Community and Emergency Services Committee Agenda

Monday, March 17, 2025
Tom Davies Square

Councillor Lapierre, Chair

4:30 p.m. Open Session Council Chamber / Electronic Participation

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Pages

1. Call to Order

2. Roll Call

3. Declarations of Pecuniary Interest and the General Nature Thereof

4. Consent Agenda

For the purpose of convenience and for expediting meetings, matters of business of repetitive or routine nature are included in the Consent Agenda, and all such matters of business contained in the Consent Agenda are voted on collectively.

A particular matter of business may be singled out from the Consent Agenda for debate or for a separate vote upon the request of any Councillor. In the case of a separate vote, the excluded matter of business is severed from the Consent Agenda, and only the remaining matters of business contained in the Consent Agenda are voted on collectively.

Each and every matter of business contained in the Consent Agenda is recorded separately in the minutes of the meeting.

4.1 Routine Management Reports

4.1.1 Healthy Community Initiative Fund Applications – March 17, 2025 — 5

This report provides a recommendation regarding Healthy Community Initiative (HCI) funding requests. By-law 2018-129 requires Council's approval for all eligible HCI Capital fund requests exceeding $10,000 and Grant requests exceeding $1,000.

5. Presentations

5.1 IamResponding App

This presentation provides information regarding the IamResponding App, recently implemented within the Volunteer Fire Service.

6. Managers' Reports

6.1 Appointment of Chair and Vice-Chair – Community and Emergency Services Committee — 11

This report provides a recommendation regarding the procedure for the election by the Committee of the Chair and Vice-Chair of the Community and Emergency Services Committee for the term ending November 14, 2026.

6.2 GOVA Transit Zero Emission Transition Plan — 13

This report provides a recommendation regarding the adoption of the GOVA Transit Fleet Zero Emission Transition Plan, which supports the Community Energy and Emissions Plan (CEEP) goal of electrifying Transit by 2035.

Healthy Community Initiative Fund Applications – March 17, 2025

Presented To:	Community and Emergency Services Committee
Meeting Date:	March 17, 2025
Type:	Routine Management Reports
Prepared by:	Steph Mathieu Leisure Services
Recommended by:	General Manager of Community Development

Report Summary

This report provides a recommendation regarding Healthy Community Initiative (HCI) funding requests. By-law 2018-129 requires Council's approval for all eligible HCI Capital fund requests exceeding $10,000 and Grant requests exceeding $1,000.

Resolution

THAT the City of Greater Sudbury approves the Healthy Community Initiative Fund requests, as outlined in the report entitled "Healthy Community Initiative Fund Applications – March 17, 2025", from the General Manager of Community Development, presented at the Community and Emergency Services Committee meeting on March 17, 2025;

AND THAT the City of Greater Sudbury directs staff to present a by-law to authorize the grants recommended in the report.

Relationship to the Strategic Plan, Health Impact Assessment and Climate Action Plans

This report refers to the City of Greater Sudbury's Strategic Plan 2019-2027 objective 5.0 Create a Healthier and More Vibrant Community through the advancement of City-led goals from Population Health, A Call to Action 2018-2028, more specifically achieving Compassionate City Designation, implementing an Age-Friendly Strategy, building Resiliency, and creating Play Opportunities. The information in this report has no relationship to the Community Energy & Emissions Plan.

Financial Implications

The Healthy Community Initiative (HCI) Fund is allocated within prescribed budgets. Approval of HCI capital projects includes approval of operating costs to be provided in the base budget in subsequent budget years to the operating department.

Background

A guiding principle of By-law 2018-129, a By-law to Adopt a Policy Regarding the Healthy Community Initiative Fund, is that HCI funds should be used primarily for funding city-owned capital projects with no more than 25% of the annual ward allocation expended on eligible grant applications. To help illustrate the difference, By-law 2018-129 and HCI reporting reference two grant streams defined as Capital and Grant.

Any funds in the ward allocation not spent at the end of a calendar year may be carried forward for the benefit of the applicable ward but may only be expended on eligible Capital projects, which results in each ward carrying different balances.

By-law 2018-129 Approval Authority

All requests that meet HCI funding criteria, and are recommended by the General Manager of Community Development (General Manager), require approval within the thresholds below.

General Manager Approval

- Grant applications less than $1,000
- Capital applications less than $10,000
- Capital applications that result in annual operating budget increases of less than $5,000

Council Approval

- Grant applications greater than $1,000
- Applications that result in an applicant receiving a cumulative total Grant greater than $1,000 in calendar year
- Applications that result in an event or initiative receiving a Grant greater than $1,000 due to applications by multiple participants
- Capital applications greater than $10,000
- Capital applications that result in annual operating budget increases greater than $5,000

HCI Fund Applications and Financial Summary

Attachment 1 – Healthy Community Initiative Fund – Applications, lists HCI Fund requests by ward as recommended by the General Manager for approval by Council. All projects listed in Attachment 1 have been evaluated against By-law 2018-129 and its related criteria and have been verified to ensure sufficient funds are available within each ward's funding allocation.

