ANNUAL COMPLIANCE REPORT FOR 2020 -

Regulatory Monitor and Compliance Officer – Ottawa Light Rail Transit

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For City of Ottawa

SAB Vanguard Consulting Inc.

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1. Executive Summary:

In accordance with the Delegation Agreement signed between the City of Ottawa and the Minister of Transport in 2011, the City appointed the Regulatory Monitor and Compliance Officer (RMCO) in 2018 to perform regulatory compliance monitoring for the Confederation Line following revenue service inception.

The RMCO prepared a multi-year Work Plan which was approved by the City on September 12, 2018, which outlines the methodology for performing compliance monitoring for City Regulations pertaining to safety and security.

Consistent with the multiyear Work Plan, regulatory compliance monitoring activities were initiated following revenue service inception. The first area monitored, during the fourth quarter of 2019, focused on training and certification of employees involved in the movement of trains and light rail vehicles. This was followed with the first RMCO Annual Compliance Report submitted to the City in January 2020 and subsequently reviewed with the Transit Commission and City Council.

In accordance with the mandate provided by the City, the RMCO pursued monitoring activities throughout 2020 by reviewing the following key areas:

- Inspection and repair activities related to track;
- Inspection and repair activities related to light rail vehicles and the catenary.

This document constitutes the second RMCO Annual Compliance Report which describes the specific areas that were monitored during 2020, including the work that was undertaken to verify compliance, as well as the compliance assessment findings for each area monitored.

This Annual Compliance Report will be submitted for review at the March 2021 Transit Commission meeting.

2. Background:

On July 14, 2011, Ottawa City Council approved the implementation of the Ottawa Light Rail Transit (OLRT) project which is considered in law to be a federal rail transportation undertaking.

Since federal legislation was not developed for application to municipal light rail systems, the City of Ottawa was provided with the authority to regulate its light rail transit system. This was formalized with an agreement between the Minister of Transport and the City of Ottawa on October 1, 2011, known as the 'Delegation Agreement'.

In accordance with the Delegation Agreement, and By-Law No. 2015 – 301, the position of 'Light Rail Regulatory Monitor and Compliance Officer' (i.e. 'Regulatory Monitor and Compliance Officer – RMCO') was created to monitor and report on compliance with the OLRT Regulations (i.e. City Regulations). Further details on the background are shown in Annex 1.

The RMCO is tasked with performing regulatory compliance monitoring post-revenue service; specific duties and responsibilities are shown in Annexes 2 and 3.

Below are some important elements:

- The RMCO is responsible for regulatory compliance monitoring for the Confederation Line;
- The compliance monitoring relates primarily to safety and security Regulations;
- The RMCO was not involved in the construction, implementation or revenue service availability activities for the Confederation Line;
- The RMCO regulatory monitoring activities started after revenue service;
- The RMCO is tasked with monitoring City Regulations on an ongoing basis and providing quarterly updates and annual reports;
- The RMCO has no duty or authority to assess the adequacy, sufficiency, or effectiveness of City Regulations, or Confederation Line components / technology.

One of the early RMCO responsibilities consisted of developing a multi-year Work Plan for carrying out compliance monitoring relative to City Regulations – this was submitted to City Council and approved on September 12, 2018.

As mentioned above, RMCO responsibilities require the preparation of an Annual Compliance Report which describes regulatory monitoring activities undertaken as well as results obtained. This document is the second Annual Compliance Report - it describes monitoring activities performed in 2020 as well as the corresponding findings.

This Annual Compliance Report also provides information on the monitoring approach and process, based on knowledge of City Regulations and monitoring experience to date, thus supplementing information provided in the Work Plan.

With respect to expenses for the RMCO, a statement of the budget and actual 2020 expenses is shown in Annex 6.

3. Regulatory Monitoring Approach:

3.1 Background:

The Work Plan approved by City Council in September 2018 described the approach used for the selection of Regulations to be monitored, as well as the approach for performing monitoring.

Subsequently, a framework was developed to perform structured monitoring using the following principles:

- Quarterly monitoring plans are developed and communicated for purposes of transparency and to enable stakeholders to provide the information and resources required for monitoring;
- Specific monitoring procedures are developed to achieve effectiveness and consistency. The monitoring process is designed to obtain objective evidence to enable the determination of a fact-based compliance assessment.

The next sections describe the monitoring framework, process and risk-based principles associated with compliance monitoring.

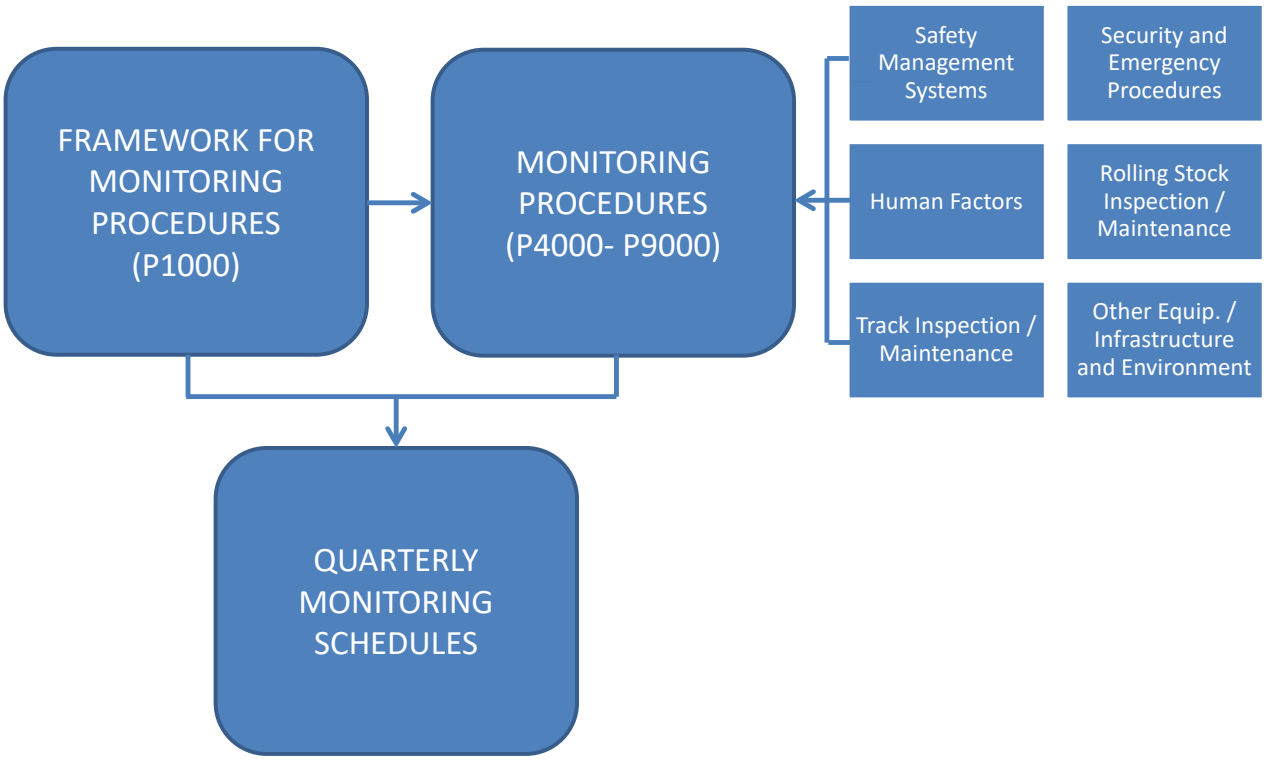
3.2 Framework for Monitoring - Documents and Procedures:

In order to perform regulatory monitoring in a structured and consistent manner, the RMCO develops specific monitoring procedures for each area to be monitored. The research and analysis contained in the Work Plan provide the foundation for the selection of Regulations / areas to be monitored and for the development of associated procedures.

As well, the RMCO developed a document entitled “Framework for Monitoring Procedures – Confederation Line Regulations – P1000” to guide the development of monitoring procedures according to the framework which uses risk-based principles and a consistent structure.

The Figure below outlines the document structure and nomenclature for the various documents developed to carry out monitoring activities:

Figure 1:



The document types shown in this Figure are described below:

1. Quarterly monitoring schedules are developed to identify City Regulations / areas to be monitored and key associated timelines / milestones;
2. For each of the six categories shown at the right of the Figure, specific monitoring procedures are developed for each Regulation / area to be monitored, thus ensuring clarity, consistency and effectiveness. Each monitoring procedure has a unique number in the range of P4000 – P9000, corresponding to a particular risk area and the corresponding City Regulations (see Figure below);
3. As mentioned above, the document entitled “Framework for Monitoring Procedures – Confederation Line Regulations – P1000”, outlines the documentation structure, risk-based principles and the approach used to develop monitoring procedures.

Figure 2:

Monitoring Procedures – Numbering System		
		Procedure Series
1	Safety Management Systems	P9000
2	Security and Emergency Procedures	P8000
3	Human Factors	P7000
4	Rolling Stock Inspection / Maintenance	P6000
5	Track Inspection / Maintenance	P5000
6	Other Equipment / Infrastructure and Environment	P4000

Monitoring procedures are designed to obtain objective evidence which enables the assessment of compliance using a combination of techniques, including quantitative and qualitative methods, which encompass the following:

1. Review and analysis of documents / records / data;
2. Sample monitoring of records / data;
3. Interviews / meetings;
4. Field observations.

