Office of the
Auditor General
City of Ottawa

Audit of Zero-Emission Buses

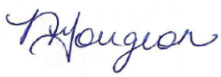
Sprint 2 – Tendering Process for 40-Foot Electric Buses

September 2022

Acknowledgement

The team responsible for this audit was comprised of Margaret Sue from the Office of the Auditor General and MNP LLP (external consultant), under the supervision of Joanne Gorenstein, Deputy Auditor General and my direction. My colleagues and I would like to thank those individuals who contributed to this project, and particularly, those from the Zero-Emission Buses project team and Supply Services who provided insights and comments as part of this audit.

Respectfully,



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Auditor General

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Introduction

The audit of the Zero-Emission Buses project was approved to be included in the Office of the Auditor General's (OAG) 2021 Interim Audit Workplan, via an amendment memo, as approved by City Council (Council) on July 7, 2021.

Background and context

As part of the Climate Change Master Plan approved by Council in January 2020 (revised in December 2020 - ACS2020-PIE-EDP-0043) to reduce greenhouse gas emissions by 100% by 2040, the City of Ottawa (the City) has undertaken a zero-emission bus (ZEB) transformation to convert its OC Transpo fleet to battery-electric buses.

On June 23, 2021, Council approved a plan for OC Transpo to commence negotiations for a loan agreement with the Canada Infrastructure Bank (CIB) and to seek additional funding from Infrastructure Canada (INFC) to gradually convert the bus fleet to battery-electric buses. Negotiations for securing federal funding are currently underway. If funding is secured, OC Transpo will purchase 26 40-foot battery-electric buses and associated charging infrastructure as part of the City's 2022 capital budget, with a planned in-service date of December 2023. The aim would be to phase in a total of 450 ZEBs by 2027 and to have a fully electric bus fleet by 2036.

The ZEB Program (Program) was established to support the conversion of OC Transpo's fleet. The Program began when OC Transpo procured four (4) battery-electric buses for a pilot project. These buses were added to revenue service on February 7, 2022. The Program intended to move forward with issuing a Request for Proposal (RFP) for 40-foot battery electric buses. At the time of the audit, the draft RFP had not yet been released.

Given some of the inherent risks related to the underlying technology, securing funding, and implementation challenges in other cities, the OAG announced its intention to engage early in the transformation and conduct an audit of the ZEB implementation. The audit leverages an agile audit approach which provides periodic reports, performed in iterative cycles (or sprints) on a continual basis with a focus on areas of greatest risk to the City. The audit aims to provide independent and objective opinions before key decisions are made and agreements and funding arrangements are signed. More specifically, this audit sprint was focused on the tendering process leading to the planned issuance of the RFP for the 40-foot ZEBs.

Audit objective and scope

The objective of this audit sprint was to provide reasonable assurance that the City's RFP for the purchase of 40-foot electric buses complied with relevant policies, incorporated lessons learned from the pilot project and other municipalities, considered industry standards, addressed key risks, and enabled the City to select the best value proponent.

The scope of this audit sprint focused on the draft RFP dated April 1, 2022. This version of the draft RFP was utilized by the OAG as management had indicated it was the final draft that was planned for release in 2 weeks. A key component of our analysis was comparing the City's draft RFP to other jurisdictions and their approach to the procurement of ZEBs. Our scope did not include the following areas:

- Procurement processes for the charging infrastructure and associated equipment (as this will be a separate procurement process)
- ZEB proponent identification processes
- Bid evaluation process and proponent selection and award
- Negotiations, approval and debrief processes

Given the agile audit approach, the OAG's role was to assess the RFP process from an objective and independent position, identify any risks or gaps in coverage and provide insights to Council to support their decision-making.

The audit fieldwork was conducted between March 2022 and April 2022, and the observations highlighted within this report are based on a review of documentation up to April 30, 2022. We were informed that City staff continued to revise the draft RFP subsequent to the version reviewed as part of this audit. For further details on the objective, scope, audit criteria and assessment areas, please refer to Appendix 2.

Conclusion

Based on the work conducted, we found that the City's draft RFP considered key insights and lessons learned to date from the pilot project. In addition, we noted that the City was managing risk by including a clause in the draft RFP that indicated all agreements resulting from the procurement would be contingent upon the City receiving full INFC and CIB funding.