Attachment 2 – Healthy Community Initiative Fund – Application Outcomes, provides a list of HCI Fund applications that were approved or denied by the General Manager since the last report presented at the Community and Emergency Services Committee meeting on December 16, 2024.

Attachment 3 – Healthy Community Initiative Fund Financials includes the recommended approvals contained in this report as well as a summary of HCI fund allocation balances up to January 31, 2025. The amounts may be adjusted due to reimbursement of under-spent funds from completed and reconciled projects or initiatives.

Next Steps

Upon Council approval, applicants will receive written notification confirming the application's approved funding and the permitted use of funds, and Grant recipients will also receive a Post-project Final Report form. This form is to be completed by the applicant and returned following completion of the initiative for

reconciliation by Financial Services.

Grant recipients will receive funding via electronic fund transfer or cheque for the approved amount, whereas a Capital funded project will be managed by the City of Greater Sudbury, working closely with the applicant.

HCI funded Capital projects will be prioritized based on the applicable City department's annual workplans and initiated within 24 months of approval in accordance with By-law 2018-129.

Should an HCI fund request not be approved, the applicant will be notified of same and the reasons for which it was not approved.

Resources Cited

Healthy Community Initiative Fund, By-law 2018-219
https://www.greatersudbury.ca/city-hall/grants-and-funding/hci-fund/application-process/hci-fund-policy/

Healthy Community Initiative (HCI) Fund

Applications for Council Approval – March 17, 2025

Capital Funds

Ward	Recipient/ Project/ Location	Purpose for Funds	Estimated Operating Costs per year	Amount Requested	Amount Recommended for Approval by the GM
	No items to report				

Grants

Ward	Recipient/Initiative	Purpose for Funds	Amount Requested	Amount Recommended for Approval by the GM
All	Independent Living Resource Centre Corp / AccessAbility Week 2025	Assist with costs for advertising of National AccessAbility Week 2025	$6,000 ($500/ward)	$6,000 ($500/ward)
3	Productions Café Heritage / Rayside Balfour Heritage Days	Assist with costs related to performance and equipment fees	$3,000	$3,000
4	Productions Café Heritage / Whitewater Summer Concerts	Assist with costs related to artist fees and equipment rentals	$3,000	$3,000
6	Four Lakes Community Association / Summer Fun Day	Assist with costs related to food, refreshments, supplies, equipment rental, and prizes for games.	$1,500	$1,500
10	Sudbury Performance Group / Her Northern Voice Festival	Assist with costs related to rental of William Bell Gazebo, Grace Hartman Amphitheatre and Bell Park digital billboard.	$3,000	$3,000

Healthy Community Initiative (HCI) Fund

Applications Approved/Denied by the General Manager of Community Development

For the period of November 14, 2024 to January 31, 2025

Successful Applications

Capital

Ward	Group / Project	Estimated Operating Costs per year	Amount Requested	Amount Approved
	No items to report			

Grants 2024 Funds

Ward	Group / Project	Amount Requested	Amount Approved
2	Miners for Cancer / Hockey Tournament Fundraiser	$500	$500
9	Wanup Quilters / Community Quilting Program	$950	$950

2024 carry-over balances will be confirmed in the 2024 HCI Annual Report in Q2 of 2025

Grants 2025 Funds

Ward	Group / Project	Amount Requested	Amount Approved
3	Onaping Falls Snowmobile Club / Volunteer Appreciation Breakfast	$500	$500
4	Northbound Sno Drifters / Volunteer Appreciation Dinner	$500	$500
7	Lake Wahnapitae Home & Campers Association / Lake Safety Program	$750	$750

Unsuccessful Applications

Ward	Group / Project	Amount Requested	Reason(s) for Denial
3	Onaping Falls Winter Carnival Committee / Onaping Falls Winter Carnival	$3,000	Onaping Falls Recreation Committee was approved for annual funding during 2025 budget which includes expenses for the Onaping Falls Winter Carnival

Healthy Community Initiative (HCI) Fund

Financials for the Period Ending January 31, 2025

Schedule 1.1 - Capital (2025 Funds)

Ward	2025 Allocation	Uncommitted Funds from 2024 (carry forward)	Adjustments from Completed Projects	Approved by General Manager 2025	Approved by Council 2025	Proposed for Approval by Council	Uncommitted Fund Balance After Resolution	Pending Requests
1	$ 29,217	To Be Determined					$ 29,217	
2	$ 29,217	To Be Determined					$ 29,217	
3	$ 29,217	To Be Determined					$ 29,217	
4	$ 29,217	To Be Determined					$ 29,217	
5	$ 29,217	To Be Determined					$ 29,217	
6	$ 29,217	To Be Determined					$ 29,217	
7	$ 29,217	To Be Determined					$ 29,217	
8	$ 29,217	To Be Determined					$ 29,217	
9	$ 29,217	To Be Determined					$ 29,217	
10	$ 29,217	To Be Determined					$ 29,217	
11	$ 29,217	To Be Determined					$ 29,217	
12	$ 29,217	To Be Determined					$ 29,217	$ 88,806