3.3 Monitoring Process:

The monitoring process is designed to carry out monitoring activities in an effective manner while engaging stakeholders such that they understand the process and have the time required to provide the necessary information and resources. This process is summarized in the Figure below:

Figure 3:

FREQUENCY	STEP	ACTIVITY	TIMELINE	RESPONSIBLE / INVOLVED
QUARTERLY - MONITORING SCHEDULE		PROVIDE QUARTERLY MONITORING SCHEDULE TO OC TRANSPO / CONTRACTORS. SCHEDULE TO IDENTIFY REGULATORY AREAS (i.e. SEGMENTS) TO BE MONITORED.	30 DAYS PRIOR TO START OF MONITORING	RMCO
MONITORING SEGMENT(S)	STEP 1	NOTIFICATION TO OC TRANSPO / CONTRACTORS 2-4 WEEKS PRIOR TO START OF FIELD MONITORING: 1) IDENTIFY SPECIFIC REGULATION(S) TO BE MONITORED. 2) REQUEST REGULATIONS / RECORDS / DATA . 3) PROVIDE MONITORING PROCEDURE. 4) DESCRIBE RESOURCES REQUIRED FOR INTERVIEWS / MEETINGS AND FIELD OBSERVATIONS.	2-4 WEEKS PRIOR TO START OF FIELD MONITORING FOR EACH SEGMENT	RMCO
	STEP 2	PROVIDE RECORDS / DOCUMENTATION	WITHIN 2 WEEKS AFTER NOTICATION	OC TRANSPO / CONTRACTORS
	STEP 3	REVIEW / ANALYSIS OF RECORDS / DOCUMENTATION	DURATION ABOUT 2 WEEKS FOLLOWING RECEIPT OF INFORMATION (STEP 2)	RMCO
	STEP 4	PERFORM MONITORING ACTIVITIES INCLUDING MEETINGS, INTERVIEWS, FIELD OBSERVATIONS etc.	DURATION ABOUT 4-8 WEEKS (MAY VARY DEPENDING ON REGULATION)	RMCO IN COORDINATION WITH OC TRANSPO / CONTRACTORS
	STEP 5	ANALYSIS OF MONITORING INFORMATION GATHERED BY RMCO AND REQUEST FOR ADDITIONAL INFORMATION AS REQUIRED	DURATION ABOUT 2 WEEKS	RMCO
	STEP 6	PRELIMINARY ASSESSMENT OF COMPLIANCE BY RMCO	2 WEEKS AFTER ANALYSIS (STEP 5) AND RECEIPT OF ANY ADDITIONAL INFORMATON REQUESTED	RMCO
	STEP 7	MEETING BETWEEN RMCO / OC TRANSPO / CONTRACTORS TO REVIEW PRELIMINARY FINDINGS AND DISCUSS POTENTIAL REMEDIAL ACTIONS AS REQUIRED	ABOUT 2 WEEKS FOLLOWING PRELIMINARY ASSESSMENT (STEP 6), DEPENDING ON AVAILABILITY OF STAKEHOLDERS	RMCO / OC TRANSPO / CONTRACTORS

The key principles used in this monitoring process are as follows:

- City Regulations and supplementary documents to be monitored are selected using a risk-based approach (refer to next section);
- Quarterly monitoring schedules are developed and communicated to stakeholders to identify City Regulations to be monitored and the timeline of monitoring activities;
- Each quarterly monitoring schedule encompasses 1 or 2 regulatory segments (i.e. regulatory areas to be monitored), depending on the scope;
- Quarterly schedules are communicated to involved stakeholders in order to facilitate planning, the allocation of resources and the delivery of requested documents / data / records.

Simply stated, City Regulations are comprised of City plans, programs, standards, practices and other requirements relating to the Confederation Line system adopted and imposed by the City through various means.

In reference to Figure 3, following is a summary of the steps which follow the quarterly notification:

- Step 1: Prior to the start of monitoring for each regulatory segment, a further notification is provided regarding the intention to initiate monitoring. This notification includes the following:
  - Procedures which will be used to perform monitoring;
  - A request for current City Regulations and supplementary documents, data, and records relevant to the area to be monitored;
  - An overview of required resources related to interviews, meetings and field observations.
- Step 2: Following the notification, the requested information is to be provided to the RMCO within 2 weeks.
- Steps 3: Once the requested documents / records / data are provided, the RMCO reviews this information and performs relevant analyses;
- Step 4: The RMCO undertakes monitoring using a combination of techniques, including the review of documents / records / data, sample verifications of records / data, meetings, interviews, site visits and field observations. This enables the RMCO to collect relevant facts, information and other objective evidence required for the assessment of compliance;
- Step 5: Following the monitoring activities, the RMCO reviews / analyzes the information collected, including observations, interviews and other information;
- Step 6: Based on the review outlined in step 5, the RMCO makes preliminary determinations relative to compliance;

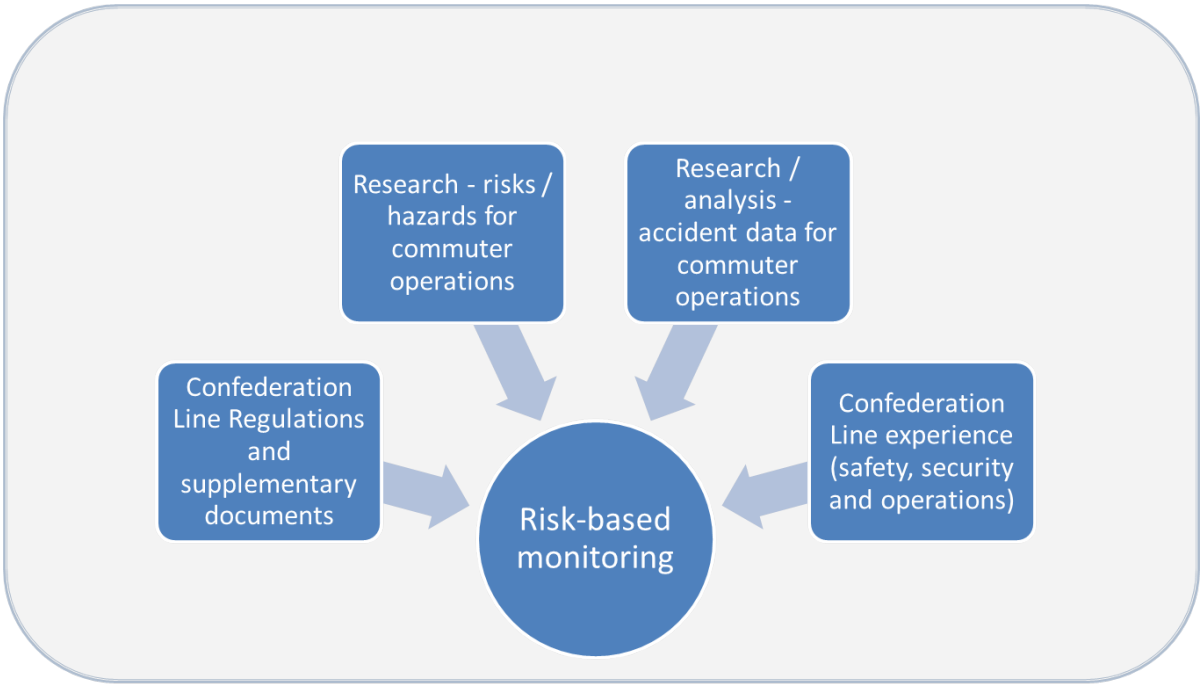
- Step 7: The RMCO will consequently plan a meeting with OC Transpo and its contractors (as required), to review preliminary findings and compliance assessments, as well as discuss potential remedial action plans.

On the basis of monitoring activities performed, and as described in Section 7 of the multi-year Work Plan (i.e. Reporting), the RMCO prepares a quarterly overview for the City Manager, as well as an Annual Compliance Report for the City Manager, the Transit Commission and City Council.

3.4 Risk-Based Monitoring:

In accordance with the multi-year Work Plan, a risk based approach is used to select Regulations / areas to be monitored using the considerations shown in the Figure below:

Figure 4:



This approach is dynamic since one of the key inputs consists of the ongoing review of safety, security and operational issues experienced in the Confederation Line. Further, RMCO monitoring activities represent a continuum where findings are considered in the understanding of risk and are therefore one of the inputs used in the ongoing risk-based selection of areas to be monitored.

The consideration of multiple inputs, as outlined above, contributes to the selection of Regulations / areas for monitoring which have the greatest potential impact on safety and security, thus complementing the City's efforts to achieve the highest possible level of safety and security.

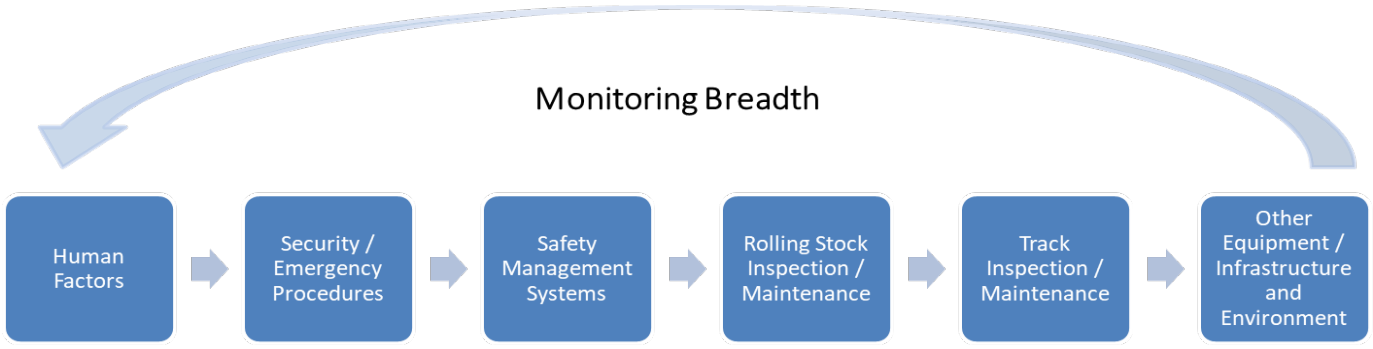
3.5 Monitoring Breadth:

In accordance with the RMCO duties and responsibilities provided by the City, as outlined in Annexes 2 and 3 of this report, Regulations are monitored on an ongoing basis using a risk-based approach. In order to maintain a broad perspective in the selection of Regulations / areas to monitor, the RMCO considers the hazard / risk categories identified in the Work Plan (refer to Annex 4 of this report and Figure 5 below) to progressively monitor Regulations / areas in each of these categories thereby achieving a broad compliance picture over time.

