

# Staff Report



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To	<b>Committee of the Whole</b>
Service Area	Infrastructure, Development and Enterprise Services
Date	Tuesday, September 8, 2020
Subject	<b>City Operations Campus – Part 1: Transit Electrification</b>

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## Recommendation

1. That staff be directed to continue developing plans in alignment with the Investing in Canada Infrastructure Plan (ICIP) projects approved by Infrastructure Canada (INFC), including negotiation of the required Transfer Payment Agreement (TPA).
  2. That staff be directed to complete electrical infrastructure modifications and initial electric bus charger installation at the existing Transit Facility at 170 Watson Road South using funds approved in project TC0059 Transit Operations Facility.
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## Executive Summary

### Purpose of Report

To provide an update on planning for the City Operations Campus, specifically the transition of Guelph Transit to an electric fleet and to seek direction from Council to proceed with the initial (pilot) installation of charging equipment at the current transit facility.

### Key Findings

- The Transit Electrification Program is directly aligned with the Sustaining Our Future pillar of the City's Strategic Plan and strongly supports both the Corporate 100% Renewable Energy and the Community Net Zero Carbon targets.
- This program is complex and multidisciplinary requiring significant planning and engineering design to ensure the effective development of the City Operations Campus and the construction of electrical charging infrastructure to support the successful electrification of the Guelph Transit bus fleet.
- Staff have taken a phased approach to allow for interim Council reporting and decisions, and also to permit additional time to consider the long-term impacts of COVID-19 on service delivery and demand.
- As part of Guelph's allocation of \$106.7 million in ICIP: Public Transit Stream funding from the federal and provincial governments, \$74.7 million has been approved for the upgrade and expansion of the bus fleet from diesel to electric and the design and construction of a new transit storage facility to enable this new technology and expanded fleet. The next step in the process of approval is

negotiation of Transfer Payment Agreements with ICIP and is expected to be carried out over the next six to nine months.

- During ICIP negotiations any changes or updates to the proposed projects can be addressed, particularly in light of COVID-19 impacts, and staff will seek approval from Council prior to entering into any final agreements.
- Staff have initiated preliminary site assessments for the City Operations Campus site that will include the future electric Transit facility. These assessments consist of natural heritage systems review, environmental impact studies and engineering servicing studies.
- A detailed route analysis and transit fleet electrification review to determine bus fleet battery sizing and charging requirements is also underway.
- Engineering design of upgrades for temporary electric bus charging at the existing Transit facility has indicated that moderate modifications can be made to the existing Transit Facility to accommodate up to four – 150kW electric bus chargers. The proposed installation of the four initial electric bus chargers will enable Guelph Transit to procure electric buses for the next lifecycle replacement allotment. As well, the initial electric bus allotment can be used as a pilot study to further inform how the City scales up the Guelph Transit Electric Bus Fleet Transition program.

## **Financial Implications**

As part of the ICIP: Public Transit Stream, the federal and provincial governments have allocated \$106.7 million in funding to the City of Guelph, through five applications completed in May 2019 and approved between January and June of this year, \$83.1 million of this funding has been allocated. Transfer payment negotiations are still to be completed to determine final details of the proposed projects, during which and changes since the time of application will be addressed. A summary of the projects and funding is provided in Attachment-1 ICIP: Public Transit Stream

Of the above projects, three specifically relate to Transit electrification, with a combined contribution for the two levels of government of \$74.7 million. The municipal contribution of \$104.1 million is funded by \$47.4 million of development charges and \$56.7 million of tax supported capital reserve funds.

The ongoing operating costs of Transit will be impacted by these projects, through operating costs of the vehicles, staffing costs for an expanded fleet and the operating costs of a new larger Transit facility. The energy efficiency of electric buses can be in the range of five times greater than diesel buses, meaning that for the same bus, less energy will be used. However, electrical energy is more costly when compared to diesel. This may result in overall fuel costs remaining the same, or even increasing. Planning, design and capital investment for electrical demand management strategies (such as coordinated controls, solar photovoltaics and energy storage) at the new Transit facility should be undertaken to manage operating costs of the electric fleet. The facility itself will also be designed to ensure minimal environmental impact and optimal operating costs. The expanded fleet will require additional operators, supervisors, maintenance staff and other support staff. As part of the overall plan for electrification, decisions will be required as the extent and pace of transit service expansion is better known.