Schedule 1.2 - Grants (2025 Funds)

Ward	2025 Allocation		Adjustments from Underspent Initiatives	Approved by General Manager 2025	Approved by Council 2025	Proposed for Approval by Council	Uncommitted Fund Balance After Resolution	Pending Funding Requests
1	$ 12,500					$ 500	$ 12,000	
2	$ 12,500					$ 500	$ 12,000	
3	$ 12,500			$ 500		$ 3,500	$ 8,500	
4	$ 12,500			$ 500		$ 3,500	$ 8,500	
5	$ 12,500					$ 500	$ 12,000	
6	$ 12,500					$ 2,000	$ 10,500	
7	$ 12,500			$ 750		$ 500	$ 11,250	
8	$ 12,500					$ 500	$ 12,000	
9	$ 12,500					$ 500	$ 12,000	
10	$ 12,500					$ 3,500	$ 9,000	
11	$ 12,500					$ 500	$ 12,000	
12	$ 12,500					$ 500	$ 12,000	

* There were no contributions to the HCI Reserve Fund in 2025 as the maximum threshold of $24,000 was achieved in 2021.

Appointment of Chair and Vice-Chair – Community and Emergency Services Committee

Presented To:	Community and Emergency Services Committee
Meeting Date:	March 17, 2025
Type:	Managers' Reports
Prepared by:	Mark Vainio Clerk's Services
Recommended by:	General Manager of Corporate Services

Report Summary

This report provides a recommendation regarding the procedure for the election by the Committee of the Chair and Vice-Chair of the Community and Emergency Services Committee for the term ending November 14, 2026.

Resolution

That the City of Greater Sudbury appoints Councillor _____ as Chair and Councillor _____ as Vice-Chair of the Community and Emergency Services Committee for the term ending November 14, 2026, as outlined in the report entitled “Appointment of Chair and Vice-Chair – Community and Emergency Services Committee”, from the General Manager of Corporate Services, presented at the Community and Emergency Services Committee meeting on March 17, 2025

Relationship to the Strategic Plan, Health Impact Assessment and Climate Action Plans

This report refers to operational matters

Financial Implications

The remuneration for the Chair is provided for in the operation budget.

Background

This report sets out the procedure for the election by the Committee of the Chair and Vice-Chair of the Community and Emergency Services Committee for the term ending November 14, 2026.

The Procedure By-law provides that a Member of the Committee shall be appointed for a two-year term by the Committee to serve as Chair, and another Member of the Committee as Vice-Chair of the Community and Emergency Services Committee by way of resolution.

Remuneration

The Chair of the Community and Emergency Services Committee is paid $ 1,444.80 per annum.

Selection

The selection of these positions is to be conducted in accordance with the City of Greater Sudbury's Procedure By-law. Council's procedure requires that in the event more candidates are nominated for the required position, that position will be chosen by simultaneous recorded vote. Simultaneously recorded votes are conducted by way of an electronic vote, however, the electronic vote system does not have the functionality for dealing with appointments. Accordingly, the By-law provides that paper ballots are to be used for members who are attending in person, and members participating virtually are to provide their votes to the Clerk in writing.

It is always in order for a Member of Council to nominate and vote for themselves.

Resources Cited

City of Greater Sudbury Procedure By-law 2019-50: https://www.greatersudbury.ca/city-hall/by-laws/

GOVA Transit Zero Emission Transition Plan

Presented To:	Community and Emergency Services Committee
Meeting Date:	March 17, 2025
Type:	Managers' Reports
Prepared by:	Laura Gilbert Transit
Recommended by:	General Manager of Community Development

Report Summary

This report provides a recommendation regarding the adoption of the GOVA Transit Fleet Zero Emission Transition Plan, which supports the Community Energy and Emissions Plan (CEEP) goal of electrifying Transit by 2035.

Resolution

THAT the City of Greater Sudbury adopts the GOVA Transit Fleet Zero Emission Transition Plan as the official plan to electrify Transit by 2035 as outlined in the report entitled “GOVA Transit Zero Emission Transition Plan” from the General Manager of Community Development, presented at the Community and Emergency Services Committee meeting on March 17, 2025;

AND THAT the City of Greater Sudbury directs staff to develop relevant business cases, including comprehensive funding strategies based on the GOVA Transit Fleet Zero Emission Transition Plan recommendations, for inclusion in the 2026 budget deliberations.

Relationship to the Strategic Plan, Health Impact Assessment and Climate Action Plans

This report describes work related to the City of Greater Sudbury Strategic Plan to develop and strengthen strategies and policies to mitigate and/or adapt to impacts of Climate Change.