In light of the nature of City Regulations, it is to be noted that each category contains many sub-categories of relevant documents which require progressive monitoring over several segments. For example, the human factors category includes sub-categories such as Training and Certification, Fitness for Duty, Fatigue management, Hours of service etc. Thus, the segment monitored during Q4 2019 relates to one such sub-category, within the broader human factors category, and is therefore the first step in progressively monitoring this regulatory area.

This approach provides compliance assessment knowledge which grows incrementally as monitoring progresses, and represents a practical approach to achieving adequate monitoring breadth over time, as shown in the Figure below:

Figure 5:



It is important to recognize that this progressive compliance assessment approach is to be distinguished from audits in the following respects:

- Audits typically encompass both compliance monitoring as well as the assessment of risks, adequacy of controls, governance etc., whereas the RMCO mandate consists primarily of monitoring compliance relative to City Regulations and supplementary documents;
- As stated in Section 2 and Annex 3 of this report, the RMCO mandate does not encompass the assessment of the adequacy, sufficiency, or effectiveness of City Regulations.

4. Regulatory Monitoring Overview for 2020:

In the Annual Compliance Report provided to the City during the first quarter of 2020, it was stated that the first segment to be monitored in 2020 would focus on track inspections and repairs. This was accomplished during the first half of 2020, and subsequently the inspection and repairs of light rail vehicles and the catenary were monitored by the RMCO during the second half of 2020.

These areas were selected using the following rationale:

- Track and rolling stock are significant regulatory elements for the Confederation Line, and also represent substantial considerations with respect to hazards and risks for commuter operations;
- A number of operational issues were experienced by the Confederation Line in the areas of track (e.g. switches), light rail vehicles (e.g. wheels, pantographs, doors) and the catenary. Although, these issues were primarily operational in nature, it is valuable to take a proactive approach to reduce risk thereby reducing the likelihood that such issues impact safety;
- Since human factors (training and certification of operating employees) were monitored during fall 2019, the monitoring of track, rolling stock and the catenary constituted a logical next step in consideration of the 6 key risk areas identified in Figure 5.

Compliance monitoring was therefore performed as follows in 2020:

- Track inspections and repairs: monitored during first half of 2020;
- Light Rail Vehicles and Catenary: monitored during second half of 2020.

The next sections describe the monitoring process and findings for each of the above areas.

5. Monitoring of Track Inspections and Repairs:

5.1 Track Inspections and Repairs - Monitoring Process:

5.1.1 Monitoring Procedure:

The monitoring of track was divided into two segments as follows:

- Segment 1: Track inspections
- Segment 2: Track repairs

As stated in Section 3, monitoring procedures are developed by the RMCO and provided to stakeholders for purposes of transparency, clarity, and consistency. As well, monitoring is preceded with an advanced notification which gives the necessary lead time for stakeholders to provide the required documents / data and to allocate the resources required for monitoring.

In accordance with Section 3.3 (Figure 3), the RMCO initiated monitoring activities for segment 1 on January 17th, 2020 with an advanced notification to stakeholders. This notification included the monitoring procedure for track inspections (P5001) which identified the required documents, data and records, as well as the monitoring steps and their corresponding timelines.

Subsequently, the RMCO undertook the following activities in order to assess compliance for track inspections:

- Review of documents provided;
- Review and analysis of track inspection data (since revenue service inception);
- Review and analysis of training records;
- Interviews and field visits;
- Engagement of stakeholders throughout the monitoring process to ensure that remedial actions are undertaken expediently and any additional relevant information is provided.

A similar approach was used to monitor track repairs as follows:

- Monitoring inception was communicated on March 9th;
- Procedure P5002 was provided to stakeholders.

Both monitoring segments were completed in May 2020.

5.1.2 Responsible Parties / Contractors:

Before explaining the elements monitored and the corresponding findings, it is important to provide perspective by explaining the roles and responsibilities of the different parties involved in these monitoring segments – this is summarized below:

1) **OC Transpo:**
   - ✓ OC Transpo is the public transit agency for the City of Ottawa encompassing light rail and bus transit;
   - ✓ OC Transpo operates the Confederation Line with key employees such as ERO's (Electric Rail Operators) who operate trains and ERC's (Electric Train Controllers) who operate the control centre;
   - ✓ The responsibility for track inspections and maintenance has been contracted to RTM, which in turn has subcontracted most of this work to Alstom;
   - ✓ During the course of their duties while operating trains, ERO's have a secondary responsibility to monitor track conditions and to report any issues. Since this monitoring segment focused on track, ERO's were included in the monitoring scope for purposes of completeness, as they have a role to perform in this area.
2) **RTM (Rideau Transit Maintenance):**
   - ✓ RTM is a General Partnership firm of ACS Infrastructure Canada, SNC-Lavalin, and Ellis Don;
   - ✓ RTM has been awarded a 30 year contract to maintain the Confederation Line, including the inspection and maintenance of track and light rail vehicles;
   - ✓ RTM has developed key documents which describe the general requirements of track inspections / maintenance (refer to Section 5.1.4).
3) **Alstom:**
   - ✓ Alstom has been contracted by RTM to perform a number of activities including track inspections and most of the track repairs;
   - ✓ Alstom has developed a number of specific documents which provide direction by explaining how such inspections and maintenance are to be performed. Such documents are part of the training for Alstom personnel and are key reference documents for performing field activities in accordance with Alstom's expectations;
   - ✓ Alstom has a complement of personnel (e.g. guideway technicians) tasked with performing track inspections and most of the repairs;

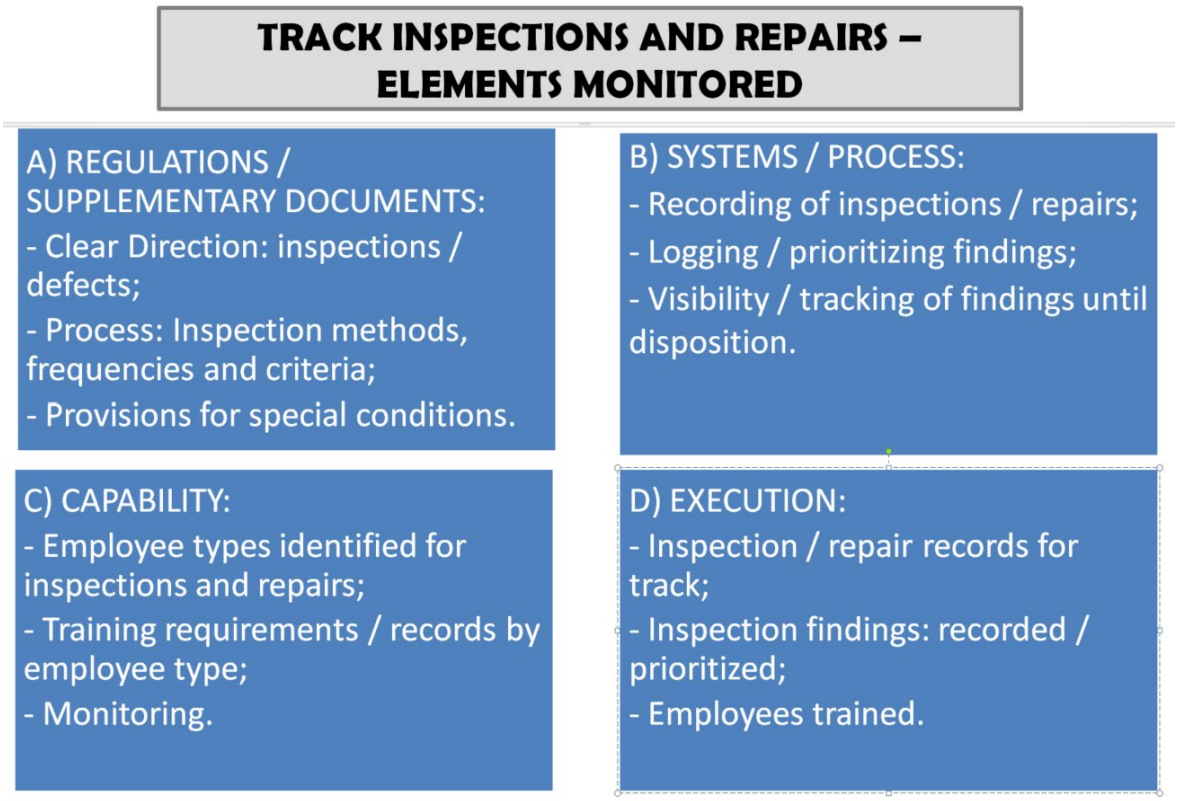
- ✓ Although there are other contractors who perform certain track repairs, such as A&B Rail, the scope of this monitoring segment focused solely on Alstom as they perform the majority of track inspections and repairs.

5.1.3 Elements Monitored:

Alstom has a schedule of inspections during which their employees perform track inspections (e.g. monthly track inspections) and maintenance (e.g. switch lubrication). Certain specialized inspections, such as ultrasonic rail flaw detection and track geometry testing, are contracted out to companies which specialize in such areas. Further, the inspection process verifies specific track components and looks for defects / conditions which are either repaired immediately or logged for subsequent repairs, depending on the nature of the finding, its priority and the scope of the required repair.

