation as to why the rate is not higher. At first glance, the development objectives seem to be achieved, yet we note that the entire share of planned investments has not been used.

A careful review of the document presented reveals that the presentation does not deal with each prong of the program. In this respect, the Direction des transports did not present efforts made to upgrade the network and develop the winter cycling network. For example, it would have been relevant to mention that the number of kilometres upgraded (30 km since 2008) represents a small share of the existing network (787 km as of December 2016), for a total of nearly 4%.

Consequently, the accountability reporting document does not contain certain pieces of information, which in our view, are important. For example:

- Investments needed to complete the development and upgrade of the network. Though the Division reports that $15 million/year should be available for the next 10 years (from 2018 to 2027), this sum does not represent all of the investments needed, since not all the priorities established by the authorities are included;
- The impact of developing the winter cycling network in terms of maintenance;
- External investments (subsidies) the city has received since the start of the program;
- Difficulties encountered, as the case may be, in implementing the development and upgrade projects (e.g., the development priorities for the cycling network differ from those of the Direction des infrastructures).

We understand that this accountability reporting pertains to the *Programme de développement et de mise à niveau du réseau cyclable* for the agglomeration; however, we believe that a comprehensive status report regarding all three components of the program should have been presented to the committee so that appropriate recommendations could be made.

Third, we noted that there were no formal mechanisms to report on the implementation of cycling network projects as approved by the urban agglomeration council. These types of accountability reporting mechanisms did exist in the years following the adoption of the *Plan de transport* until the bilan quinquennal 2008-2012. This is no longer the case. We note that the last time the urban agglomeration council was given an overview of the progress made was in June 2016 with the production of the 2014-2015 review of the *Plan de développement durable de la collectivité montréalaise 2010-2015*. Given that the development of the cycling network was one of the priorities established to reduce car dependency, the report mentioned that as of December 31, 2015, the cycling network totalled 730 km, which represented 91% of the initial objective featured in the 2008 *Plan*

de transport. Since then, the authorities had not been given an updated picture of the total kilometres developed.

With the approval of the *Plan-cadre vélo* by the urban agglomeration council we believe that that tracking and accountability reporting mechanisms must be established to monitor the implementation of the plan's 10 strategic orientations through the 32 measures and schedule of its action plan. Since one of the measures involves the development of the cycling network, the accountability reporting should provide a picture of the network in terms of the kilometres mentioned in the previous paragraph. Accountability reporting mechanisms would provide the people in charge and authorities involved with accurate information on how well the measures put in place contributed to the achievement of the objectives.

Moreover, since cycling is part of the "*VISION ZÉRO décès et blessé grave*" approach adopted by city council in September 2016 and given that the city has committed to increasing the practice of cycling throughout the Montréal agglomeration, more specifically in central boroughs in the next 15 years, we believe that the results obtained should be measured and evaluated as set out in the action plans and that accountability reporting mechanisms need to be implemented. This would provide the opportunity to assess the extent to which the solutions selected have contributed to anticipated results.

RECOMMENDATIONS

3.7.B.	**We recommend that the Service des infrastructures, de la voirie et des transports produce for the city manager, a comprehensive review report on the Programme de développement du réseau cyclable d'agglomération and the state of investments required to complete the planned development of the network approved by the urban agglomeration council in January 2015 and the upgrade of the network in order to facilitate sound decision making that reflects the strategic orientations of the authorities.**
3.7.C.	**We recommend that the Service des infrastructures, de la voirie et des transports implement periodic and formal accountability reporting mechanisms on the actions set out in the action plan of the *Plan-cadre vélo* adopted in September 2017 by the urban agglomeration council in order to adequately inform the appropriate people in charge and enable them to adapt the development, upgrade and operation practices, as and when appropriate, so that the objectives established may be reached.**
3.7.D.	**We recommend that the Service des infrastructures, de la voirie et des transports implement periodic and formal accountability reporting mechanisms on the actions set out in the action plan of the "*VISION ZÉRO décès et blessé grave*" approach, from the start, in order to adequately inform the appropriate people in charge and demonstrate the achievement of the objectives established.**

BUSINESS UNIT'S RESPONSES

3.7.B. ***Service des infrastructures, de la voirie et des transports***

[TRANSLATION] Every year, the Service des infrastructures, de la voirie et des transports presents a detailed account of the development and upgraded infrastructure projects for the cycling network of the agglomeration to the Comité corporatif de gestion des projets/programmes d'envergure, which reports to the Direction générale and to the Comité de coordination des projets d'envergure. In coming presentations, the Service des infrastructures, de la voirie et des transports will make sure to document this presentation more thoroughly by focusing on the need to identify the investments required to complete the planned cycling network approved by the urban agglomeration council.