Within the Low-Carbon Transportation Strategy Sector of the Community Energy & Emissions Plan, this report aligns with Goal 9 to electrify 100% of transit fleet by 2035**.**

Financial Implications

There are no financial implications associated with this report. Subject to Council’s adoption of the GOVA Transit Fleet Zero Emission Transition Plan, staff will prepare a business case for the 2026-2027 budget (and subsequent budgets) that considers the recommendations within this plan.

The GOVA Transit Fleet Zero Emission Transition Plan provides a clear roadmap for GOVA Transit to electrify its fleet by 2035. The incremental cost over the study period of 2023-2050 inclusive of operating,

maintenance, and infrastructure costs, is anticipated to be $89 million. Staff will identify funding programs to reduce the municipal impact of transition costs, if applicable, and include in the business case.

Background

The City of Greater Sudbury is committed to achieving a greener economy and reducing energy consumption in response to its Climate Emergency Declaration from May 2019. As part of this effort, the Community Energy and Emissions Plan (CEEP) was developed, aiming for net-zero emissions by 2050. Transportation focused goals include electrifying 100% of the GOVA Transit.

In alignment with CEEP goals, the City of Greater Sudbury participated in a Battery Electric Bus Joint Procurement Roadmap as part of Metrolinx's Joint Transit Procurement Initiative in 2021. The Battery Electric Bus (BEB) Roadmap provided a framework for fleet electrification for Ontario agencies, beginning with the acquisition of consulting services to develop and plan for full fleet electrification.

With approved funding through the Zero Emission Transit Fund (ZETF), the City of Greater Sudbury received $112,856 towards consulting services in the development of a Transit Fleet Zero Emission Transition Plan feasibility study and Municipal Fleet Analysis. The scope of work included six tasks: Route Modelling and Schedule Optimization, Facility Assessment, Full Fleet Electrification Transition Plan, Municipal Fleet Analysis, Noise Assessment and Climate Adaptation and Resilience Assessment.

Executive Summary

The Zero Emission Fleet Transition Plan provides a clear roadmap for GOVA Transit to electrify its fleet by 2035, built around a phased approach. The transition is not just about acquiring electric buses, but also integrating new technologies and operational strategies into service delivery, which will address fleet, infrastructure, and cost requirements. With phased implementation, careful attention to infrastructure needs, and strategic cost management, it outlines key steps for the City of Greater Sudbury to meet its sustainability targets, while providing reliable and efficient service for the community.

The fleet transition is planned in alignment with GOVA's existing conventional diesel bus fleet replacement schedule, allowing Staff to gain valuable experience with Battery Electric Buses (BEBs), as the technology matures. The plan consists of four distinct phases, each of which are subject to future Council decision making as a part of future year's budget deliberations :

- **Phase 1** (2025-2029): Transition 27 diesel buses to battery electric, with plug-in depot charging only.
- **Phase 2** (2030-2031): Transition 9 diesel buses to battery electric, with continued depot charging; install en-route charging at the Downtown Hub.
- **Phase 3** (2032): Transition 7 diesel buses to battery electric.
- **Phase 4** (2033-2035): Transition 16 diesel buses to battery electric.

The approximate total cost over the study period of 2023-2050 inclusive of operating, maintenance, and charging infrastructure costs, is anticipated to be $578M; an increase of $89M (2023 dollars), in comparison to existing diesel bus operations, over a 12-year lifecycle. Despite increased capital costs for buses and infrastructure, as well as increased operating costs attributed to increased non-revenue bus swaps, a cost savings in the amount of $19M is realized in fueling, which offsets the overall net cost to transition the fleet.

While analysis through this feasibility study confirms that costs to operate a fully electrified transit system are more than it would be to operate the existing diesel transit system, the plan highlights long-term benefits of transit electrification including significant emission reductions; making it a vital step toward achieving net-zero emissions by 2035. Annual emissions are expected to be reduced from approximately 5,600 tonnes of greenhouse gas (GHG) emissions per year to just over 600 tonnes of GHGs per year. Compared to a scenario where the fleet is not transitioned to BEBs, this results in a reduction of approximately 94,300 tonnes of GHGs over the study period. This reduction occurs even though some residual emissions from the diesel auxiliary heaters in the BEBs are expected.

Transit Fleet Zero Emission Transition Plan

The GOVA Transit Fleet Zero Emission Transition Plan outlines a four-phase roadmap to fully electrify the transit fleet by 2035. It includes a bus procurement schedule and phased deployment insights. The plan focuses on analyzing Battery Electric Bus (BEB) technologies, energy consumption, and determining appropriate charging infrastructure. Key elements addressed are System Level Planning, Operational Planning & Development, Capacity to Implement the technology, Financial Planning, and Environmental benefits.

