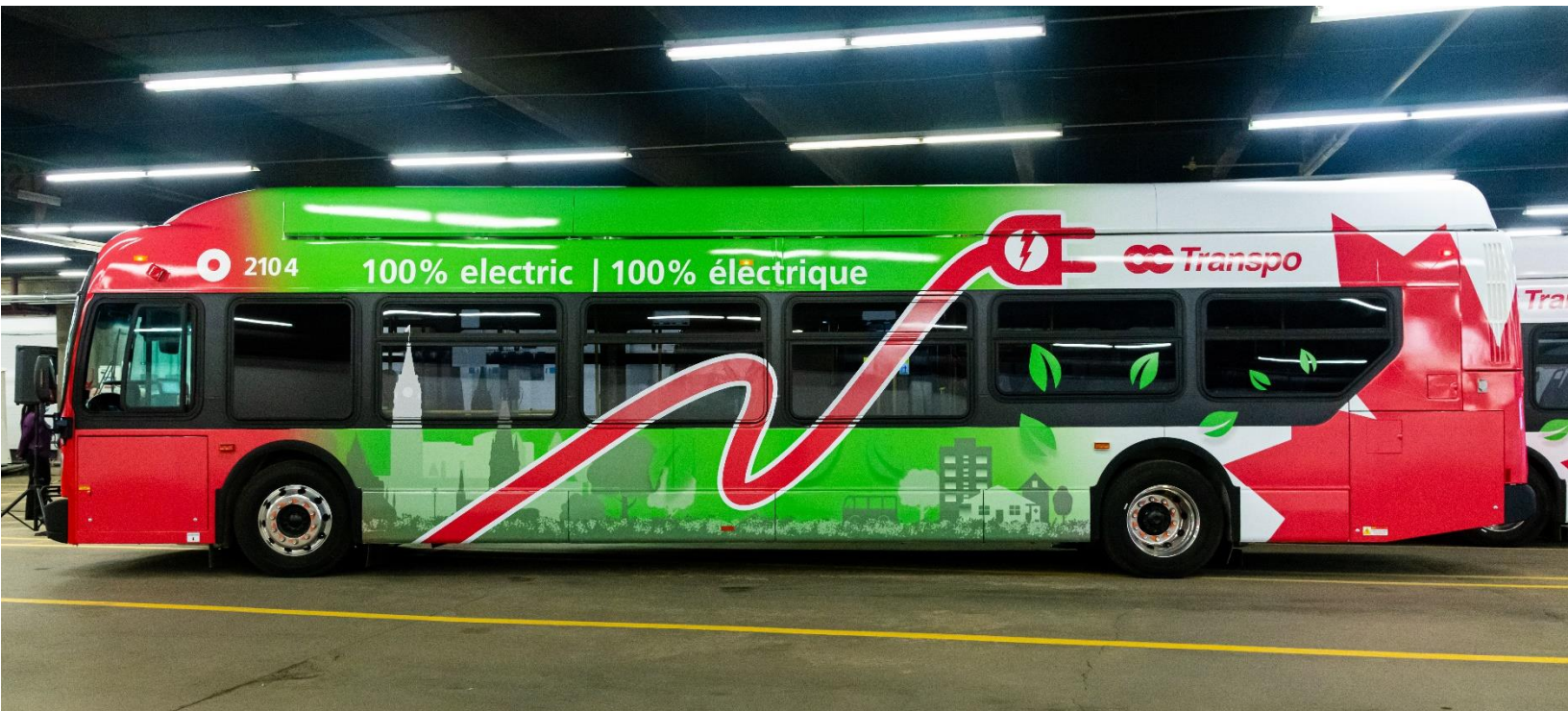




Office of the
Auditor General
City of Ottawa

Audit of Zero-Emission Buses

Sprint 4 – Envari Contract



June 2023

Acknowledgement

The team responsible for this audit was comprised of Cory Richardson 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.

Respectfully,



Nathalie Gougeon, CPA, CA, CIA, CRMA, B. Comm.

Auditor General

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Introduction

The audit of the Zero-Emission Buses (ZEB) 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 – Annual Greenhouse Gas Inventories, Status Update And Administrative Amendments \(ACS2020-PIE-EDP-0043\)](#) approved by Council in January 2020 (revised in December 2020) to reduce greenhouse gas (GHG) emissions by 100% by 2050, the City of Ottawa (the City) has undertaken a ZEB transformation to convert its OC Transpo fleet to battery-electric buses (also known as the ZEB Program).