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## Background

### Corporate Fleet Electrification - Electric Bus Fleet

An information report titled [Pathways to Corporate Fleet Electrification](#) was provided to Council in July 2019. Within the report staff identified that the transit bus fleet emissions are a significant contributor to Corporate greenhouse gas (GHG) emissions, emitting 6,725 tonnes of CO<sub>2</sub>e per year, or 35% of the annual Corporate GHG emissions. By electrifying the transit bus fleet, GHG emissions will be significantly reduced.

### City Operations Facilities Needs Assessment

The [City Operations Facilities Needs Assessment](#) identified that Transit, Operations, Fleet Maintenance and Corporate Building Maintenance departments are all currently operating in facilities that are over capacity, at the end of their useful life, and are not suitable for expansion.

The report recommended a consolidated campus at the City owned property located at the northwest corner of Watson Parkway South and Stone Road East. This is to include new facilities for Transit, Operations, Fleet Maintenance and Corporate Building Maintenance departments.

The City Operations Facilities Needs Assessment was presented to Council on October 21, 2019 and the following motion was passed:

That staff be directed to proceed with planning and design for a consolidated City Operations Campus consisting of operations facilities for Transit, Operations, Fleet Maintenance, and Corporate Building Maintenance located on the City owned Dunlop Drive property and that the final decision on a new city operations campus be determined following the presentation of a detailed business case and staging plan being provided to Council.

### Investing in Canada Infrastructure Program Funding

In May 2019, the City submitted five applications to the Investing in Canada Infrastructure Program (ICIP).

1. ICIP-GUE-01 Bus Fleet Expansion

The purchase of 30 electric buses to expand the existing Guelph Transit bus fleet and to have more frequent and reliable service. This will increase public transit ridership and utilize zero tail-pipe emissions vehicles.

2. ICIP-GUE-02 Guelph Central Station – Terminal Upgrades and Expansions

Construction of a zero carbon building that will include public waiting area and employee space.

3. ICIP-GUE-03 New Guelph Transit Storage Facility

Construction of a new energy efficient transit facility that will accommodate bus fleet expansion and the transition to an electric bus fleet.

4. ICIP-GUE-04 Bus Fleet Electrification

The lifecycle replacement of 35 diesel buses with zero tail-pipe emissions electric buses.

5. ICIP-GUE-05 Cycling Network Expansion and Enhancements

Construction of strategic segments of the Cycling Master Plan for all ages and abilities and to serve two major transit hubs: Guelph Central Station and the University of Guelph Bus Loop.

In January and June 2020, all five mentioned ICIP applications had been approved by the Federal and Provincial governments.

Three of the five applications (ICIP-GUE-01 Bus Fleet Expansion, ICIP-GUE-03 New Guelph Transit Storage Facility, and ICIP-GUE-04 Bus Fleet Electrification) are directly related to the City Operations Campus and the electrification of the Guelph Transit Bus Fleet. The following is a summary of the directly related funding contributions:

<b>Funding Application</b>	<b>Federal Contribution</b>	<b>Provincial Contribution</b>	<b>Municipal Contribution</b>	<b>Total Estimated Project Budget</b>
<b>ICIP-GUE-01: Bus Fleet Expansion</b>	\$9,828,000	\$8,190,000	\$22,932,000	\$40,950,000
<b>ICIP-GUE-03: New Guelph Transit Storage Facility</b>	\$18,914,280	\$15,756,418	\$52,115,302	\$86,786,000
<b>ICIP-GUE-04: Bus Fleet Electrification</b>	\$12,012,000	\$10,008,999	\$29,009,001	\$51,030,000
<b>Total</b>	<b>\$40,754,280</b>	<b>\$33,955,417</b>	<b>\$104,056,303</b>	<b>\$178,766,000</b>

As per the table above, the Federal and Provincial contribution covers 42% of the total estimated capital cost. The municipal contribution is a combination of tax supported capital funding and development charge funding.

Transfer payment agreements are currently being drafted by the ICIP administrators and will be reviewed by the City and negotiated.

### **COVID-19 Ridership Impacts**

In March 2020, many businesses and institutions throughout Guelph were closed due to COVID-19. Guelph Transit ridership levels were impacted with decreased year-to-year ridership by approximately 50%. Consequently, a revised Transit expansion plan that considers both the opportunity of using ICIP funding to reach City goals, and the long-term impacts of COVID-19 on service delivery and demand will be required and is identified under next steps.