System Level Planning

Battery Electric Buses (BEBs) & Charging Options: BEBs are favored for their use of the electric grid, but they have limited range compared to diesel buses. For longer routes, additional vehicles or en-route charging may be needed. En-route charging at transit centers can help extend BEB range, particularly for circular routes with layover times.

Energy Consumption Analysis: GOVA Transit worked with HDR, Inc. to model energy consumption and its impact on service, using the Zero+ model. This model analyzed factors like route terrain, vehicle stops, and temperature to develop a detailed energy profile specific to GOVA Transit's operations. It also examined variables like battery degradation, HVAC load, and operating environment.

Modelled Scenarios: The energy consumption model analyzed five different scenarios, each testing different combinations of BEB configurations, battery sizes, and charging strategies. These scenarios tested the feasibility of transitioning to BEBs, considering battery sizes, auxiliary heating needs (diesel heaters were preferred for winter climates), and the impact on service operations:

- Baseline (Diesel)
- Full BEB Fleet (ii) 525 kWh or iii) 675 kWh batteries) with Depot Charging Only
- Full BEB Fleet (iv) 525 kWh or v) 675 kWh batteries) with Depot and En-Route Charging

With depot charging alone, about half of the fleet (27 of 59 buses) can be transitioned to BEBs without needing extra vehicles or en-route charging. The recommended approach is to transition to a full fleet of 675 kWh BEBs, supported by both depot and en-route charging at key locations like GOVA Transit Hubs. While the transition plan suggests that GOVA Transit can replace diesel buses with BEBs, the recommended transition suggests a combination of depot and en-route charging infrastructure to maintain service levels without expanding fleet size.

Operational Planning and Development

This section outlines the critical fleet and infrastructure needs for the implementation of Battery Electric Buses (BEBs), including the phased deployment of the fleet, facility upgrades, and infrastructure for charging. The deployment of BEBs will take place in phases to ensure smooth transition and continued service efficiency.

GOVA's main facility is located at 1160 Lorne Street and currently supports 59 diesel buses. This facility will require upgrades to accommodate BEB charging, including direct current (DC) Fast Chargers and Facility modifications.

The transition plan recommends that GOVA Transit begin transitioning its fleet to BEBs in 2026. The transition will occur gradually, starting with replacement of older diesel buses with BEBs that align with the current fleet size and service levels. All BEBs purchased during the transition will have a 675 kWh battery supported by 150 kW plug-in chargers at the Lorne Street Depot, each powered by two (2) new 2,000 kVA unit substations.

- **Phase 1 (2025-2029):** The first phase involves the purchase of 27 BEBs, replacing diesel buses on a one-to-one basis. Charging infrastructure will include the installation of nine 150 kW plug-in chargers at the depot; the first 2,000 kVA substation will be ordered in 2025, for installation at the Lorne Street Depot.
- **Phase 2 (2030-2031):** Nine (9) BEBs will be added (to replace diesel buses on a one-to-one basis). En-route charging infrastructure will be installed at the Downtown Hub, alongside the continued deployment of infrastructure (3 150 kW plug-in chargers) to support at depot charging. A second 2,000 kVA substation will be installed at the Lorne Street Depot in 2030.
- **Phase 3 (2032):** Seven (7) BEBs will be added to bring the active fleet to 43 BEBs; still replacing diesel buses at a one-to-one basis. En-route charging and depot charging (3 150 kW plug-in chargers) will continue to support the fleet.
- **Phase 4 (2033-2035):** The final phase will bring the fleet to 59 BEBs and 100% of the conventional transit fleet, with the purchase of 16 BEB's (including spares) completing the transition. 5 150 kW plug-in chargers will be installed at the depot in this phase.

By the end of Phase 4, the conventional transit fleet will be entirely electrified, with 59 BEBs in service. A total of two (2) 2,000 kVA substations will have been installed at the Lorne Street Transit Depot; further, twenty (20) 150 kW plug-in chargers will be installed, with capacity to charge a fleet of 60 BEB's (3 per unit). The phased approach ensures that GOVA Transit can procure and integrate the necessary buses and charging infrastructure for the full electrification by 2035.

During the first two phases of electrification, GOVA Transit will maintain current service levels without increasing fleet size. However, for future service expansion (such as that seen in September 2024), GOVA will monitor the feasibility of one-to-one vehicle replacement based on route lengths and energy efficiency. Routes requiring more than 307 km of travel would need either additional vehicles for swapping or en-route charging and dedicated layover to meet the service and energy demands.

As Greater Sudbury expands its transit system, further en-route charging locations will be considered based on service needs and financial feasibility. These sites will be assessed through ongoing studies and future expansions of the transit system.

<u>Enterprise Asset Management Plan Alignment</u>

The City of Greater Sudbury's Enterprise Asset Management Plan (2023) emphasizes making informed decisions about acquiring, maintaining, and disposing of assets to sustainably provide municipal services. The plan is aligned with the city's strategic goals, particularly focusing on asset management and service excellence. For expanding the asset footprint, the plan recommends:

1. Long-term Financial Planning: Using the plan to inform future capital projects and asset life-cycle interventions.
2. Service Delivery: Ensuring reliable service delivery by supporting municipal infrastructure systems with effective plans and financing decisions1.
3. Key Performance Indicators: Returning to Council to confirm asset levels of service and related key performance indicators for each asset class1.