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 ([ACS2021-TSD-TS-0009](#)). At the same time, Council approved the City to negotiate and enter into an appropriate agreement with Hydro Ottawa Holdings Inc. (Hydro Ottawa) and/or its subsidiaries for the energy supply, provision of backup power, and supply and operation of charging infrastructure to support the electric buses.

The Zero Emission Bus (ZEB) Program began when OC Transpo procured four (4) battery-electric buses for a pilot project, as described in our [Sprint 1: Technology and Performance Audit Report](#). As funding is secured, OC Transpo will purchase 26 40-foot battery-electric buses and associated charging infrastructure in 2023, with a planned in-service date of 2024. The aim would be to phase in a total of 350 ZEBs by 2027 and to have a fully ZEB fleet by 2036.

As of August 11, 2022, the City entered into a \$380M loan agreement with the CIB to fund the upfront costs of purchasing ZEBs. As of December 16, 2022, INFC's funding was also approved in the form of a \$350M grant to the City to be used to cover the purchase price of ZEBs, the infrastructure required to implement the ZEBs, and the transition costs associated with the implementation. Information related to these sources of funding can be found in our [Sprint 3: Zero-Emission Buses Funding Mechanisms and Agreement Audit Report](#).

With the funding for the initial phase of the ZEBs in process, the City turned its attention to the procurement of the buses as reflected in our [Sprint 2: Tendering Process for 40-foot Electric Buses Audit Report](#).

In parallel, and per direction from Council, the City has been working on a separate contract with Envari Holding Inc. (Envari) to deliver the charging infrastructure to support the battery-electric buses. Envari is a wholly owned subsidiary of Hydro Ottawa which primarily manages large energy transformation projects. Hydro Ottawa is a for-profit corporation that is 100% owned by the City and governed by an independent Board of Directors. From a financial perspective, the City earns an annual dividend of at least \$20M (this could be more, based on the earnings of Hydro Ottawa’s **regulated** operations). As Envari is not part of Hydro Ottawa’s regulated operations, their revenues do not have a direct impact on the City’s annual dividend amount. Because Hydro Ottawa is owned by the City, its net profit is picked up as part of the City’s revenues within the consolidated financial statements.

The charging infrastructure is comprised of the “electricity distribution, on site, standby power and charging stations needed to charge the ZEBs at the maintenance facility¹”. The intent is for the City to enter into a design and build contract with Envari for the design, procurement, installation, and commissioning of the charging infrastructure for 350 ZEBs. This agreement is intended to cover the period from 2023 to 2025 and be valued at approximately \$180M².

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 overall transformation and conduct an audit of the ZEB implementation. The audit aims to provide recommendations and support with informing decisions before agreements and funding arrangements are signed. Specific to the Envari contract, the OAG’s focus was on providing feedback to Council and management on any risks identified with the planned contract, in consideration that it is a non-arm’s length entity, prior to finalizing the contract.

Audit Objective and Scope

The objective of this audit sprint was to independently assess the final draft of the design-build contract the City is entering into with Envari, for the provision of the charging infrastructure, to support the ZEB program. The draft contract was reviewed, and key risks highlighted to provide City Council with information to support their decision-making.

¹ City of Ottawa ZEB Program: Framework for a Charging Infrastructure Design Build Agreement with Envari/Hydro Ottawa; Draft 1.0 dated June 29, 2022.

² Master Work Plan – ZEB Charging Infrastructure Program Activities.

The scope focused exclusively on the contract being developed between the City and Envari for the provision of the ZEB charging infrastructure. The audit assessed the quality and design of the draft contract from an objective and independent position and aimed to identify any risks or gaps in coverage or assumptions.

The scope of this audit did not include a legal review of any contractual documents. The City's Legal Services were involved in the contract review and negotiations for the Envari contract.

Please refer to [Appendix 2](#) for the audit criteria and details.

Conclusion

The charging infrastructure to be provided under this proposed agreement is one of the critical elements of the overall transformation of the electrification of OC Transpo's bus fleet. Recognizing the benefits of working with Hydro Ottawa, the contract is being negotiated directly with Envari and no competitive procurement was initiated. As the arrangement has been structured as a design-build, limited requirements or specifications have been established and further no fixed price or timeline has been built into the contract. This, in addition to the "cost plus" basis of the contract and the fact that the overhead rate being negotiated is on the high end as compared to benchmarked contracts, increases the risk of this contract to the City.