While we are not concluding on the effectiveness of the overall procurement strategy, the audit noted that the draft RFP did not contain any point-rated components or weighting for varying technical capabilities. Proponents were only to be assessed on

whether they met the stated technical requirements and not whether they had capabilities that surpassed the requirements. Once proponents were to be assessed as compliant with the technical requirements, the lowest-priced proposal would have been selected to move on in the process. This procurement approach could have resulted in awarding the contract to a proponent with the lowest proposed price that met the stated requirements, but not necessarily the proponent with superior technical capabilities which could potentially support the City as its operational needs change over time.

Through comparative review of other municipalities and industry standards, we further identified opportunities to improve the clarity of the City's draft RFP. Instances were noted where requirements were not measurable or clear to enable an objective evaluation of compliant/non-compliant bids. Furthermore, for some requirements, the draft RFP provided minimal guidance on how proponents should demonstrate their compliance with the requirements. This could have made it difficult for City evaluators to assess compliance. We were advised that this approach was intended to minimize the risk of bids being deemed non-compliant.

Lastly, the audit concluded that some warranty requirements and thresholds outlined in the draft RFP were lower than what was required in other municipalities and the City had not yet performed costing analysis to support these requirements.

As a result of the audit work performed relative to the draft RFP and subsequent inquiry into other avenues by staff, management has decided not to release an RFP for the purchase of 40 ft ZEBs. Instead, management will be pursuing an opportunity to leverage the Toronto Transit Commission's (TTC) procurement vehicle for ZEBs. We believe this change in procurement strategy for the 40 ft ZEBs addresses many of the risks identified in this audit report. **It is important to note that the OAG has not performed any additional audit work on the revised procurement approach.**

Audit findings and recommendations

1. Draft RFP's Design and Scoring Methodology

The City's draft RFP had the following five stages of evaluation:

1) Step One – Evaluation against Mandatory Response (Pass/Fail);
2) Step Two – Financial Proposal;
3) Step Three – Due Diligence;
4) Step Four – Selection of the Preferred Proponent; and
5) Step Five– Negotiations / Contract Finalization.

Before commencing the evaluation process, Commercially Confidential Meetings (CCM) were to be held to provide an opportunity for proponents to propose alternatives that could, if deemed acceptable, achieve the operational needs of the City. The draft RFP was comprised of over 600 terms of reference elements which included a combination of mandatory requirements, other technical requirements, information requests and contract terms and conditions. In step one, a pass/fail grading methodology was to be applied to these elements. Once proponents passed step one, they would move to step two where the lowest priced proposal (i.e., weighing 100% on price) would be selected to proceed to the due diligence, selection, and negotiation stages.

While we are not concluding on the overall procurement strategy, our audit identified risks linked to aspects of the procurement approach selected by the City which are outlined below.

1.1 Draft RFP did not score technical requirements of capabilities

By design, the draft RFP did not contain any point-rated components or weighting for varying technical capabilities. The pass/fail grading approach on all technical requirements would not have allowed the City to award points to proponents who demonstrated superior technical capabilities in key areas (e.g., range, battery life, battery decay rates).

Other municipalities, in contrast, have used a different procurement approach for the purchase of ZEBs which included a combination of mandatory requirements and point-rated scoring for technical requirements where the financial score was often limited to just a fraction of the total percentage (e.g., 5%-30% vs. 100%). In these cases, it enabled the municipalities to consider the range of ZEB manufacturers' technical

capabilities, as compared to their requirements, and evaluate proponents based on a weighted scoring method. We were advised that an assessment of manufacturers' technical capabilities would occur during the CCMs, which could result in the City amending its technical requirements if determined to be in the City's best interests.

By developing a draft RFP that only required baseline technical requirements to be met and did not allow for additional weighting for capabilities beyond this baseline, the City could have been accepting a product that did not meet its needs should they change over time. For example, the City established that a 250 km battery range consuming 75% of the State of Charge (SOC) would meet their current operational requirements. This was reflective of what staff observed in the market for the city's normal operating environment[1], and as such, included this range requirement in the draft RFP. This requirement is less than what we noted was offered by three large ZEB manufacturers (i.e., maximum ranges on a single charge were between 404 km to 529 km). Further, one municipality which issued their RFP five years ago listed their desired performance criteria with an operating range of 440kms. The specific operating conditions of the ZEB manufacturers' maximum battery capacity have not been reviewed as part of our audit.