These recommendations aim to enhance the city's infrastructure while maintaining a sustainable approach to asset management.

To support operational planning, the City of Greater Sudbury and Greater Sudbury Utilities (GSU) have executed a Memorandum of Understanding whereas GSU will support necessary feasibility analysis related to GOVA's electrification. The Parties intend to explore a potential commercial agreement that would involve GSU and GOVA collaborating toward Electrification Infrastructure upgrades including but not limited to GOVA's 1160 Lome Street Garage, and three (3) identified Transit Hubs with consideration for GSU to undertake the design, procurement, construction, operation, and maintenance of the Electrification infrastructure and the associated Energy Management Systems for the Facilities.

Given the high costs associated with battery electric bus charging infrastructure, the plan's focus on long-term financial planning and effective service support suggests that exploring third-party ownership models could be a viable option. This approach could help manage lifecycle costs and ensure reliable service delivery without the City taking on additional assets.

Capacity to Implement Technology

This section of the plan discusses GOVA Transit's capacity to implement a new Battery Electric Bus (BEB) fleet, focusing on the necessary staffing, training, and risk management strategies for a successful transition. It further outlines the necessary steps to build a skilled workforce ensuring safety, efficiency, and competency among all relevant staff.

GOVA Transit recognizes the importance of training staff on BEB systems and components to ensure safe and efficient operations. The City will collaborate with training programs, Original Equipment Manufacturers (OEMs), and other transit agencies to train the existing workforce. The plan includes assessing existing skills, identifying gaps, and developing a training program for bus operators and maintenance personnel. A workforce growth strategy will be created to recruit, retain, and support employees, with funding opportunities for expansion.

GOVA Transit's technical training will evolve as it integrates new vehicles and systems into its fleet. New OEM training modules will be procured to cover all vehicle systems, subsystems, and components. A phased approach will be taken for battery electric bus (BEB) specific training, expanding the number of trained mechanics/technicians as the fleet grows. A core group of BEB fleet specialists will be developed through hands-on experience to ensure a smooth transition to a fully zero-emission workforce, including the creation of an Electric Vehicle Technician who will support enterprise-wide transition to electrification. The plan outlines collaboration with other regional transit agencies and training providers to optimize training resources, given the shortage of qualified BEB OEM trainers. Partnerships with local institutions, such as Cambrian College's Industrial Battery Electric Vehicle Maintenance Certificate Program, will help develop a skilled workforce for BEB maintenance.

Financial Analysis

This section provides a financial analysis that compares two scenarios: the Baseline Scenario (continued operation with diesel buses) and the Battery Electric Bus Transition Scenario (BEB - full conversion).

Capital costs include the purchase of buses and infrastructure like charging stations and required electric upgrades. The capital cost assumptions for each bus and infrastructure component are included in Table 1.

Table 1: Capital Cost Assumptions

Conventional Fleet Capital Assumptions	
Diesel Bus Cost	$780,000
Battery Electric Bus Cost (675 kWh)	$1,874,287
Plug-In Depot Charger (150 kW)	$133,900
Plug-In Depot Cable Dispenser	$44,596
Pantograph Charger (450 kW)	$312,455

Table 2 provides a comparison of total operating cost estimates over the 2023 to 2050 period for the Baseline and BEB scenarios. It is anticipated that the cost of the BEB scenario will be $89.1 million more than existing diesel operations in discounted 2023-dollar terms over the 2023 to 2050 period. The result shows that the higher capital cost of the transition to BEBs is not offset by fueling cost savings relative to the Baseline Scenario.

Table 2: Comparison of Baseline and BEB Financial Scenarios

	Baseline	BEB	Variance
Bus Purchases	$58.0	$139.3	$81.4
Related Infrastructure	-	$16.8	$16.8
Lifecycle Capital Costs	**$58.0**	**$156.2**	**$98.2**
Operations & Maintenance	$380.1	$388.3	$8.1
Fueling	$51.1	$32.1	-$19.0
Related Infrastructure O&M	-	$1.8	$1.8
Lifecycle O&M	**$431.2**	**$422.1**	**-$9.1**
Total	**$489.2**	**$578.3**	**$89.1**

Where BEB technology is still relatively new, longer-term detailed analysis of vehicle maintenance costs is not available. Diesel spending is significantly lower in the BEB Scenario due to the rapid transition to BEBs. Higher BEB operating costs (due to incrementally higher kilometers travelled from swaps) more than offset the decrease in operating costs attributable to diesel buses. Values in the variance column represent expenditures by bus type under each scenario, and do not represent savings.