In response to this risk and given the unknowns at the time of contract negotiation, the City and Envari have established a set of protocols, which form part of the contract and provide the framework for the working relationship between the two parties. While controls are embedded in these protocols to ensure that Envari operates in accordance with City expectations, it is primarily the responsibility of the City to monitor Envari's adherence to protocols and their performance considering the reputational risk to the City if the contract is unsuccessful. The City will need the appropriate expertise to continuously oversee all aspects of this contract – from the design of the infrastructure and systems to the development of the work packages, procurement activities and performance, and budget management.

Audit Findings and Recommendations

Risks to the City Due to High-Level Requirements within the Contract

The draft contract with Envari is structured as a design-build arrangement, and while the scope of the project is set out in the Statement of Requirements, the descriptions are high-level with little specifications on the technical design, equipment construction, testing and commissioning requirements. In addition, no fixed contract price or expected timelines will be reflected within the contract. Finally, there are limited details within the contract on the role of Hydro Ottawa Ltd. regarding the electrical distribution component of the contract.

As an example, although the scope of work references an Energy Management System, Smart Charging Software, and Electricity Cost Optimization, no specific requirements or roles and responsibilities between the parties have been outlined to establish expectations for development of these components. Further, City Information Technology Services (ITS) representatives were not engaged during the drafting of the contract to inform software specification, data collection, security considerations, and City systems in scope for integration. By not having engaged ITS early on in the process, the City could be exposing itself to IT system risks and the potential for system integration issues in the future.

We understand that keeping the requirements and scope high level was largely due to the complexity of the ZEB technology and supporting infrastructure, lack of internal technical expertise, and program uncertainties and interdependencies (e.g., procurement of the buses, required modification to the OC Transpo garage). It is also recognized that the infrastructure has not yet been designed, so a complete definition of requirements and specifications is not yet known. Without a minimum set of specific requirements defined for the charging infrastructure, there is an inherent risk that work delivered and infrastructure procured does not meet the needs of the ZEB Program. As work packages are developed, we understand that the specific requirements and the delivery expectations of Envari will be established. However, without these specifications, it is unclear how the City will measure or enforce performance against the contract. If these performance expectations are not articulated from the outset, it may be more difficult for the City to establish them later in the relationship with Envari.

The City, recognizing the risks due to the lack of specificity within the contract and the various unknowns within the ZEB Program, has established a set of protocols which form part of the contract and provide the framework for the working relationship between the City and Envari. These are:

- Work Plan Protocol;
- Detailed Design Protocol;
- Procurement Protocol;
- Commissioning Protocol; and
- Cost Recovery Protocol

The protocols, which are contractually binding, define the guiding controls and responsibilities for both the City and Envari for the scope of work activities (i.e., for the design, procurement, installation, and commissioning). The controls defined for the City include oversight, review, and approval of the workplans, individual statements of work, procurement activities, and schedules that are developed and/or maintained by Envari. For example, while Envari is responsible for the procurement of all charging and electrical infrastructure components, controls have been embedded within the protocols for City feedback and approval at various stages of the procurement process, including the detailed statements of work/requirements which will be tendered. In addition, detailed requirements for each work activity, including the preliminary design, will be developed by Envari as part of the Master and Annual Workplans, which the City will review on an annual basis. The City has also stipulated a longer warranty period (30 months versus standard warranty of 12 months) within the contract for all related work activities and construction components.

While controls are embedded within the protocols, in the absence of detailed requirements at the outset of the contract, these controls, for the most part, are the responsibility of the City. The onus is on the City to continuously monitor Envari's activities and ensure that the design and build specifications defined by Envari meet the City's needs and expectations. This will require the City to ensure that it has all the necessary technical expertise dedicated to the oversight of this contract – including electrical engineering, procurement and finance. We understand that the City is continuing to establish these resources to support contract monitoring from the outset as they were not all finalized at the time of our audit fieldwork.

RECOMMENDATION 1 – EARLY ENGAGEMENT OF IT

Moving forward with the ZEB Program, the General Manager, Transit Services should ensure there is sufficient early engagement with ITS representatives to minimize system and integration risk.

The General Manager, Finance and Corporate Services Department and Chief Financial Officer should ensure project teams consult with ITS representatives early

on when developing contracts that include the development and/or integration of IT systems.

MANAGEMENT RESPONSE 1

Management agrees with this Recommendation.