The last presentation to the Comité corporatif de gestion des projets/programmes d'envergure was on May 8, 2018.
(Planned completion: May 2019)

3.7.C. ***Service des infrastructures, de la voirie et des transports***

[TRANSLATION] The Service des infrastructures, de la voirie et des transports will put in place an accountability mechanism to track the initiatives carried out under the Plan du réseau cyclable in accordance with the deployment strategy, which will be based on the human and financial resources allocated by the authorities. This mechanism will be a dashboard where the main milestones linked to the development and implementation of the 10 orientations of the Plan can be entered:

- *Actions taken to date (meetings, consultations, studies);*
- *Subsequent steps;*
- *Investments to date and projected;*
- *Level of implementation of the project;*
- *Overall project status (under control, action required, major problems);*
- *Timelines.* ***(Planned completion: June 2020)***

3.7.D. ***Service des infrastructures, de la voirie et des transports***

[TRANSLATION] As part of the development of the action plan of the "VISION ZÉRO décès et blessé grave," approach, the Bureau de la sécurité des déplacements, subject to additional resources being made available, has as one of its intervention axes the implementation of periodic and formal accountability mechanisms on actions set out in the action plan of the "VISION ZÉRO décès et blessé grave," approach, in order to adequately inform all the people in charge and demonstrate the achievement of the objectives established. ***(Planned completion: December 2020)***

4. CONCLUSION

With the adoption of the *Plan de transport* in 2008, the urban agglomeration council embarked on a new phase of development focused on active transportation[27]. It set out to double the cycling network in the agglomeration over seven years, bring the existing network up to standards and develop a four-season cycling network. In response to major demand for cycling infrastructure, a revised version of the cycling network map was adopted by the urban agglomeration council in January 2015, tripling the 2008 network for a total of 1,280 km. During the same period, the responsibility of updating the *Plan de transport* was transferred to the Service de la mise en valeur du territoire to ensure the integration of land use planning concepts, while the Service des infrastructures, de la voirie et des transports was given an annual development objective of 50 km/year by city council in order to complete the *Plan du réseau cyclable*. In September 2016, city council made a commitment to the "*VISION ZÉRO décès et blessé grave*" approach, and a formal action plan was to be produced. The urban agglomeration council also adopted a *Plan-cadre vélo* in 2017. Its objective was to increase, over the next 15 years, the practice of cycling in metropolitan Montréal, more specifically in the central boroughs, by increasing cycling's modal share by 15%.

In conclusion, our audit indicates that significant efforts have been made to ensure that the development of the cycling network meets the priorities established by the authorities. It should be noted that 421 km of bikeways have been developed since 2008, reaching a total of 846 km at the end of 2017 and that a four-season cycling network of 521 km was accessible as of that date. It should also be added that the annual development objective set by the municipal administration was reached over the past few years. However, since the authorities have made a commitment to the "*VISION ZÉRO décès et blessé grave*" approach, and adopted the *Plan-cadre vélo*, in addition to the production of the *Plan de mobilité* currently under way (it will replace the *Plan de transport*), our audit work indicates that the development and upgrade of the cycling network is not meeting all their priorities. The new orientations call for the review of certain management practices by the appropriate stakeholder involved in the management of the cycling network. Consequently, this means that the management processes currently in place cannot be used to determine the level of safety of the cycling network. Lastly, our audit found that maintenance is conducted on the cycling network, but that improvements must be made to harmonize management practices in this respect.