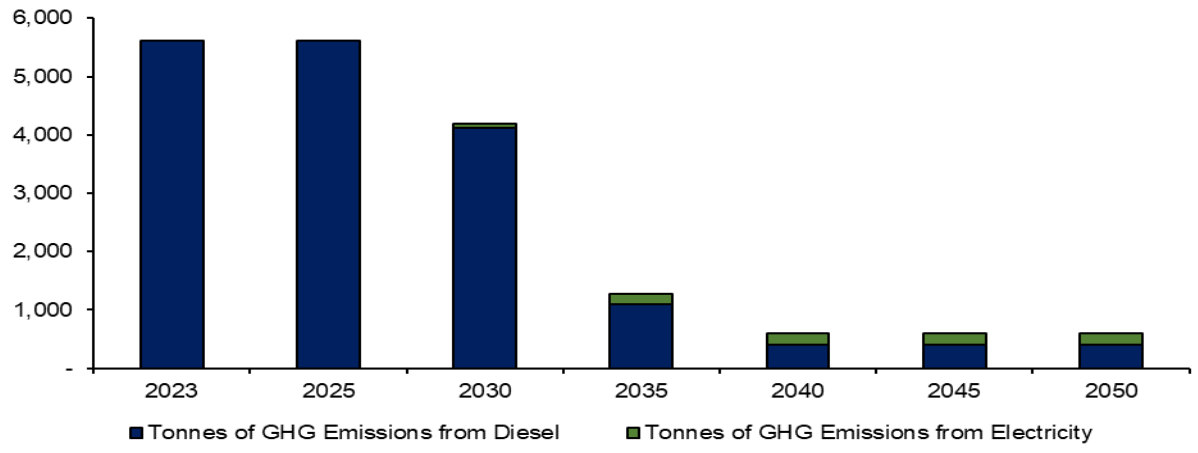
Fuel and electricity costs associated with the transition include the propulsion of diesel and BEBs, and diesel fuel required to operate diesel heaters on board BEBs. Fuel costs are more expensive due to the increasing price of diesel, driven in part by escalating carbon taxes, with realized savings of $19 million over the scenario period.

Environmental Benefits

GOVA Transit's shift to a 100% Battery Electric Bus fleet will contribute to substantial GHG emissions reductions, aligning with environmental goals and supporting a cleaner, more sustainable transit system for the City of Greater Sudbury.

GOVA Transit's diesel buses emit approximately 5,600 tonnes of GHGs annually. After the full transition to BEBs, the annual GHG emissions drop dramatically to just over 600 tonnes per year. This represents a reduction of about 157 tonnes of CO2 per bus annually. Over the study period, this transition will result in a total GHG emissions reduction of approximately 94,300 tonnes. This savings is attributed to the shift from diesel fuel to electricity, with a decrease in emissions due to the cleaner electricity grid over time. The environmental benefits of transitioning to BEBs are substantial, as summarized in the table and figure below:

Chart 1: GHG Projections 2023-2050



Funding Opportunities

Leveraging provincial and federal funding opportunities and considering third party asset ownership models, GOVA Transit can offset capital outlays and potentially reduce the financial impact of the transition. Transitioning to a zero-emission fleet will require a significant initial investment, particularly for bus purchases and infrastructure, however, environmental benefits make it a viable option for the City of Greater Sudbury to meet its CEEP goal of a 100% electrified fleet by 2035.

Current funding opportunities that support transit electrification are:

Canadian Permanent Transit Fund (CPTF)- Federal: The City of Greater Sudbury was successful in its Expression of Interest application for the Baseline Funding stream of the permanent Canada Public Transit Fund. An allocation of funds in the amount of $1.4 million annually, over 10 years, is available to support the GOVA Zero Emission Transition Plan, upon submission and approval of a capital plan prior to April 1st, 2026.

Investing in Canada Infrastructure Program (ICIP)- Federal/Provincial: The Accelerated Bus Fleet Replacement Funding Program capital project ICIP-SUD-01 replaces GOVA Transit diesel buses which have reached the end of their lifecycle to reduce maintenance costs and provide the user with a more reliable transit experience. The approved project scope of work is for the purchase of 53 diesel replacement buses (40-foot-low-floor), at six buses per year, ending in 2027. Proceeding with the purchase of BEBs under this program requires a modification request to the Ministry of Transportation to change the scope of work from diesel buses to battery electric buses.

In response to capital cost increases for diesel buses, and inflationary pressures, a modification request has been submitted to ICIP on behalf of the City of Greater Sudbury requesting to reallocate funds from the Bus Rapid Transit project (ICIP-SUD-05) to the Accelerated Bus Fleet Replacement Program (ICIP-SUD-01) to cover capital costs of bus purchases in the amount of $10,250,000. The request is necessary to cover price escalation and ensure the full scope of the bus replacement project can be achieved.

While this modification request is under review, a project scope change cannot be submitted to change ICIP-SUD-01 funding from diesel buses to BEBs. The City's application request will take approximately nine months to approve.