The RMCO performed monitoring of the elements identified in the Figure below since these are fundamental for effective track inspection, maintenance and repairs, thus having a direct bearing on compliance and safety:

Figure 6:



In accordance with the above Figure, monitoring encompassed the following elements:

Part A – Regulations / Documents:

- Documents Contain Clear Direction on Track Inspections:
  - Components to inspect are defined (e.g. rail, ties, ballast, track geometry);
  - Inspection criteria are defined for each major component (e.g. rail wear limits);
  - Provisions for inspections during special conditions (e.g. extreme cold / heat temperatures);
  - Inspection methods are identified (e.g. high-rail vehicle, walking, rail flaw detection);
  - Inspection frequencies are defined for each inspection method.

Part B – Systems / Processes:

- System / process to record inspections and repairs;
- System / process to prioritize / repair findings identified during the inspection process;
- System / process to provide alerts when inspections / repairs are not done within required timelines.

Part C – Capability:

- List of employees responsible to perform track inspections and repairs;
- Training requirements defined for each employee type;
- Monitoring process relative to employees.

Part D – Execution:

- Records available for inspections according to scheduled time frames since revenue service inception;
- Records available for inspection findings and corresponding repairs;
- Employees have been trained in accordance with training matrix requirements.

5.1.4 Documents / Data / Records:

The following documents were used as a basis for monitoring as they contain certain City adopted and imposed (and related) requirements relating to track inspections and repairs:

- Schedule 15-3 Maintenance and Rehabilitation Requirements;
- RTM Maintenance and Rehabilitation Plan (RTM-MC-PLN-042);
- RTM Track Safety and Inspection Rules (RTM-ENG-RUL-132).

Since the above documents cover general requirements relative to track, a number of additional specific documents were provided by RTM / Alstom to describe specific procedures used for associated track inspections / maintenance.

The documents, data and records provided to the RMCO were used to perform the monitoring steps described in Section 5.1.3. On the basis of these monitoring activities, the monitoring findings are presented in Section 5.2 below.

Further, in the course of carrying out the review of the relevant documents and related work activities, the RMCO observed and noted potential or apparent non – compliances with City Regulations, the contractual obligations of RTM and Alstom, the requirements of RTM's and Alstom's own documents (and apparent inconsistencies with City requirements) and with prevalent industry sector practices for similar activities in similar operating conditions.

5.2 Track Inspections / Maintenance and Repairs - Findings:

Table 1 (below) summarizes findings for track inspections / maintenance and repairs. See footnote below relative to findings which are determined relative to requirements in documents provided.

Category	Element Monitored *	Company	Findings **	Comments
A – Regulations and Documents	A1 - Inspection procedures	RTM / ALSTOM	**Mostly Compliant**	1) A substantial number of documents were provided, which give clear direction for most track related inspections. 2) Certain Alstom documents are inconsistent or missing some requirements specified in the RTM Maintenance & Rehabilitation Plan for 3 areas: • High temperature inspections for mainline missing; • No time frame for inspections related to rapid temperature change; • Combined rail wear criteria missing These findings were subsequently addressed by Alstom.
B – Systems / Process	B1 – System to record inspections / findings	RTM / ALSTOM	**Compliant**	• GSI (SAP) information system is used by Alstom. • IMIRS information system is used by RTM. • Alstom document "Defect and Concession Management" OTT-GNR-ENG10" identifies how issues are prioritized.
	B2 - System / process to provide alerts when inspections are not done	ALSTOM	**Opportunity**	Although Alstom uses an elaborate information system, no process was provided to RMCO relative to alerts for missed inspections. Subsequently, Alstom committed to add this process to support execution of inspections, and confirmed in April that script was developed to flag missing inspections.

*** Note 1 - Applicable documents which stipulate requirements:** 1) Schedule 15-3 Maintenance and Rehabilitation Requirements; 2) Maintenance and Rehabilitation Plan - RTM-MC-PLN-042 part 16; 3) Track Safety and Inspection Rules (RTM-ENG-RUL-132)

**** Note 2 – Findings :**

Compliant: means that monitoring activities have identified compliant results in accordance with requirements in documents.
Mostly Compliant: means that monitoring activities have identified predominantly compliant results, with some exceptions.
Partially Compliant: means that monitoring activities have identified mixed compliance results, with some compliant areas, as well as non-compliant areas.
Not Compliant: means that monitoring activities have identified either fully non-compliant results or mostly non-compliant results.
Opportunity: means that monitoring activities have identified an opportunity for improvement relative to Good Industry Practice (GIP).

Category	Element Monitored *	Company	Findings **	Comments
C – Capability / Training	C1 - Employees responsible to perform each type of inspection	ALSTOM	**Compliant**	Alstom provided list of employees responsible to perform inspections: These are Guideway Technicians and Guideway Team Leads.
		OC TRANSPO	**Compliant**	OC Transpo provided list of ERO's (electric rail operators).
	C2 - Training requirements defined for each employee type	ALSTOM	**Compliant**	Alstom provided Training Matrix which identifies required mandatory training (includes ELORv1.2, Track Inspection courses, WMS documents etc.).
		OC TRANSPO	**Compliant**	OC Transpo provided relevant training material.
	C3 - Oversight / Monitoring of field employees	OC TRANSPO	**Compliant**	OC Transpo supervisors monitor employees and operations through Rules Safety Compliance Program.
		RTM / ALSTOM	**Opportunity**	Alstom described process to monitor Guideway Technicians: this consists of lead hand oversight. Alstom committed to add structured supervision oversight (similar to OC Transpo Rules Safety Compliance program). As well, Alstom implemented "3 P" audits (People, Parts Process).
	C4 - Training records	OC TRANSPO	**Compliant**	Sample review shows that employees received required training.
		ALSTOM	**Partially Compliant**	Sample review of training records shows that about half of the employees monitored received all required courses, while the other half received only part of required courses (identified as 'mandatory' in training matrix). Alstom explained that newer employees work with experienced lead hands but may not have taken all required training. Alstom committed to identify a minimum standard for courses required for new employees prior to starting work.

Category	Element Monitored *	Company	Findings **	Comments
D – Execution of track inspections / repairs	D1 - Daily track inspections (MTN10-WMS 014)	ALSTOM	**Partially Compliant**	Records reviewed in GSI download of Feb. 25 account for about 60% of daily inspections required (70 of 120).
	D2 - Twice per week track inspections (MTN10 -WMS-001)	ALSTOM	**Mostly Compliant**	Records reviewed in GSI download of Feb. 25 account for about 90% of such inspections. There are two periods of 2 weeks and four periods of 1 week with missing inspection records ("3D GWY MAINLINE VISUAL INSPECTION"); the missing records correspond mostly to the winter period.
	D3 - Monthly track inspections (MTN10 -WMS-016)	ALSTOM	**Mostly Compliant**	Records reviewed in GSI download of Feb. 25 and subsequent data provided by Alstom show that most (about 90%) monthly track inspections were done with the exception of the January - February 2020 period ("1M TRK BMSF TRACK INSPECTION").
	D4 - 3 Month Track Inspections (MTN10 -WMS-003)	ALSTOM	**Compliant**	Records reviewed in GSI download of Feb. 25 show all such inspections completed. Note that Alstom explained and substantiated that such inspections are entered in GSI as '1 month inspections'. Alstom agreed to update GSI to differentiate 3 month track inspections on a go forward basis.
	D5 - 1 Month turnout / crossover inspec. (MTN10 -WMS-002)	ALSTOM	**Mostly Compliant**	Records reviewed in GSI download of Feb. 25 and subsequent data provided by Alstom account for all such inspections, except 2 of 25 missing (winter period) - ("1M TRK TURNOUT & CROSSOVER INSP").
	D6 - 3 Month turnout / crossover inspections (MTN10 - WMS-014)	ALSTOM	**Compliant**	Records reviewed in GSI download of Feb. 25 and subsequent data provided by Alstom show that all such inspections were completed.
	D7 - 3 Month expansion joint inspections (MN10 - WMS-004)	ALSTOM	**Compliant**	Records reviewed in GSI download of Feb. 25 and subsequent data provided by Alstom show that all such inspections were completed.
	D8 - 3 Month rail flaw detections	ALSTOM	**Compliant**	Records show that all such inspections were completed.
	D9 - Extreme weather inspections	ALSTOM	**Partially Compliant**	Records provided by Alstom show that 2 such inspections were performed since revenue service. A review of weather data identified 5 instances when criteria were met thus requiring such inspections (winter). Further, at the time of monitoring, such inspections were not entered as unique entries in GSI, but Alstom subsequently agreed to create unique entries.
	D10 - Track repairs.	ALSTOM	**Mostly Compliant**	A review of track repair data / records showed the following: - 314 entries were identified as requiring repairs and assigned a priority - Of the 314 entries, there were 85 entries (i.e. about 27%) which were not completed within established repair timeline (mostly winter period). - RTM is monitoring closely track repairs and has established KPM's.

6. Monitoring of LRV and Catenary Inspections / Repairs:

6.1 LRV and Catenary Inspections / Repairs - Monitoring Process:

6.1.1 Monitoring Procedure:

The monitoring of LRV's (light rail vehicles) and the catenary were divided into two segments as follows:

- Segment 3: LRV and catenary inspections;
- Segment 4: LRV and catenary repairs.

Considering the large number of LRV components, a risk-based approach was used to focus monitoring on the most relevant components based on risk and experience.