It appears that the City has lesser battery range requirements than what is available in the market. There is also the possibility that these requirements may change over time, especially considering the City's draft RFP was meant to purchase up to 450 buses over 5 years.

Additionally, since the pilot project is not yet complete (i.e., has not been operated for a full year) the operational needs of the City may not yet be fully confirmed. Establishing technical specifications that only meet current requirements could limit the City's opportunity to evaluate a technically superior bus that may offer the City more flexibility as operational needs change over time. While superior technical capabilities will likely cost the City more money, a cost benefit analysis needs to be performed to make the determination of whether it is worthwhile to the City.

In addition, the draft RFP design did not consider the possible scenario where a proponent's bid might be slightly higher than the lowest bid price but may provide far superior technical capabilities. An incremental cost increase for a ZEB with superior capabilities may be worthwhile to the City as it may provide better value for money over a longer time horizon.

[1] As per the City, the normal operating environment represents no recharging where ambient temperatures range between -26 to 40 degrees Celsius with 23 passengers on board, each weighing 150 lbs, while maintaining respective bus interior temperatures.

RECOMMENDATION 1 – PERFORM COST BENEFIT ANALYSIS ON KEY TECHNICAL PERFORMANCE REQUIREMENTS

The Director, Engineering Services should identify the key technical performance requirements within the draft RFP (e.g., battery range capacity, battery degradation, etc.) and perform a cost benefit analysis to determine whether it is worthwhile for the City to pursue technical capabilities that surpass the current stated requirements of the City.

MANAGEMENT RESPONSE 1

Management agrees with this recommendation. While the procurement strategy in question has been utilized numerous times by the City, including the procurement of the four pilot Zero Emission Buses, and has routinely resulted in successful procurement that demonstrated best value for the City, following a review of the Sprint 2 draft report and the OAG's recommendations - management will be pursuing an opportunity to leverage the Toronto Transit Commission's (TTC) procurement vehicle for ZEBs; as a result, this recommendation is no longer applicable.

A joint e-bus procurement was explicitly identified as an option for staff to explore in the Zero-Emission Buses for OC Transpo report (ACS2021-TSD-TS-0009) tabled at and approved by Council on June 23, 2021. Precedent existed for OC Transpo in procuring the fleet of NOVA 40 ft diesel buses as part of a province-wide procurement and therefore Metrolinx, along with The Canadian Urban Transit Research & Innovation Consortium (CUTRIC), the Association du Transport Urbain du Québec (ATUQ) and the Toronto Transit Commission (TTC) were reviewed as potential joint procurement options.

The TTC strategy satisfies OC Transpo's procurement needs. The TTC RFP intends to award up to two contracts for the supply of 40-foot battery electric buses and the City of Ottawa would enter into a separate agreement with the selected proponent(s) via an adoption agreement in the TTC RFP.

It is with this joint program that OC Transpo has decided to align its next phase of Zero Emission Bus procurement with the goal of standardizing vehicle specifications and providing operations and maintenance benefits.

2. Elements of the draft RFP lack clarity

In our review of other municipalities' RFPs, we noted they generally followed a consistent evaluation format. This format differed from the City's draft RFP. Management indicated that the procurement strategy selected by the City was less prescriptive and was intended to enable alternative solutions and innovation. The onus was placed on proponents to demonstrate how they could meet the requirements. This differs from traditional RFPs where the City would usually be more prescriptive on how proponents must demonstrate compliance with the requirements. While this approach was designed to be more flexible, the City's draft RFP design had less clarity in the areas described below.

2.1 Documentation requirements

The City's requirements for documentation from proponents were much broader and nonspecific when compared to other municipalities. Management indicated that the intention was to permit proponents to demonstrate their compliance in the manner most applicable to their operating context.

Other municipalities' RFPs provided more detailed guidance to proponents on what documentation was expected to prove compliance, but at the same time, was not overly prescriptive and allowed for different types of evidence and testing results to be submitted.