## **Progress Update**

Significant planning and engineering design is required to ensure the effective development of the City Operations Campus and the construction of electrical charging infrastructure given the complex and multidisciplinary nature of the work. This infrastructure is needed to support the successful electrification of the Guelph Transit bus fleet. Figure 1 (Attachment-2) outlines the phased approach and key milestones associated with this program of work.

Although progress on the City Operations Campus and the electrification of the Guelph Transit Bus Fleet was delayed due to COVID-19 staffing impacts, work resumed in Q3 2020.

Staff are currently engaged in a number of projects to further this program, including:

- Preliminary site assessments for the Watson Parkway South and Stone Road East location including natural heritage systems review, environmental impact studies and engineering services.
- Detailed route analysis and transit fleet electrification review to determine suitable battery electric bus fleet size and preliminary charging infrastructure requirements.
- Engineering design of upgrades for temporary electric bus charging for the existing Transit Facility at 170 Watson Road South.

This work is described in greater detail in the following sections.

### **Environmental and Engineering Site Reviews**

A phased Environmental Impact Study (EIS) is being conducted to assess the impacts of the proposed consolidated City Operations Campus.

The first phase of the EIS will identify potential site constraints and requirements to support the refinement of the City Operations Campus concept. The following phase will assess the impacts and constraints in greater detail to inform site planning and building design.

In addition to the EIS, engineering studies will also be completed including hydrogeological studies, utilities servicing and stormwater management (SWM) planning.

### **CUTRIC Performance Verification Study**

City staff are currently working with the Canadian Urban Transit Research and Innovation Consortium (CUTRIC) to conduct detailed modelling of the electrification of Guelph Transit's entire fleet. The modelling utilizes geographic information system (GIS), topographical and actual transit route and travel data as well as electric bus manufacturers' vehicle data to determine information such as bus fleet battery sizing and charging requirements. This information is critical for electric bus fleet selection as well as design of electrical charging infrastructure at transit storage facilities. CUTRIC has completed similar studies for the Toronto Transit Commission, Edmonton Transit, Quebec City, London Transit and Grand River Transit.

### **Initial Electric Bus Charging – Watson Rd Upgrades**

The existing Transit Facility at 170 Watson Road South is currently constrained by a 300kVA transformer. After discounting the current facility's electrical loading, only a single 150kW electric bus charger can be added. For context, a 150kW electric bus charger is currently the largest air cooled plug-in electric bus charger that can fully

charge a 600kWh battery-sized electric bus (exceeds 300km driving range) in approximately 4 hours.

Further review has determined that moderate modifications can be made to the existing Transit Facility to accommodate up to four – 150kW electric bus chargers. The initial electric bus chargers will enable Guelph Transit to procure electric buses for the next lifecycle replacement allotment. The initial electric bus allotment can be used as a pilot study to further inform how the City scales up the Guelph Transit Electric Bus Fleet Transition program.

The modifications will not be a sunk cost as future building use will benefit from the modifications and the electric bus chargers can be moved to the new electric Transit Facility. Preliminary level cost estimates are \$1.5 million for electric bus chargers and electrical infrastructure upgrades.

Additional electric bus chargers (beyond four – 150kW chargers) cannot be installed at the existing Transit Facility without significant electrical infrastructure modifications and electrical utility upgrades and is not recommended based on the physical constraints of the site and limitations for growth identified in the City Operations Facility Needs Assessment report.

### **Next Steps**

As noted previously, the complex and multidisciplinary nature of this program requires significant planning and engineering design work ensure the effective development of the City Operations Campus and the construction of electrical charging infrastructure. This infrastructure is needed to support the successful electrification of the Guelph Transit bus fleet. The plan is expected to evolve over time as further details are determined.

- Continue work on the phased EIS and engineering studies.
- Complete working with CUTRIC
  - Report back to Council with study findings, specifically with financial implications of transitioning to an electric transit bus fleet.
  - Apply findings to new electric transit facility design and procurement of electric buses.
- Detailed design and construction of electrical infrastructure modifications and installation of electric bus chargers at 170 Watson Road South.
- Conceptual design of City Operations Campus with focus on the electric transit facility. COVID-19 impacts on ridership along with electrification requirements are to be considered as these factor into the right-sizing and electrification of the transit bus fleet.
- Revised Transit expansion plan that considers both the opportunity of using ICIP funding to reach City goals, and the long-term impacts of COVID-19 on service delivery and demand.