As such, monitoring activities were focused on the following areas:

1) Light Rail Vehicles:
    - Wheels
    - Brake systems
    - Bogies
    - Couplers
    - Doors
    - Pantographs
2) Catenary

In accordance with Section 3.3 (Figure 3), the RMCO initiated monitoring activities for segment 3 on June 8th, 2020 with an advanced notification to stakeholders. This notification included the monitoring procedure for LRV and catenary inspections (P6001) which identified the required documents, data and records, as well as the monitoring steps and their corresponding timelines.

Subsequently, the RMCO undertook the following activities in order to assess compliance for LRV and catenary inspections:

- Review of documents provided;
- Review and analysis of inspection data (from revenue service inception);
- Review and analysis of training records;
- Interviews and field visits;
- Engagement of stakeholders throughout the monitoring process to ensure that remedial actions are undertaken expediently and any additional relevant information is provided.

A similar approach was used to monitor LRV and catenary repairs as follows:

- Monitoring inception was communicated on September 30th;
- Procedure P6002 was provided to stakeholders.

Both monitoring segments were completed in November 2020.

6.1.2 Responsible Parties / Contractors:

Before explaining the elements monitored and the corresponding findings, it is important to provide perspective by explaining the roles and responsibilities of the different parties involved in this monitoring segment.

Please refer to Section 5.1.2 which describes the roles of the parties and contractors involved in these monitoring segments; specifics relative to light rail vehicles and the catenary are described below:

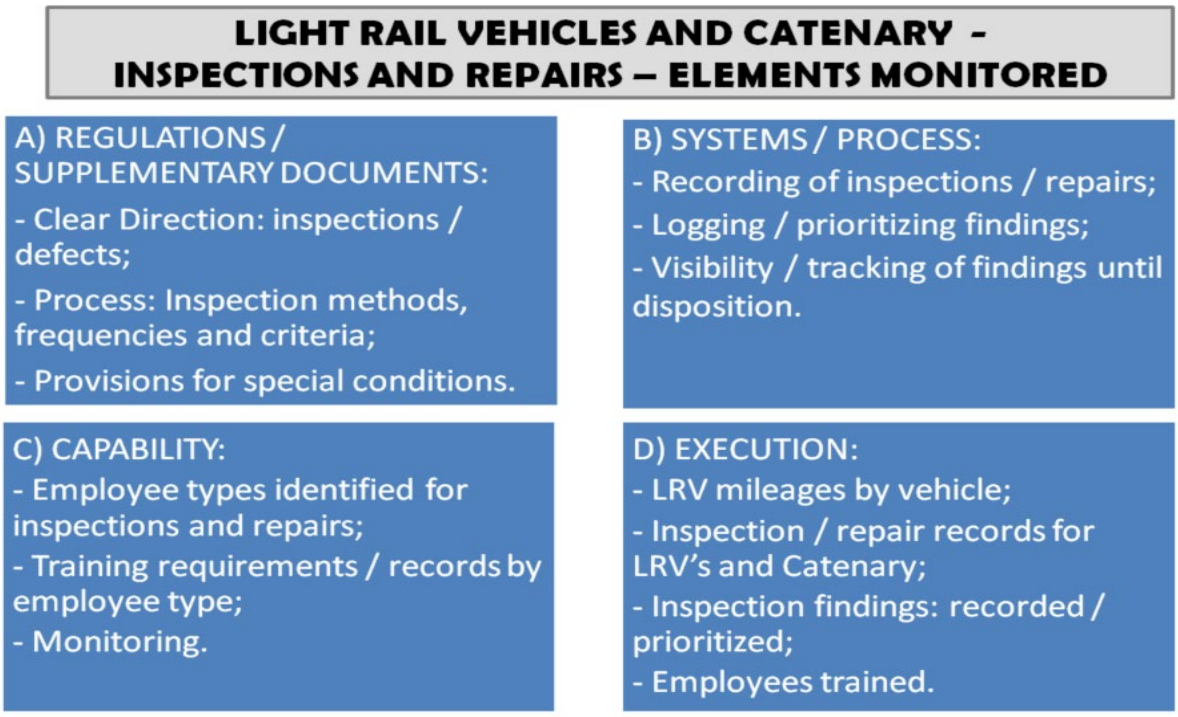
1) **RTM (Rideau Transit Maintenance):**
   - ✓ RTM has been contracted to maintain the Confederation Line. This includes the inspection and maintenance of light rail vehicles and catenary which are the focus of this Section;
   - ✓ RTM has developed key documents which describe the main requirements relative to the inspection and maintenance of light rail vehicles and the catenary (refer to Section 6.1.4).
2) **Alstom:**
   - ✓ Alstom has been contracted by RTM to perform a number of activities including the inspection and maintenance of light rail vehicles and the catenary;
   - ✓ Alstom has developed a number of specific documents which provide direction by explaining how such inspections and maintenance are to be performed. Such documents are part of the training for Alstom personnel and are key reference documents for performing field activities in accordance with Alstom's expectations;
   - ✓ Alstom has a complement of personnel tasked with performing the inspection and maintenance of LRV's and the catenary.

6.1.3 Elements Monitored:

Alstom has a schedule of inspections during which their employees perform LRV and catenary inspections / maintenance. During the inspection process, defects / conditions are identified and either repaired immediately or logged for subsequent repairs, depending on the nature of the finding and its priority.

The RMCO performed monitoring of the elements identified in the Figure below while using the risk-based focus on the components identified in Section 6.1.1. The elements identified in the Figure below are fundamental for effective inspection and repair processes, and have a direct bearing on compliance and safety:

Figure 7:



In accordance with the above Figure, monitoring encompassed the following elements:

Part A – Documents:

- Documents contain clear direction on inspections for LRV's and catenary:
  - Inspection schedule and required frequencies are identified;
  - Components to inspect are identified;
  - Provisions for special inspections, such as those for winter / extreme weather events.

Part B – Systems and Processes:

- System / process to record inspections and repairs;
- System / process to prioritize findings identified during inspection process;
- System / process to provide alerts when inspections or repairs are not done within required timelines.

Part C – Capability:

- List of employees responsible to perform inspections and repairs (specific to LRV and catenary);
- Training requirements defined for each employee type;
- Monitoring process relative to employees.

Part D – Execution:

- Records of inspections and repairs are available since revenue service inception for each LRV number, specifically for the components identified above, and the schedule of inspections provided by Alstom;
- Records available for inspection findings and corresponding repairs.
- Employees have been trained in accordance with training matrix requirements.

6.1.4 Documents / Data / Records:

The following documents were used as a basis for monitoring as they contain requirements relating to LRV and catenary inspections and repairs:

- Schedule 15-3 Maintenance and Rehabilitation Requirements;
- RTM Maintenance and Rehabilitation Plan (RTM-MC-PLN-042);
- RTM LRV Safety and Inspection Rules (RTM-ENG-RUL172);
- 4.7 LRV Safety and Inspection Rules (OLRT – OLR-05-0-RGL-104070).

Since the above documents cover general requirements for LRV's and the catenary, a number of additional specific documents were provided by RTM / Alstom to describe specific procedures used for the associated inspection and repair activities.

The documents, data and records provided to the RMCO were used to perform the monitoring steps described in Section 6.1.3. On the basis of these monitoring activities, the monitoring findings are presented in Section 6.2.

Further, in the course of carrying out the review of the relevant documents and related work activities, the RMCO observed and noted potential or apparent non – compliances with City Regulations, the contractual obligations of RTM and Alstom, the requirements of RTM's and Alstom's own documents (and apparent inconsistencies with City requirements) and with prevalent industry sector practices for similar activities in similar operating conditions.

6.2 LRV and Catenary Inspections and Repairs - Findings:

Table 2 (below) summarizes monitoring findings for LRV and Catenary inspections and repairs. These findings relate to Alstom since they are the company performing LRV and Catenary inspections / maintenance. See footnote below relative to findings which are determined relative to requirements in documents provided.

Category	Sub-Category	Element Monitored *	Findings **	Comments
A – Regulations and Documents	A1 – Light Rail Vehicles and Catenary	Documents / Procedures – Overview	**Compliant**	A substantial number of documents were provided with clear direction for LRV and Catenary inspections / maintenance. Documents are well structured and detailed.
	A2 – Light Rail Vehicles	Documents / Procedures – Mileage Tolerance for Inspections	**Opportunity**	Inconsistency identified between RTM and Alstom documents regarding mileage tolerance within which LRV inspections must be performed, as well as actions required / disposition in the event that mileage tolerance is exceeded. RTM and Alstom have agreed to review and align.
	A3 – Light Rail Vehicles	Documents / Procedures – Extreme Weather	**Opportunity**	Upon inception of monitoring, documents provided did not describe measures for LRV's / Catenary for extreme weather. Subsequently, RMCO was provided with 6 RTM documents describing winter preparation / severe weather actions – these were reviewed and addressed by RTM / Alstom.
	A4 – Catenary	Documents / Procedures – Extreme Weather	**Opportunity**	Same as A3.

*** Note 1 - Applicable documents which stipulate requirements:** 1) Schedule 15-3 Maintenance and Rehabilitation Requirements; 2) Maintenance and Rehabilitation Plan - RTM-MC-PLN-042 part 16; 3) LRV Safety and Inspection Rules (RTM-ENG-RUL172); 4) 4.7 LRV Safety and Inspection Rules' (OLRT – OLR-05-0-RGL-104070)

**** Note 2 – Findings :**

Compliant: means that monitoring activities have identified compliant results in accordance with requirements in documents.
Mostly Compliant: means that monitoring activities have identified predominantly compliant results, with some exceptions.
Partially Compliant: means that monitoring activities have identified mixed compliance results, with some compliant areas, as well as non-compliant areas.
Not Compliant: means that monitoring activities have identified either fully non-compliant results or mostly non-compliant results.
Opportunity: means that monitoring activities have identified an opportunity for improvement relative to Good Industry Practice (GIP).