By providing minimal guidance on what was required to evidence compliance, the City was likely to receive a wide variety of responses, including potential ambiguity, which ultimately, could have made it challenging for City evaluators to determine compliance. To mitigate some of the identified risks, the City included four rounds of CCMs within the procurement process where proponents would have had the opportunity to seek clarification, discuss, and receive feedback from the City.

2.2 Minimum standards

The open-ended nature of specific requirements lacked clarity as to what the minimum standard was for a pass (i.e., compliance). This left room for subjectivity and opened the City up to the risk of being or appearing unfair. In some cases, requirements did not contain measurable and objective thresholds for justifying a pass/fail rating. The design of these requirements could have potentially resulted in any documented proponent response being deemed compliant. Examples of open-ended technical requirements noted at the time of our audit included:

- "Proponent to provide MDBF (mean distance between failure) rate of the proposed buses";
- "Proponent's Proposal should include test results that demonstrate ride comfort levels, body roll and maneuverability of the Bus"; and
- "Proponent shall describe the reliability expected of proposed Bus in kilometres of continuous revenue service between equipment malfunctions over its designed Service Life".

It was unclear how the City would use the information requested above to determine a pass or fail for these technical requirements.

In contrast, other municipalities were observed to have specific and measurable technical requirements. As an example, in one municipality, the RFP specified the average MDBF requirements and further outlined the liquidated damages that were applicable in the event the proponent failed to meet the defined distance. This level of clarity plainly laid out what was expected from a proponent and held them to a standard defined by the municipal transit agency. In the City's draft RFP, it may not have been clear to a proponent what would have constituted a pass versus fail if they were just required to provide a response. To mitigate some of the identified risks, the City included four rounds of CCMs within the procurement process where proponents would have had the opportunity to seek clarification, discuss, and receive feedback from the City.

RECOMMENDATION 2 – INCREASE CLARITY OF RFP

The Director, Engineering Services should consider clarifying the expectations outlined within the draft RFP to minimize the risk of ambiguity by:

- Providing additional guidance to proponents on what is expected to demonstrate their compliance with technical requirements; and
- Revising applicable requirements to ensure that they are well defined, objective and measurable.

MANAGEMENT RESPONSE 2

Management agrees with the recommendation. The majority of the findings identified were addressed in subsequent iterations of the draft RFP following initial discussions with the Auditor General's Office. The risks related to documentation requirements are not reflective of the City's experience utilizing this procurement methodology. The procurement strategy in question has been utilized numerous times, including the procurement of the four pilot Zero Emission Buses, and has routinely resulted in successful procurement that demonstrated best value for the City.

As management will be pursuing an opportunity to leverage the Toronto Transit Commission's (TTC) procurement vehicle for ZEBs, this recommendation is no longer applicable.

3. Lack of costing analysis to support warranty periods

In comparing industry standards and requirements in other municipal RFPs, we noted that some of the warranty requirements and thresholds in the City's draft RFP were lower than expected. With respect to battery-life warranties, most ZEB manufacturers offer a standard 6-year warranty and the option of extended warranty periods of up to 12 years at an additional cost. For one large ZEB manufacturer, the standard battery-life warranty is 12 years.

The City's draft RFP required a 7-year battery-life warranty. In contrast, some other municipalities required an extended 12-year battery-life warranty as part of their ZEB RFPs. Management explained that the warranty requirement in the RFP was based on the City's expectation of a 15-year useful life for each ZEB. The City expected to have one midlife battery replacement; thus, only required a battery warranty for half the expected life of the bus.

The audit further noted that the City only required a 5-year warranty on the propulsion system, while another municipality required a 12-year warranty on the propulsion system.

There are risks to the City in requiring only limited extended warranties. These include having to bear the cost of replacing the battery and/or propulsion system and maintaining it over the remaining useful life. Not optimizing extended warranty options potentially exposes the City to increased future uncertainty and higher future costs. We would have expected that the City perform costing analysis in advance of drafting the RFP, in order to determine what warranty period would be financially most optimal to

the City to support the requirements stated in the draft RFP. The City has not yet performed such costing analysis to date.