As the ZEB Program is a priority for the City, Transit Services and Finance and Corporate Services are both closely overseeing the transition to electric buses and have the resources available to support this program. Any development/integration of IT systems required will have the involvement of ITS representatives early in the planning of the different work activities, following the protocols that are in place within the Design Build contract.

Finance and Corporate Services has implemented and will continue to investigate further options to ensure project teams consult with ITS representatives early on when developing contracts that include the development and/or integration of IT systems. ITS is actively evolving business processes for engaging with Service Areas across the corporation on all technology initiatives, are establishing the Technology Investment Lead function in all departments to work with IT Services in the early inception period of all technology needs and are implementing additional controls and reporting as part of the procurement process. Finance and Corporate Services will continue taking steps to further promote that departments engage with ITS on projects as an expected and standard practice moving forward. These steps will include policy and procedure changes to better ensure early and ongoing collaboration with all departments and promoting corporate-wide adoption in the way that IT projects/contracts are undertaken.

Finance and Corporate Services will implement required policy and procedure changes to ensure early ITS consultation and engagement on developing contracts that include the development and/or integration of IT systems by Q4 2023.

Risk to the City Due to Cost-Plus Arrangement and 15% Overhead and Profit Margin

As noted earlier, the contract for the charging infrastructure will not include a fixed price for the scope of work to be delivered by Envari. Rather, a “cost-plus” arrangement will form the basis of the contract where a 15% overhead and profit margin will be applied on all eligible direct costs (e.g., equipment, third-party services, materials and supplies). For charges/costs related to work performed by Envari’s employees, the City will reimburse Envari based on an established hourly rate card (and is not subject to the overhead/profit margin).

Given that the detailed specifications of the design have not been established, we recognize that a fixed price was not established at contract signing; however, without this, the City may end up paying significantly more than intended which could impact the overall scope of the ZEB Program and may only be identified downstream through the life of the contract. Further, there is inherently less incentive for Envari to minimize costs with a cost-plus arrangement.

We understand the 15% overhead and profit margin that has been negotiated is on the highest end of the range benchmarked by the City, despite Envari being a strategic partner. While we understand that the current Master Services Agreement between the City and Envari includes a 15% overhead and profit margin, considering the scale of this project, it was expected the City could get better value because of this partnership. At a minimum, consideration may have been given to applying different rates depending on the nature of the activities undertaken by Envari and the level of administration associated with those activities (as opposed to the “one-size-fits-all” approach). It has been confirmed that negotiations took place to reduce the 15% overhead and profit margin on some elements that would not require effort based on volume (e.g., the number of charging units procured). While modifications to the Cost Recovery Protocol were made to stipulate the ability for the City to conduct an annual review to validate the overhead and profit margin, the rate of 15% was not changed.

The 15% overhead and profit margin is also specifically being charged on all Hydro Ottawa Ltd. costs applied to the project. Given that Envari is owned by Hydro Ottawa, the audit team expected possible efficiencies in overhead costs that could be passed along to the City. We understand that the City has enquired about this opportunity, but no further assessment has been performed.

It is understood that the City intends to manage the contract budget using the controls established by the protocols and the Master Workplan developed by Envari acting as a cost baseline. The Procurement Protocol; for example, stipulates how the City will be getting value for money due to the expectation that Envari will initiate competitive procurements as applicable when sourcing the work under the contract. In addition, the contract includes a mechanism for the City to designate a “Payment Certifier” who will review and certify the value of the work performed by Envari prior to invoice payment.

Ultimately, the onus is on the City to establish robust budget management and financial controls to mitigate any impact of increased cost on the scope of the contract or overall ZEB Program. This requires the availability and integration of the necessary electrical, financial and procurement expertise into the processes.

There are direct and indirect benefits to both Envari, and the City associated with this contract. For the City, there are existing synergies and expertise that are leveraged by partnering with Envari. For Envari, we understand that large scale projects such as this one could enable them to access a lower cost of borrowing for capital investments, which could increase their profitability. Should Envari benefit from lower interest cost, this would result in higher earnings for Hydro Ottawa and downstream could increase revenues to the City. In contrast, additional overhead and profit charged to the City as a result of this contract, impacts the overall cost of the ZEB Program and given the finite funds available to support this transformation, could impact the scope of the program.

In summary, given the benchmark information gathered by management, we are unable to provide assurance that the 15% overhead and profit margin will yield the best value for money for the City. However, as noted above, we believe there are benefits and synergies for the City by working with Envari and Hydro Ottawa. We appreciate that management needs to move forward with this contract given the interdependencies with the rest of the ZEB Program and the fact that choosing an alternative direction at this point would likely cost the City more and be contrary to Council direction.