Category	Sub-Category	Element Monitored *	Findings **	Comments
B – Systems / Process	B1 – System / Process	Records of Inspections / Findings	**Compliant**	GSI (SAP) information system is used by Alstom to record LRV and catenary maintenance activities. IMIRS information system is used by RTM. There is an interface between the two systems enabling for verifications of work activities.

Category	Sub-Category	Element Monitored *	Findings **	Comments
C – Capability / Training	C1 - Training	Training Delivery - Catenary	**Partially Compliant**	• Alstom provided list of power technicians assigned to catenary inspections / repairs, as well as their respective training records. • Sample verification identified about half of the employees (4 of 8) monitored who did not receive all required courses identified in training matrix.
	C2 - Training	Training Delivery - LRV's	**Mostly Compliant**	• Alstom provided list of maintenance vehicle technicians (MVT's) assigned to LRV inspections and repairs, as well as their respective training records. • About 10% of employees (2 of 20) did not receive all required courses identified in training matrix.
	C3 - Oversight	Oversight LRV and Catenary	**Compliant**	• Alstom provided a description of their monitoring process entitled '3P audits'.

Category	Sub-Category	Element Monitored *	Findings **	Comments
D – Execution: LRV / Catenary inspections / repairs	D1 - LRV Inspections	LRV Inspection Data	**Mostly Compliant**	• A review of LRV inspection data shows that scheduled inspections are mostly performed within mileages specified in WMS procedures (e.g. 10K, 25K, 30K, 50K, 100K). • However, some LRV inspections (about 10%) were done after the prescribed mileage and allowable tolerance. Most issues occurred during last winter.
	D2 - LRV Inspections	LRV Work Orders	**Compliant**	• A sample of LRV work orders were monitored to verify if inspections correspond to maintenance requirements for specific mileages. The work orders verified showed that the inspections performed correspond to WMS inspection procedures.
	D3 - Catenary Inspections	Catenary Inspection Data	**Mostly Compliant**	• A review of catenary inspection data shows that scheduled Inspections are mostly performed within WMS timelines (1M, 3M, 6M, 1Y). • However, some catenary inspection records are missing (about 10%). Most issues occurred during last winter.
	D4 - Catenary Inspections	Catenary Work Orders	**Opportunity**	• A review of work orders (task lists used as checklists for inspections) shows that some are detailed checklists (1M and 3M), whereas others (6M and 1Y) show only one line which is insufficient to support completeness and execution. • Alstom has expanded the 6M and 1Y work orders (task lists) during the summer 2020 to make them consistent with the 1M and 3M ones.
	D5 - LRV Repairs	LRV Repair Records	**Mostly Compliant**	• A sample review of 23 work orders which identified required repairs shows that there are repair records for 16 of these. Most of the repair items which do not have records occurred in the first half of 2020. This indicates that the execution of repairs and / or records could be improved.
	D6 - Catenary Repairs	Catenary Repair Records	**Mostly Compliant**	• A sample verification of 9 catenary inspection records (1M, 3M, 6M, 1Y inspections) revealed 2 defects. Subsequently a list of defects was requested for a 6 month period – this showed 45 defects of which 30 show as 'complete', while the other 15 show 'responded' with no recorded indication of work done. This indicates that the execution of repairs and / or records could be improved.

7. Summary of 2020 Compliance Monitoring Findings:

In accordance with the multiyear Work Plan, and the RMCO duties and responsibilities, regulatory compliance monitoring activities for the Confederation Line were performed in 2020 with a focus on track inspections and repairs, as well as the inspection and repairs of light rail vehicles and the catenary.

These areas represent significant regulatory elements for the Confederation Line, and also represent important considerations with respect to hazards and risks for commuter operations. Thus, significant progress was made in advancing monitoring activities which have thus far encompassed four of the six major areas identified in Section 3.5.

Sections 5 and 6 provide tables which identify the areas which were monitored, as well as the corresponding findings. Although these tables identify areas of strength and opportunity, many of the issues identified occurred during the winter of 2019-2020, with improvements noted afterwards. A summary of the compliance monitoring findings is provided below.

A) Track:

1) **Documents and Direction:**
   - In general, Alstom documents relative to track inspections and maintenance are structured and detailed, thus providing a solid foundation for such activities;
   - There were inconsistencies between certain RTM and Alstom documents which were subsequently addressed. The most significant ones were Alstom's lack of high temperature inspection criteria for the mainline, the unclear criteria for mainline inspections during rapid temperature changes and the lack of a combined rail wear criteria. Note that these requirements were in RTM documents, but were not in the corresponding Alstom documents which are the ones used for field execution. These findings were subsequently addressed.

2) **Systems and Processes:**
   - Information systems used by RTM and Alstom relative to track inspections / maintenance are generally robust;
   - An opportunity was identified to strengthen Alstom's information system to flag scheduled inspections which do not get performed within required timelines. This was acted upon as part of the remedial actions (refer to Section 8).

3) **Capability / Training:**
   - OC Transpo was found to be compliant relative to training requirements, delivery and monitoring for their ERO's, relative to their secondary responsibility to monitor track;
   - Alstom provided training requirements for their employees involved in track inspection / maintenance. Alstom's training plan and matrices are substantial, however training delivery was partially compliant and an opportunity was identified (and acted upon) for monitoring such employees.
4) **Execution:**
   - The execution of track inspections showed areas of strength and opportunity;
   - Most of the execution issues occurred during the winter of 2019-2020, with subsequent improvements noted.
   - Of the 9 track inspection types monitored, 4 were compliant, 3 mostly compliant and 2 partially compliant;
   - The completion of track repairs was mostly compliant. However, about one quarter of the repairs monitored did not have records to confirm that they were completed within the established repair timelines.

B) <u>Light Rail Vehicles and Catenary:</u>

1) **Documents and Direction:**
   - In general, Alstom documents relative to LRV and catenary inspections and maintenance are structured and detailed, thus providing a solid foundation for such activities;
   - Inconsistencies were identified between certain RTM and Alstom documents relative to mileage tolerances for scheduled inspections, as well as the disposition of LRV's when tolerances are exceeded. There is also an opportunity to strengthen LRV and catenary inspection / maintenance documents by adding specifics relative to extreme weather and winter preparation. RTM and Alstom have addressed these opportunities.
2) **Systems and Processes:**
   - Information systems used by RTM and Alstom relative to track inspections / maintenance are generally robust.
3) **Capability / Training:**
   - Alstom provided training requirements for power technicians responsible for catenary inspections / maintenance, as well as maintenance vehicle technicians responsible for light rail vehicle inspections / maintenance;
   - Alstom's training plan and matrices are substantial, however training delivery for power technicians was partially compliant (relative to training matrix requirements), while maintenance vehicle technicians were mostly compliant.

4) Execution:

- Inspection records for LRV's show that most scheduled inspections were done within mileages prescribed in WMS procedures, but some (about 10%) exceeded the mileages and allowable tolerances, particularly during winter months (2019-2020). The data / records show improvements following winter;
- Inspection records for the catenary show that most scheduled inspections were done within prescribed time frames, but some were missed during winter months. The data / records show improvements following winter.
- Work Orders used to perform and document scheduled inspections / maintenance work were found to be robust for LRV's, but some of the catenary work orders required improvement and have already been enhanced by Alstom;
- A review of LRV repair records shows that most repairs, but not all, have records to validate completion;
- A review of catenary repair records shows that the great majority were completed. The enhancement of catenary scheduled inspection work orders will support stronger execution by detailing inspection requirements and providing more complete records of inspections and findings.

8. Remedial Actions :

As described in Section 3, the monitoring process involves the ongoing review of findings with stakeholders for two key reasons:

- Provide an opportunity for stakeholders to provide objective evidence which contributes to the accuracy and completeness of preliminary findings;
- Provides the ability to take early remedial actions.

At this point, it is important to note that the RMCO's mandate does not encompass the follow-up for remedial actions since the City (OC Transpo) engages its contractors to review findings, request remedial actions and follow-up on these.

In line with the above, the RMCO worked closely with OC Transpo to provide detailed information on findings, and to engage Contractors in an effort to obtain remedial actions which address findings. The City requested and required remedial actions are generally aligned with the contractual obligations of RTM and Alstom.

Further, in an effort to support structured and timely follow-up, a table of remedial actions was developed and updated progressively. This table identifies findings, the corresponding remedial actions, the target close date as well as the progress / status.

Remedial actions shown in this table were the subject of several meetings between the RMCO, OC Transpo, RTM and Alstom during 2020 and Q1 2021. The table of remedial actions is presented in Annex 5.

The intent is to continue reviewing remedial actions with stakeholders on a quarterly basis to review their status, address the latest monitoring findings, and to selectively monitor their progress and completion.

9. Monitoring Focus in 2021:

In accordance with the risk-based approach outlined in Section 3 of this report, as well as City Regulations and supplemental documents, the RMCO will develop monitoring plans to identify areas to be monitored in 2021. The focus will be on areas which have not been monitored thus far, thereby supporting adequate monitoring breadth and providing an increasing picture of compliance spanning the six key risk areas identified in Section 3.5.

A quarterly monitoring plan will be developed and communicated during the first quarter of 2021 to provide visibility on the areas to be monitored during the first half of 2021, as well as the corresponding timelines.

Throughout 2021, the RMCO will continue to monitor Regulations using a risk-based approach anchored on the construct described in the Work Plan approved by City Council in September 2018, which considers relevant research and data as well as emergent information specific to the Confederation Line.

Context / Disclaimers

This report, including any enclosures and attachments, has been prepared for the exclusive use of the City of Ottawa solely for the purpose for which it is provided under the Terms of the Contract executed March 2nd, 2018 between SAB Vanguard Consulting Inc. and the City of Ottawa, as well as the supplemental information in Annex 3 of this report.