We also noted the City's RFP had lower thresholds than other municipalities for battery degradation and capacity requirements. ZEB batteries degrade over time based on a variety of factors, including usage, temperature, high power, depth of discharge, and the average state of charge[2]. In the electric bus industry, it is generally considered that the end of battery life typically occurs when a battery has less than 80% of its initial capacity.[3] The audit found that the City's draft RFP required batteries to have 70% available capacity after 7 years. In comparison:

- one of the municipalities reviewed required 85% capacity after 6 years and 70% after 12 years; and
- another municipality required 80% after 7 years of use.

We recognize that other safety factors need to be considered when determining an appropriate residual capacity. Notwithstanding, the draft RFP's lower threshold may have resulted in the City not getting the best quality ZEB battery and would have held the successful proponent to a lower standard than what is generally expected in the industry. Moreover, if the battery is allowed to degrade to 70% after year 7, and industry standard is to retire the battery at 80% remaining capacity, the City could be planning on using the initial battery past its useful life. This could result in the City using an inefficient battery that holds less charge and may only be able to operate on a shorter route on a single charge in its later years; potentially requiring bus scheduling changes.

Furthermore, it was noted that other municipalities had defined service level agreements (SLA) for battery performance and degradation throughout the warranty period. This holds the vendor to a quantifiable schedule and objectively benchmarks future performance expectations. The City's draft RFP did not include SLAs to benchmark expected battery performance. Without defined SLAs and/or battery fade schedules, there is a risk that the City may be unable to justify and quantify damages for poor battery performance.

[2] Source: Top 4 Factors That Influence Battery Degradation In Electric Buses & How To avoid them - ViriCiti

[3] Source: Electrifying Transit: A Guidebook for Implementing Battery Electric Buses (nrel.gov)

RECOMMENDATION 3 – PERFORM COSTING ANALYSIS TO INFORM WARRANTY REQUIREMENTS

The Director, Engineering Services should perform costing analysis to support the required warranty periods in the draft RFP. The costing analysis should include an assessment of:

- The cost difference between purchasing extended warranties and performing battery/propulsion system replacement and maintenance in-house; and
- The warranty period that would be financially most optimal to the City.

MANAGEMENT RESPONSE 3

Management intends to pursue an opportunity to leverage the Toronto Transit Commission's (TTC) procurement vehicle for ZEBs.

The City intends to adopt the terms in the TTC RFP relating to warranty. Prior to entering into a contract with the successful bidder, Transit Services will complete a costing analysis to assess extended warranties and battery/propulsion system replacement and maintenance strategies that would provide the best coverage for the City. Based on that analysis, Transit Services will determine at that time whether further negotiations with the successful bidder are required.

This recommendation will be completed by the end of Q4 2022, subject to any unforeseen changes to the TTC procurement process.

RECOMMENDATION 4 –REVIEW BATTERY DEGRADATION THRESHOLDS

The Director, Engineering Services should review the battery degradation threshold within the draft RFP to ensure it aligns with industry standards and the City's planned usage of the battery. The battery degradation threshold/schedule should enable buses to operate on their planned routes on a single charge. Additionally, consideration should be given to including into the draft RFP defined service level agreements for battery performance and degradation throughout the warranty period.

MANAGEMENT RESPONSE 4

Management intends to pursue an opportunity to leverage the Toronto Transit Commission's (TTC) procurement vehicle for ZEBs. The City intends to adopt the terms in the TTC RFP relating to battery degradation. Prior to entering into a contract

with the successful bidder, Transit Services will confirm that battery performance and degradation align with the City's planned usage of the ZEBs.

This recommendation will be completed by the end of Q4 2022, subject to any unforeseen changes to the TTC procurement process.

4. Draft RFP did not consider experience in the industry

While there is currently no bus manufacturer that has had a ZEB in service for its entire useful life, demonstrating a track record of industry experience is still a good measure of the proven abilities and reliability of a manufacturer. The City's draft RFP did not contain any requirements related to years of experience successfully delivering ZEBs, nor did it ask proponents to specify the experience they have in the ZEB industry.