Despite efforts made, there is room for improving management practices to ensure that the cycling network comply with all the priorities approved by the authorities. In this spirit, we recommend that the city:

- Clearly define and communicate the responsibilities of the stakeholders involved in the review of the current and planned *Plan du réseau cyclable* and in the production of the coming *Plan de mobilité* to ensure everyone's contribution to reaching the objectives established;

27 All forms of transportation that require the expenditure of energy by human beings (e.g., walking, cycling, non-motorized wheelchair, inline skating or skateboarding).

- During the next review of the *Plan du réseau cyclable*, take into account all orientations approved by the authorities as well as safety and land use planning requirements and the needs of cyclists in order to reach the objectives established;
- Establish priorities for the development of the planned cycling network and integrate them into an overall timeline to facilitate implementation by all stakeholders involved;
- Establish objective criteria to identify and choose projects to be included in the annual development and upgrade programming of the cycling network in keeping with the orientations of the municipal administration;
- Establish levels of service and minimum standards for the maintenance of the cycling network and obtain approval of city council to harmonize maintenance practices across the network and promote its use among cyclists;
- Implement mechanisms to evaluate client satisfaction with the cycling network to achieve the objectives of the *Plan-cadre vélo* approved by the urban agglomeration council in September 2017;
- Implement accountability reporting mechanisms for the action plan of the *Plan-cadre vélo* and the action plan of the "*VISION ZÉRO décès et blessé grave*" approach once it is developed by way of tracking the objectives established.

Through its *Plan de transport*, its "*VISION ZÉRO décès et blessé grave*" approach and its *Plan-cadre vélo*, the city has chosen to focus on the development, upgrade and safety of its cycling network. In this regard, the city has decided to make major investments in coming years, as is reflected in its mission of consolidating Montréal's standing as one of North America's top cycling cities. Consequently, the authorities have decided to accelerate the implementation of cycling infrastructure across the Montréal agglomeration. If the city wants to increase cycling's modal share in the years to come and reach the targets it has established, it must focus on the quality of cycling infrastructure, both new and existing, on the establishment of levels of service for the boroughs as a whole, on maintenance standards that include quality snow operations and, lastly, on improving the safety of cyclists.

5. APPENDICES

5.1. GOALS AND EVALUATION CRITERIA

OBJECTIVE

To ensure that the city's management practices are adequate for ensuring the proper maintenance and safety of the cycling network and its upgrade and development in accordance with the priorities approved by the relevant authorities and the needs of cyclists.

EVALUATION CRITERIA

- The roles and responsibilities of the business units and related municipalities in the maintenance, development and upgrade of the cycling network are clearly defined and communicated;
- The people in charge have a good understanding of the location, state, use and safety of the cycling network;
- Interventions to ensure the maintenance of the network and the safety of users are effective and efficient;
- The development and upgrade of the network are subject to planning (multi-year and annual) in accordance with established priorities and requirements in terms of safety, land use planning and the needs of cyclists;
- Cost estimates are produced as part of the planning process and prior to the launch of calls for tenders;
- Tracking and control mechanisms are implemented to ensure the sound management of the development and upgrade cycling network projects in terms of compliance with timelines, anticipated costs and project implementation as planned;
- Mechanisms are put in place to evaluate the level of client satisfaction with the development, safety and maintenance of the network;
- Periodic accountability reporting mechanisms provide the appropriate people in charge with required information.

5.2. TYPES OF CYCLING INFRASTRUCTURE

DESIGNATED SHARED ROADWAY

Street or traffic lane shared by drivers and cyclists. Signage involves pavement markings and signs alerting drivers to the potential presence of cyclists on the road.

BIKE LANE

One-way or contraflow on-street lane reserved for cyclists. The lane is defined by pavement markings. Delineators are sometimes installed along the dividing line when there is a risk of encroachment into the lane by cars.

BIKE PATH

Cycling path separated from traffic by a physical barrier, such as a concrete mall, plant mall, delineators, bollards, etc. or located on a separate section of the roadway. Bike paths can be designed as separate lanes or within the road allowance.

MULTI-USE TRAIL

Paved or gravel laneway that can be used by cyclists and pedestrians. Multi-use trails are also known as multipurpose trails. They are separate cycling lanes accessible to cyclists and pedestrians.