Any use, decisions or actions taken as a result of this work shall be the responsibility of the parties directly involved in the decisions or actions.

ANNEXES

ANNEX 1

OTTAWA LIGHT RAIL TRANSIT (OLRT) – REGULATORY BACKGROUND

This Annex provides background information on the Ottawa Light Rail Transit (OLRT) project which is considered in law to be a federal rail transportation undertaking:

On July 14th, 2011, Ottawa City Council approved the implementation plan for the Ottawa Light Rail Transit (OLRT) project which is considered in law to be a federal rail transportation undertaking.

Since Federal legislation was not developed for application to municipal light rail systems, the City of Ottawa was provided with the authority to regulate its light rail transit system. This was formalized with a **Delegation Agreement** between the Minister of Transport and the City of Ottawa on October 1st, 2011, which provides authority to the City to regulate any matters covered by Part III and IV of the *Canada Transportation Act* as well as the *Railway Safety Act*. This delegated authority applies only to the Confederation Line and does not extend to other OC Transpo operations (i.e. Trillium Line, Bus, Para). s

In accordance with the Delegation Agreement, and By-Law No. 2015 – 301, the position of 'Light Rail Regulatory Monitor and Compliance Officer' (i.e. 'Regulatory Monitor and Compliance Officer – RMCO', or 'Compliance Officer') was created to monitor and report on compliance with the Ottawa Light Rail Transit (OLRT) Regulations (i.e. City Regulations); the duties and responsibilities of this position are shown in Annex 2. The Compliance Officer is independent of the Transportation Services department and reports directly to the City Manager and City Council.

The Compliance Officer is tasked with specific responsibilities as follows:

1. Development of a **multi-year Work Plan** for monitoring compliance relative to City Regulations as they relate to the safety and security of the system;
2. Perform ongoing compliance monitoring in accordance with the RMCO mandate and Work Plan;
3. Prepare **Annual Compliance Reports** that describe the specific areas of the regulatory framework that were reviewed during the past year; report on the work that was undertaken to verify compliance in these areas; identify areas where compliance with City Regulations has been fully achieved; and report on areas where compliance has not been fully achieved;
4. **Quarterly monitoring** and reporting of any potential regulatory compliance gaps to the City Manager, in order for City staff to correct any compliance deficiencies.

ANNEX 2

RMCO (REGULATORY MONITOR AND COMPLIANCE OFFICER)- DUTIES AND RESPONSIBILITIES

The following schedule was prepared by the City of Ottawa to describe the duties and responsibilities of the RMCO. It is part of the Contract signed between the City of Ottawa and SAB Vanguard Consulting Inc. on March 2nd, 2018.

SCHEDULE "A"

STATEMENT OF DUTIES AND RESPONSIBILITIES

The Light Rail Regulatory Monitor and Compliance Officer ("Compliance Officer") is responsible for reviewing, investigating, monitoring and reporting on compliance with the Ottawa Light Rail Transit (OLRT) regulations.

The Compliance Officer will be independent of the Transportation Services Department and will report directly to the City Manager and City Council.

The Compliance Officer will be responsible for the development of a multi-year workplan for monitoring compliance with the OLRT regulations as it relates to the safety and security of the system. The workplan will detail the strategy for the selection of regulations, rules, and procedures to be monitored, the overall methodology to undertake monitoring and reporting, the specific regulatory areas to be monitored, and the timeframes for undertaking the work. The multi-year workplan will be submitted to both the Transit Commission and Ottawa City Council. Prior to developing the multi-year workplan, the Compliance Officer will be required to review and understand the City's comprehensive regulatory framework.

The role is expected to involve monitoring regulatory compliance through site visits, interviews with City staff and contractors, and review of relevant documentation, records, and performance reporting. These tasks are expected to include but not be limited to:

- Reviewing regulations, policies and procedures;
- Conducting interviews and meetings with field staff and senior management;
- Conducting field observations of operations, maintenance and/or safety management activities;
- Reviewing technical submissions;
- Analyzing data and performance records;
- Assessing compliance with regulations;
- Providing timely and accurate advice to staff to consider improvements to the regulations and/or to the implementation and enforcement of regulations when required; and,
- Monitoring implementation of staff recommended improvements, developments and new initiatives in respect to the OLRT Regulations.

The Compliance Officer will prepare an Annual Compliance Report that will describe the specific areas of the regulatory framework that were reviewed during the past year; report on the work that was undertaken to verify compliance in these areas; identify areas where compliance with Regulations has been fully achieved; and report on areas where compliance has not been fully achieved. The Annual Compliance Report will also include any revisions to the multi-year workplan.

After preparing a draft of the report and taking input from the City Manager and affected persons as determined necessary, the Annual Compliance Report will be submitted annually to the City's Transit Commission and City Council. The City Manager will prepare a Management Response Companion Report that will be considered by Transit Commission and Council alongside the Annual Compliance Report.

The Compliance Officer will also be responsible for quarterly monitoring and reporting of any potential regulatory compliance gaps to the City Manager, in order for City staff to correct any compliance deficiencies.

ANNEX 3

RMCO (REGULATORY MONITOR AND COMPLIANCE OFFICER)- SUPPLEMENTAL INFORMATION RELATIVE TO SCOPE

In accordance with the Delegation Agreement referenced in Annex 1, and the report submitted to City Council on September 23rd, 2015, the duties and responsibilities of the RMCO are described in Annex 2.

In addition, the following supplemental information is provided to further clarify the scope of the RMCO:

- The RMCO is responsible for regulatory compliance monitoring for the Confederation Line.
- This mandate covers the Confederation Line exclusively and any expansions or extensions to this transit system or other light rail systems. This mandate does not cover commuter rail operations such as the Capital / Trillium railway, bus transit operations, or Para Transpo operations.
- The compliance monitoring primarily relates to safety and security City Regulations adopted by the City through bylaw or by other means, including standards and requirements imposed by contract.
- The RMCO was not involved in the construction, implementation or revenue service availability activities for the Confederation Line. The RMCO regulatory monitoring activities start after revenue service.
- As stated in the statement of duties and responsibilities prepared by the City, the RMCO will *"provide timely and accurate advice to staff to consider improvements to the regulations and/or to the implementation and enforcement of regulations when required"*. As well, on specific request, the RMCO will provide input to and consult with City personnel in respect of particular matters relating to the City Regulations.
- The RMCO has no duty or authority to assess the adequacy, sufficiency, or effectiveness of the City Regulations, or Confederation Line components / technology.
- RMCO activities will consist of performing regulatory compliance monitoring rather than audits. This implies that the assessment of risks, controls, governance, etc. will not be part of the monitoring scope.
- The RMCO will monitor City Regulations on an ongoing basis according to monitoring schedules and will provide a progressive assessment of compliance.

ANNEX 4

RISK-BASED PRINCIPLES FOR MONITORING

Risk-Based Selection of Areas / Regulations to Monitor:

As described in Section 3 of this report, a number of factors are considered in the risk-based selection of Regulations / areas to be monitored; this is summarized below:

- Confederation Line regulations and supplementary documents
- Confederation Line experience (relative to safety, security and operations)
- Research relative to risks / hazards for commuter operations
- Research / analysis relative to accident / incident data for commuter operations

This approach is dynamic since key inputs in the selection of areas to monitor consist of the ongoing review of safety, security and operational issues experienced in the Confederations Line. Further, RMCO monitoring activities represent a continuum with the ongoing review / analysis of regulatory compliance findings as well as the understanding of risk. In this manner, such inputs are used in the ongoing risk-based selection of areas to be monitored.

The consideration of such multiple inputs, as outlined above, contributes to the selection of areas / Regulations for monitoring which have the greatest potential impact on compliance, safety and security, thus complementing the City's efforts to achieve the highest possible level of performance in these areas.

Overview of Potential Hazards:

Safety and security risks can result from multiple sources (hazards), each with their respective potential probability (i.e. likelihood) and consequence.

The multi-year Work Plan presented research performed on potential hazards and accident / incident causes. This resulted in the identification of the following broad hazard categories:

- Human Factors
- Track
- Rolling stock related
- Security / emergency preparedness related
- Other equipment / infrastructures, environmental and other
- Safety management system