In contrast, in one comparable municipality's RFP, the proponent's experience was a significant consideration. Specifically, it was a mandatory requirement that the proponent have ZEBs in revenue service for a minimum of 6 years. If proponents were unable to demonstrate this minimum level of experience, they were not permitted to continue in the RFP process. In another municipality, proponents were required to list the:

- quantity of ZEBs ordered by other companies;
- number of years of experience in building ZEBs;
- number of ZEBs built in the last 3 years; and
- number of ZEBs in production.

A corresponding rating was then given to the response and factored into the overall weighting of the proposal.

By not considering the experience of proponents in the evaluation process, the City could end up selecting from proponents with no or limited track record of ZEB reliability or experience in revenue service. While the draft RFP does require that various tests must be passed to demonstrate compliance with industry standards, proponents with ZEBs that are new to the industry may face difficulties and challenges resulting from a lack of experience in the electric bus market. Partnering with these types of vendors potentially exposes the City to more risk in meeting expected timelines and costs of the ZEB program.

RECOMMENDATION 5 – GIVE CONSIDERATION TO VENDOR EXPERIENCE

The Director, Engineering Services should consider including an assessment of each proponent's experience with ZEBs in the evaluation process, to ensure that the City is selecting from vendors with proven track records in the electric bus industry.

MANAGEMENT RESPONSE 5

Management agrees with the recommendation. This finding was addressed in subsequent iterations of the draft RFP following initial discussions with the Auditor General's Office. As management will be pursuing an opportunity to leverage the Toronto Transit Commission's (TTC) procurement vehicle for ZEBs, this recommendation is no longer applicable.

5. "Total Proposed Price" did not include the price of key replacement components necessary for lifecycle planning

As noted above, the draft RFP was structured such that once a proponent was deemed to "pass" on the technical requirements (step 1), the proponent with the lowest "Total Proposed Price" (step 2) would continue to the due diligence and negotiations phases. The Total Proposed Price is comprised of six cost categories and is calculated as per Price Schedule A of the draft RFP. The most significant cost category is for the ZEBs themselves.

The Total Proposed Price, outlined in the draft RFP, did not include costing out the price of major components of the ZEBs (i.e., for purposes of lifecycle maintenance costs). While the draft RFP did require proponents to provide an itemized price schedule of major bus components, consideration of these costs was not factored into the Total Proposed Price calculation and therefore not factored into the award decision. Since the City will take over maintenance of most major bus components in year 6, for lifecycle planning and costing, it is imperative for the City to know the replacement cost of these components for proper planning and budgeting. Even though the prices could change over time, comparing the current cost of major components would still give the City some indication of the lifecycle costs of each proponents' ZEB.

Other municipalities required proponents to provide costing for key spare parts and considered these costs as part of their pricing evaluation. We also observed that in other municipalities, proponents were required to provide pricing for configuration options (e.g., seating options, extended structural warranty, bike rack options, etc.). This

further pricing enabled transit agencies to have a more comprehensive view of possible additional costs that may be added to the base price of the ZEB.

Without including the replacement cost of major components in the price evaluation of each proponent, the City could inadvertently be selecting a vendor that does not provide the best value for money in the long run.

RECOMMENDATION 6 – REVIEW COMPONENTS REQUIRED IN FINANCIAL PROPOSALS

The Director, Engineering Services should review the draft RFP's financial proposal and consider:

- Including the price of key bus replacement components in the Price Schedule An evaluation to enable a comparison of lifecycle costs; and
- Requesting proponents to provide pricing for configuration options.

MANAGEMENT RESPONSE 6

Management agrees with this recommendation. However, following a review of the Sprint 2 draft report and the OAG's recommendations, the City of Ottawa and OC Transpo will be entering into a partnership procurement arrangement with the Toronto Transit Commission (TTC), and therefore – this recommendation will no longer be applicable. Aligning the next phase of OC Transpo's Zero-Emission Bus procurement process with the RFP recently posted by the TTC will address the concerns identified in these recommendations.

As Members of Council may recall, a joint e-bus procurement was explicitly identified as an option for staff to explore in the Zero-Emission Buses for OC Transpo report (ACS2021-TSD-TS-0009) tabled at and approved by Council on June 23, 2021. Precedence existed for OC Transpo in procuring the fleet of NOVA 40 ft diesel buses as part of a province-wide procurement, and therefore - Metrolinx, along with The Canadian Urban Transit Research & Innovation Consortium (CUTRIC), the Association du Transport Urbain du Québec (ATUQ) and the Toronto Transit Commission (TTC) were reviewed as potential joint procurement options.