RECOMMENDATION 2 – AVAILABILITY OF TECHNICAL EXPERTISE

The General Manager, Transit Services should ensure that the necessary technical expertise is available and sufficiently dedicated to the oversight and monitoring of the Envari contract through its life. Formal roles and responsibilities for the resources charged with monitoring should be formalized by the City.

MANAGEMENT RESPONSE 2

Management agrees with this Recommendation.

The contract sets out a protocol and a governance model for the City's ongoing relationship with Envari. It establishes a structure that includes controls and oversight mechanisms to ensure that the City has the flexibility to mitigate risks and ensure a high-quality result. Furthermore, the contract includes a 30-month warranty period vs the standard period of 12months, which adds significant value to the City.

Infrastructure and Water Services Department (IWSD) has created a dedicated Project Management Office, in the Design and Construction Facilities Branch within Infrastructure Services, for the delivery of all necessary civil and electrical infrastructure, including the Envari Agreement, to support the ZEB program. IWSD has a solid practice and processes for project delivery that align with corporate policies.

Transit Services has created a dedicated Zero Emission Bus Project Management Office under Transit Engineering Services to provide dedicated oversight to the program and ensure alignment of the project's timelines and deliverables with the procurement and delivery of zero emission buses.

Through the agreement, IWSD and Transit Services experts will work with Envari to confirm an annual scope of work, which will include oversight over project budgets.

Because the industry is evolving so quickly, this structure provides the City flexibility to incorporate new solutions, leveraging Envari's expertise and experience. The City will retain the ability to make changes to the annual scope of work, as needed.

A dedicated Procurement resource has been established to review Envari's procurement practices and ensure compliance with the Procurement Protocols.

A dedicated Finance resource has been established for the ZEB program overall. Finance will have transaction recording and reporting in place for tracking expenditures against plan and per the contract. Finance will also have the systems and processes in place to recover costs incurred eligible for INFC funding and claims processing.

Additional resources, subject matter and construction expertise, such as expertise in scheduling, risk analysis, claims, inspections, specific technical areas, contract administration, cost assessment, payment certifiers, etc. will be brought on board as the project proceeds and as needed to ensure proper support is available.

Finally, the existing ZEB Program Governance Structure will be refined to reflect the requirements of the implementation period as the program transitions out of the planning period. Roles and responsibilities including clear reporting lines and communications protocol will be included as part of the updated structure. Similarly, the ZEB Program Executive Table (i.e., Executive Steering Committee) will remain intact to ensure regular and period updates. The updated Governance Structure, roles and responsibilities and communications protocol will all be finalized and communicated to key staff by the end of Q4 2023.

RECOMMENDATION 3 – ESTABLISH EXPECTATIONS FOR OVERHEAD AND PROFIT RATES FOR FUTURE ARRANGEMENTS

The General Manager, Finance and Corporate Services and Chief Financial Officer should establish expectations regarding overhead and profit margins with Envari for future large-scale projects to ensure appropriate value-for-money is obtained.

MANAGEMENT RESPONSE 3

Management Agrees with this Recommendation.

The General Manager, Finance and Corporate Services and Chief Financial Officer will work with Envari to define and support the costs, overhead and profit that comprise the markup percentage in future projects. This will include an assessment of Envari's proposed role in a project, how risks will be allocated, whether new or emerging technologies are involved, any extended warranties, and the mechanisms proposed to manage cost, schedule and quality considerations.

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 audit cycles (or sprints) on a continual basis with a focus on areas of greatest risk to the City.
Annual Workplan	The plan to be developed by Envari, following completion of the Master Workplan, detailing the activities to be completed under each work activity for the relevant calendar year. This includes the work activity actions, schedule, budget, and risk assessment.
Charging Infrastructure	The infrastructure needed to charge ZEBs. This includes electricity distribution, on site stand-by power, and charging stations needed to charge the ZEBs at the maintenance facility.
Commissioning	The process of putting the charging infrastructure into operation and includes start-up verification and performance testing as well as training.
Cost Plus	The agreement for the contract in which the City will pay Envari the actual cost of the work plus a fixed overhead and profit margin on eligible costs.
Design	The design for the charging infrastructure which includes the drawings and graphics of the construction needed and specifications for charging infrastructure and equipment.
Design-Build	The method of delivery for the charging infrastructure services where Envari, as the design-builder, will work under a single contract with the project owner, the City.
Direct Costs	The actual costs reasonably incurred by the Design-Builder for the proper performance of the work, including but not limited to the actual cost of eligible items. See section 2.2. of the Cost Recovery protocol for a list of eligible cost items.
Electricity Distribution	The electrical infrastructure and distribution needed to charge the ZEBs including transformer substations, service connections, and standby electricity generation infrastructure.