ANNEX 5 - REMEDIAL ACTIONS *

Finding	Remedial Action	QMSLI ID	Person In Charge (PIC)	Target Close Date	Progress Status	Complete (Yes / No)
2019B Human Factors - Training: Strengthen process for managing training actions for employees absent for extended periods of time	Define criteria for long absences and reassessment/training needs according to position	1070795	MSC	2020-06-30	- HRM-SV-OTT-MAN-001 Training Competency Plan Rev D updated to capture this requirement - HRM-SV-OTT-MAN-001 Training Competency Plan Rev D copy provided to RTM as evidence - HRM-SV-OTT-MAN-001 Training Competency Plan Rev D executed and fully deployed. Item can be closed at the discretion of RMCO	Yes
2020A Track Inspections (Segment 1/2, Finding A1) : MSC to add high temperature inspection criteria for mainline (consistent with RTM documents).	Update WMS to include the high temperature inspections (preventive).	1070799	MSC	2020-06-19	- WMS procedure OTT-GWY-MTN30-WMS-004 updated to capture requirement of high temperature inspections. - WMS OTT-GWY-MTN30-WMS-004 procedure sent to RTM as evidence	Yes
	Define process for triggering high temperature inspections in GSI		MSC	2020-06-30	- Process defined in OTT-GWY-MTN30-WMS-004 - Copy of process OTT-GWY-MTN30-WMS-004 sent to RTM as evidence - Process triggers via GSI extracts sent to RTM as evidence	Yes
2020B Track Inspections (Segment 1/2, Finding A1): MSC to add time frame for rapid temperature change relative to mainline inspections (consistent with RTM documents).	Update WMS to include timeframe for rapid temperature changes (Preventive)	1070800	MSC	2020-06-19	- Process now defined in OTT-GWY- MTN30-WMS-004 procedure - Copy of process OTT-GWY-MTN30- WMS-004 sent to RTM as evidence	Yes
	Define process for triggering inspection in GSI (rapid change temperature)		MSC	2020-06-30	- Process defined in OTT-GWY-MTN30-WMS-004 - Copy of process OTT-GWY-MTN30-WMS-004 sent to RTM as evidence - Process triggers via GSI extracts sent to RTM as evidence	Yes
2020C Track Inspections (Segment 1/2, Finding A1) : MSC to add combined rail wear criteria (consistent with RTM documents).	Update WMS to include combined rail criteria (Preventive)	1070801	MSC	2020-06-15	- All following WMS procedures were updated to capture combined rail wear criteria: 1)OTT-GWY-MTN10-WMS-002 2) OTT-GWY-MTN10-WMS-003 3) OTT-GWY-MTN10-WMS-004 4) OTT-GWY-MTN10-WMS-015 5) OTT-GWY-MTN10-WMS-016 - Alll above documents evidence were supplied to RTM	Yes
	MSC shall correspond with RTM to request the provision of the necessary documentation needed to satisfactorily address this finding		MSC	2020-06-15	- Correspondence exchange between Mariano Garcia and RTM Tammy L June 16 2020 - RTM supplied RTM-ENG-RUL-132 Track Safety and Inspection Rules June 16 2020	Yes
2020D Track Inspections (Segment 1/2, Finding A1) : MSC to review their documents to achieve consistency with RTM document (RTM-ENG-RUL- 132).	MSC shall correspond with RTM to request the provision of the necessary documentation needed to satisfactorily address this finding	1070802	MSC	2020-06-15	- Correspondence exchange between Mariano Garcia and RTM Tammy L June 16 2020 - RTM supplied RTM-ENG-RUL-132 Track Safety and Inspection Rules June 16 2020	Yes
2020E Track Inspections ((Segment 1/2, Finding B2): MSC to strengthen their information system to flag planned inspections which are not completed on time.	Implement Daily Ops Meeting for Infra	1070803	MSC	2020-06-19	- Daily Ops meetings are in effect for infra - Daily Ops meetings evidence extract sent to RTM	Yes
	Implement KPI and reports for daily meeting to monitor compliance		MSC	2020-06-19	- Infra KPIs discussed and shared during daily meetings. Evidence of topics and KPIs/extract shared with RTM	Yes
2020F Track Inspections (Segment 1/2, Finding C3) : MSC to develop / implement process for supervisor oversight	Implement audit schedule (3P) for infrastructure activities	1070804	MSC	2020-06-30	- 3P audits are in effect - 3P audit schedule launched - 3P audits and schedule extracts provided to RTM	Yes
2020G Track Inspections (Segment 1/2, Findings D1-D8): MSC to develop process to strengthen execution of inspections. This action will be supported with action 2020E.	Process to be implemented outlining how deferred preventative maintenance will be escalated, controlled and re-planned.	1166635	MSC	Feb 28,2021	Daily maintenance review meeting implemented to highlight deferred maintenance. Defect and Concession Management process (OTT-GNR-ENG10-PRO-001 created to detail execution of inspections. Alstom's Defect and Concession Management Plan to be reviewed by RTM.	No

2020H Track Repairs (Segment 1/2, Finding D10): MSC to develop process to strengthen timeliness of repairs.	Process to be implemented outlining defect management handled. Alstom's Defect and Concession Management Plan to be reviewed by RTM.	1166637	MSC	Feb 28,2021	Defect and Concession Management process (OTT-GNR-ENG10-PRO-001 created to detail required reviews od defects and associated priorities and repair timescales. Daily and weekly review meetings implemented to review status of open defects. Alstom's Defect and Concession Management Plan to be reviewed by RTM.	No
2020I (Segment 3/4, Finding A2) - LRV Scheduled Inspections. RTM and MSC to determine common criteria for excess mileage and disposition.	Approach to maintenance tolerances to be included in the Asset Management Plan	N/A	MSC	N/A	Tolerance for LRV maintenance submitted via document CISC000270085. Asset Management Plan, ref ENG-SV-OTT-PRO-001 updated to detail tolerances applied.	Yes
2020J (Segment 3/4, Finding A3) - LRV Extreme Weather Provisions. RTM / MSC to determine appropriate measures for extreme weather.	Severe weather plans to be implemented defining appropriate measures for extreme weather.	N/A	RTM & MSC	N/A	Process implemented with RTM and the City.	Yes
2020K (Segment 3/4, Finding A4) - Catenary Extreme Weather Provisions. RTM / MSC to determine appropriate measures for extreme weather.	Severe weather plans to be implemented defining appropriate measures for extreme weather.	N/A	RTM & MSC	N/A	Process implemented with RTM and the City.	Yes
2020L (Segment 3/4, Finding C1) - Training Delivery for Power Technicians. MSC to develop process to ensure PT's have received prescribed training when they work.	Additional staff to receive train-the-trainer course to support delivery of trainings related to PT activities. Outstanding trainings to be delivered to PTs.	1166609	MSC	March 31, 2021	Train-the-trainer course conducted	No
2020M (Segment 3/4, Finding C2) - Training Delivery for Maintenance Vehicle Technicians. MSC to develop process to ensure MVT's have received prescribed training when they work.	Training matrix to be updated to better categorise and prioritise training requirements.	N/A	MSC		Procedure defined: HRM-SV-OTT-MAN-001 Training and Competency Plan. Training matrix updated.	Yes
2020N (Segment 3/4, Finding D1) - LRV Scheduled Inspections. MSC to develop and implement process to ensure that LRV's obtain scheduled inspections within prescribed mileages / tolerances, and that appropriate dispositions are taken when such is exceeded.	Process to be implemented outlining how deferred preventative maintenance will be escalated, controlled and re-planned. Approach to maintenance tolerances to be included in the Asset Management Plan.	N/A	MSC		Daily maintenance review meeting implemented to highlight deferred maintenance (Alstom meeting). Defect and Concession Management process (OTT-GNR-ENG10-PRO-001 created to detail execution of inspections. Tolerance for LRV maintenance submitted via document CISC000270085. Asset Management Plan, ref ENG-SV-OTT-PRO-001 updated to detail tolerances applied. Alstom's Defect and Concession Management Plan to be reviewed by RTM.	No
2020 O (Segment 3/4, Finding D3) - Catenary Scheduled Inspections. MSC to develop and implement process to ensure that Catenary scheduled inspections are performed within prescribed time frames.	Periodicity of OCS inspection to be realigned with original manufacturer recommendations (MVA-54-0-S017-MAN-1000_0) requiring inspections at 6 monthly intervals.	1166616	MSC	Feb 15th, 2021	Asset Management Plan, ref ENG-SV-OTT-PRO-001 updated to detail required inspection intervals for the OCS maintenance	Yes

2020P (Segment 3/4, Finding D4) - Catenary Work Orders. Catenary Work Orders for 6M and 1Y have been expanded to be consistent with 1M and 3M documents. Such documents need to be implemented.	The task lists (paperwork) for the activities to be updated to better capture the steps performed as part of the activity.	N/A	MSC	N/A	The task lists for 6M and 1Y have been updated.	Yes
2020Q (Segment 3/4, Finding D5) - LRV Repairs / Records. MSC to review process for LRV Repairs and Records to ensure completeness and consistency.	A review of the process of capturing defects on preventative inspections to be undertaken including the peer review to ensure that respective work orders are generated for defects raised. Secondary spot check at weekly intervals to be considered as part of review of process.	1166618	MSC	March 31, 2021		No
2020R (Segment 3/4, Finding D6) - Catenary Repairs / Records. MSC to review process for Catenary Repairs and Records to ensure completeness and consistency.	A review of the process of capturing defects on preventative inspections to be undertaken including the peer review to ensure that respective work orders are generated for defects raised. Secondary spot check at weekly intervals to be considered as part of review of process.	1166618	MSC	March 31, 2021		No

* Note: This table was reviewed with stakeholders on a quarterly basis during 2020. The top part ('shaded') of the table addresses findings for segments 1 and 2. A recent update of this table was provided in January 2021 to address monitoring results for segments 3 and 4 (bottom part of the table which is not 'shaded') – the quarterly follow-up of remedial actions and this table will continue during 2021.

ANNEX 6

SUMMARY OF BUDGET AND EXPENSES - 2020

RMCO (REGULATORY MONITOR AND COMPLIANCE OFFICER)

BUDGET	DAYS BUDGETED	AMOUNT BUDGET (NO TAX)	TAXES	TOTAL
RMCO LABOUR*	120	$ 180,000.00	$23,400.00	$203,400.00
RMCO EXPENSES		$ 25,200.00	$ 3,276.00	$ 28,476.00
RMCO TOTAL		$ 205,200.00	$26,676.00	$231,876.00

	DAYS ACTUAL (2020)	AMOUNT ACTUAL (NO TAX)	TAXES	TOTAL
RMCO LABOUR	101.5	$ 152,250.00	$19,792.50	$172,042.50
RMCO EXPENSES		$ 4,024.98	$ 523.25	$ 4,548.23
RMCO TOTAL		$ 156,274.98	$20,315.75	$176,590.73

VARIANCE	(SURPLUS)	$ 48,925.02	$ 6,360.25	$ 55,285.27

* Budget based on 2018 Contract between City of Ottawa and RMCO (SAB Vanguard Consulting Inc.)