Upon review, management has confirmed that the TTC strategy satisfies OC Transpo's procurement needs. The TTC RFP intends to award up to two contracts for the supply of 40-foot battery electric buses, and the City of Ottawa would enter into a separate agreement with the selected proponent(s) via an adoption agreement in the TTC RFP.

It is with this joint program that OC Transpo has decided to align its next phase of Zero-Emission Bus procurement with the goal of standardizing vehicle specifications and providing operations and maintenance benefits.

Appendix 1 - Definitions

Term	Definition
Agile Audit	The approach and methodology used for the audit of ZEB; designed to provide periodic reports, be performed in iterative cycles (or sprints) of audits on a continual basis with a focus on areas of greatest risk to the City.
Liquidated Damages	Represents the amount of damages owing to the injured party in the case of a breach of the terms and conditions of a contract.
MDBF	The mean distance between failure (MDBF) measures the transit fleet's mechanical reliability and success of preventative maintenance efforts. MDBF is determined by the total vehicle mileage divided by the total chargeable road calls, or disruptions due to mechanical failures, and is reported by mode.
Proponent	A corporation, partnership, joint venture that may submit or that has submitted an RFP Submission.
Revenue service	The service when the buses run on actual bus routes and carry passengers.
RFP	A Request for Proposal is a formal document used in soliciting bids for a potential business by an agency or company. The purchaser issues the RFP to provide background information to the potential vendors and invite them to submit a proposal to meet the need.
SLA	A service-level agreement (SLA) is a contract between a service provider and its customers that specifies the expectations between the service provider and the customer, including the products or services to be delivered, the metrics by which the service is measured, the remedies or penalties in case a service or product is not delivered.
ZEB	Zero-Emission Buses (ZEB) are buses that adopt a zero-emission technology e.g., battery-electric buses and hydrogen-fuelled buses. For the City of Ottawa, the selected technology for ZEBs are battery-electric buses.

Appendix 2 – About the audit

Audit objectives and criteria

The objective of this audit sprint is to provide reasonable assurance that the City's tendering and RFP process for the purchase of 40-foot ZEBs is in compliance with relevant policies, incorporates lessons learned, and addresses key risks.

Criteria listed below were assessed and validated during the audit. The criteria were defined by considering the results of the preliminary risk assessment, program milestones, and stakeholder priorities.

	RFP and Tender Process
1.1	A procurement strategy and plan have been established with defined governance, roles and responsibilities, and timelines for the tender of 40-foot electric buses.
1.2	RFP criteria and specifications have been updated based on lessons learned and key risks including but not limited to insights from the pilot, recent municipality experience, and other industries thought leadership.
1.3	Management has followed and complied with relevant City By-Laws in initiating, developing and approving the RFP and tender process.
1.4	The draft RFP addresses terms and conditions and clauses around financial risk, warranty, confidentiality, indemnity, delivery timeframe, and other technological risks.

Scope

The audit sprint focussed on the activities undertaken by the City to initiate the RFP and tender for the procurement of 40-foot ZEBs. Areas of focus included:

- Alignment of the City's RFP process to required procurement by-laws
- Lessons learned from the pilot, other municipalities, and industry thought leadership were considered within the RFP
- Comparison to other municipalities' ZEB RFPs
- Terms, conditions, and clauses address key risks

This sprint was limited to reviewing the procurement of 40-foot ZEBs and did not include the procurement of chargers and associated equipment.

The audit fieldwork was conducted between March and April 2022. Audit reporting continued from May to June 2022.

Audit approach and methodology

Audit staff performed the following procedures to complete this audit:

- Reviewed relevant documents related to the tender process including the draft RFP, procurement strategy, and contract
- Interviewed stakeholders from the ZEB program, and external stakeholders
- Literature reviews and comparative reviews to other municipal ZEB RFPs (e.g., Toronto, Edmonton, Montréal, etc.)
- Performed other analyses and tests, as necessary