Eligible Costs	The direct costs incurred by Envari in performing the work under the contract for which an overhead and profit margin will be applied.
Installation	The assembly and installation of the charging infrastructure and related equipment and components.
Master Workplan	The plan to be developed by Envari which is all-inclusive and describes the work, services, and activities to be undertaken under the Contract. This includes the planned actions, workflows, master budget and master risk assessment.
Overhead and Profit Margin	The percentage markup added to the Direct Costs that Envari will incur in performing the work under the contract, which is payable by the City, and is equal to 15%.
Protocols	Documents that form part of the contract with Envari, provide the framework for the working relationship between the City and Envari, and includes the Commissioning Protocol, Detailed Design Protocol, Procurement Protocol, Work Plan Protocol, and the Cost Recovery Protocol.
Revenue service	The service when the buses run on actual bus routes and carry passengers.
Statement of Requirements	A document that forms part of the contract and aims to provide the City's requirements for the contract scope, and includes high level descriptions on the project scope, electrical infrastructure and charging equipment components (also called Owners Statement of Requirements).
Work Activity	The phases of the work and components to be delivered by Envari in alignment with contract scope. This includes the fit-up of garages and buildings, electricity cost optimization, energy management system, substation, power supply, distribution, and on-site generation.
Zero-Emission Buses (ZEBs)	Buses that adopt a zero-emission technology e.g., battery-electric buses and hydrogen fueled buses. For the City of Ottawa, the selected technology for ZEBs are battery-electric buses.

Appendix 2 – About the Audit

Audit Objectives and Criteria

Criteria listed below were developed in line with the audit objective and scope. The criteria were defined by considering the results of the preliminary risk assessment, program milestones, and stakeholder priorities.

1. Contract Compliance to Applicable Policies, Legislation and Regulations	
1.1	The process to establish the Envari contract adhered to City policies, procedures and relevant regulations and was consistent with leading practice for design and build contracts.
1.2	The procurement approach adopted by the City was appropriate and aligns with the Procurement By-law.
1.3	Stakeholders with adequate skills, independence and objectivity were involved in the creation of the contract and appropriate sign-off was obtained in line with decision authorities.
1.4	Established protocols within the contract align with applicable City legislation, bylaws and/or policies.
2. Risk Management Mechanisms	
2.1	Areas of risk exposure exist within the contract that may impact the City and achievement of ZEB program objectives were adequately mitigated.
2.2	Key performance indicators and underlying systems supporting reporting objectives exist to enable the City and relevant stakeholders to properly monitor the contract compliance and performance.
3. Definitions, Terms and Clauses within the Contract	
3.1	Definitions and assumptions embedded within the contract are reasonably clear.
3.2	Dependencies within key clauses are defined and the underlying triggers and conditions are traceable within the master contract, sub-agreements and working protocols.

3.3	Compliance with other relevant requirements (CIB loan obligations, INFC requirements) are defined and considered within the contract, including assigned responsibilities.
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Audit Approach

Audit staff performed the following procedures to complete this audit:

- Reviewed contract documents, including the main contract template, supplementary conditions, statement of requirements, and supporting protocols.
- Conducted interviews and walkthroughs with stakeholders from the ZEB program (Program Manager, Legal Services, Procurement, Infrastructure Services) and external consultants.
- Performed other analysis and related to the contract with Envari.

Audit Methodology

The Audit of Zero-Emission Buses leveraged an **agile audit approach**. This methodology is designed to provide periodic reports, performed in iterative cycles (“sprints”) that successively refine scope based on new information or changing environmental circumstance and providing the greatest value and insight to City management and the Council. This methodology is well suited to the ZEB transformation as the audit cycles can work together with the progress of individual projects and activities to provide timely insights to Council on specific risk areas.

Each iterative cycle includes the following steps:

- A. Follow-up on previous audit sprint results
- B. Assess risk
- C. Perform analysis
- D. Identify findings and recommendations
- E. Update plan (next iteration and overall plan)

At the end of each sprint, there is an opportunity to, in conjunction with management, review and update the plan to ensure subsequent sprint scope areas and planned timing are still relevant.

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