### **Financial Implications**

The City currently has an opportunity to advance a significant City priority of this nature through the shared funding model of the ICIP: Public Transit Stream, from which the federal and provincial governments have allocated \$106.7 million in funding to the City of Guelph. In May of 2019 the City submitted five applications based on known transportation needs, totaling \$198.2 million in combined capital projects. Between January and June of this year these projects have all been approved by the

federal and provincial governments, resulting in \$83.1 million of the \$106.7 million available funding being allocated. The next step in the process of approval is negotiation of Transfer Payment Agreements with ICIP and is expected to be carried out over the next six to nine months. During these negotiations any changes to the proposed projects will be addressed. A summary of the projects and funding is provided in Attachment-1 ICIP: Public Transit Stream.

Of the above projects, three specifically relate to Transit electrification, with a combined contribution for the two levels of government of \$74.7 million. The municipal contribution of \$104.1 million is funded from \$47.4 million development charges and \$56.7 million tax supported capital reserve funds. These three projects allow for the implementation of a significant portion of the current Transit growth strategy as well as conversion of 50% of existing buses to electric. This funding allows for the implementation of these changes in an earlier time frame than was previously possible given current city capital funding levels.

In addition to the capital investment, the ongoing operating costs of Transit will be impacted by these projects, through operating costs of the vehicles, staffing costs for an expanded fleet and the operating costs of a new Transit facility. Staff are continuing to work on developing estimates of these impacts, however, preliminary design work regarding the facility, buses and charging is required in order to develop accurate estimates. This will require expenditure of some of the funds currently approved prior to a final decision on the plan.

Specific operational costs relate to the energy efficiency of electric buses, which can be in the range of five times greater than diesel buses, meaning that for the same bus, less energy will be used. However, electrical energy is more costly when compared to diesel. This may result in overall fuel costs remaining the same, or even increasing. Planning, design and capital investment for electrical demand management strategies (such as coordinated controls, solar photovoltaics and energy storage) at the new Transit facility should be taken to manage operating costs of the electric fleet.

The facility itself will also be designed to ensure minimal environmental impact and optimal operating costs. The size, design and features built into the facility will be based on the type of buses to be used, the size of the fleet and the City's 100% Renewable Energy target.

The expanded fleet of buses to reach the City's Transit growth strategy will require additional operators, supervisors, maintenance staff and other support staff. As part of the overall plan for electrification decisions will be required as the extent and pace of transit service expansion is determined. The impact of transitioning to electric buses will also be a part of this consideration.

With recent changes to service delivery and demand brought about by COVID-19 the estimation of the operating impacts will depend significantly on the overall design of the future transit system. Further, the capital tax supported investment as proposed in the 2020-2029 capital plan assumed increased investment in the City Building and 100RE capital strategies. COVID-19 may also have an impact on the timing and level of this investment over the next ten years.

## **Consultations**

Members of staff consulted to provide information, review, and insight include:

- Joe Amaral, Manager Fleet Services, Operations

- Tara Baker, General Manager/City Treasurer, Finance
- Greg Clark, Manager Financial Strategy Long Term Planning, Finance
- Robin Gerus, General Manager, Guelph Transit
- Doug Godfrey, General Manager, Operations
- Chris Hill, Program Manager Fleet Planning, Operations
- Jason Simmons, Manager Transit Operations, Guelph Transit
- Alisa Wiebe, Project Manager Corporate Energy and Climate Change, Facilities and Energy Management

### **Strategic Plan Alignment**

The Guelph Transit Electric Bus Fleet Transition Program is directly aligned with the Sustaining Our Future pillar of the City's Strategic Plan. Transitioning from diesel buses to electric buses significantly reduces greenhouse gas emissions and drastically improves the energy efficiency of the bus fleet. This strongly supports both the Corporate 100% Renewable Energy and the Community Net Zero Carbon targets.

### **Attachments**

Attachment-1 ICIP: Public Transit Stream

Attachment-2 City Operations Campus and Guelph Transit Electric Bus Fleet Transition Next Steps

### **Departmental Approval**

Not applicable

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## Report Approval Details

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This report and all of its attachments were approved and signed as outlined below:

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**No Signature - Task assigned to Kealy Dedman was completed by assistant Jessie Finkelberg**

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