Zero Emission Transit Fund (ZETF)- Federal: The City of Greater Sudbury was approved for $112,856 within the Planning stream of the Permanent Public Transit Fund- Zero Emission Transit Fund, to support the completion of necessary planning and feasibility work. Within a capital stream, eligible recipients can receive grants covering up to 50% of eligible capital costs for BEBs and charging infrastructure. Upon approval of the GOVA Transit Fleet Zero Emission Transition Plan, the City of Greater Sudbury will be applying to future intakes, recognizing federal funding stacking maximums. According to Housing, Infrastructure, and Communities Canada, the current ZETF envelope is anticipated to be fully allocated soon. Greater Sudbury has been advised to wait for the announcement of the next funding intake under the Canada Public Transit Fund before applying.

Green Municipal Fund (GMF) – Federal: The Green Municipal Fund (GMF) is a federal program that provides grants and loans to municipalities for projects that aim to improve environmental sustainability, such as reducing greenhouse gas emissions and enhancing energy efficiency. Municipalities can apply for funding to support feasibility studies, pilot projects, and full-scale implementations.

Potential Challenges

U.S. Tariffs

U.S. tariffs pose a threat to Canadian Transit Manufacturing and Affordability. Although there is a 30-day temporary pause on tariffs as of February 3rd, 2025, significant risks persist, potentially destabilizing North

America’s transit manufacturing and clean energy production sectors. The imposition of 25% tariffs on Canadian exports, coupled with 10% tariffs on energy products, could lead to increased public transit costs, delays in vehicle deliveries, uncertainty for manufacturers, and adverse effects on electricity and hydrogen production—both crucial for Canada’s transition to zero-emission transit.

Through resolution CC2025-51, City of Greater Sudbury Council approved a motion to address the impact of U.S. tariffs. The motion calls on the federal and provincial governments to provide municipalities with greater flexibility to prioritize the purchase of products, supplies, and materials from countries other than the United States. This is in response to the challenges posed by U.S. tariffs and aims to ensure that public investments benefit Canadian businesses and worker.

Under the current Metrolinx Agreement, the City of Greater Sudbury procures transit buses through the manufacturer, New Flyer. While New Flyer BEBs are currently manufactured in both Canada and the U.S., the company plans to complete all BEB production in Winnipeg, Canada by the end of Q3 2025.

Zero Emission Transit Fund- Application Denial

In Fall 2024, both the City of Saskatoon and the City of Durham faced setbacks with their applications for funding under the Zero Emission Transit Fund (ZETF). Saskatoon’s application was denied in September 2024, leading them to spend $23M on new diesel buses. Similarly, Durham anticipated receiving $33M million in grant funding from the ZETF for the purchase of 34 battery-electric buses and the necessary charging equipment and infrastructure. However, Infrastructure Canada recently informed Durham that they would not receive the funding. Consequently, Durham voted to purchase 18 diesel buses instead.

Operational Challenges Colder Climate

The City of Edmonton's battery electric bus implementation has faced significant challenges. Initially, the city purchased 60 electric buses from the U.S. company Proterra, aiming to provide a greener and more efficient public transportation option. However, many of these buses have experienced frequent breakdowns, leading to substantial maintenance costs and operational issues.

Where performance guarantees for Edmonton’s climate specified an operation range of 328 kilometres at the beginning of battery life and 268 kilometres in extreme cold, no buses ever achieved 328 kilometres, and bus range in the winter has been approximately 165 kilometres. In contrast, a diesel bus in GOVA Transit service with a full tank of fuel, at 474 liters, can travel anywhere between 600 and 800 kilometres. As an example, a bus assigned to Route 105 Valley travels up to 600 kilometres a day without refueling.

Complicating matters further, Proterra filed for Chapter 11 bankruptcy protection, which has delayed the availability of necessary replacement parts. As a result, more than half of Edmonton's electric buses are currently out of service. Despite these setbacks, Edmonton remains committed to sustainable transportation and continues to explore other options, including hydrogen fuel cell buses.

Fire Services

Concerns noted by Fire Services surround charging and storage of electric vehicles inside garage or enclosed spaces. These concerns relate to the significant hazard a battery-electric fire poses as it can be difficult to control and due to the volatility of the battery when it combusts, can cause serious impacts to the adjacent vehicles or equipment. Stored inside a facility, a battery fire on one transit bus would impact several units around it, most likely before they could be safely moved, or the fire placed under control; water or firefighting foam systems have a minimal impact on these types of fires and few alternatives currently exist.

In addition to the transit fleet stored and repaired at the Lorne Street Depot, Fire Apparatus, Paramedic Ambulances, Municipal small and large fleet vehicles are all stored and repaired in the same location. This makes any storage location a critical component of several key infrastructure and community safety services.

As transit buses are stored indoors, consideration should be made with respect to the storage and charging of electrified vehicles inside the garage.

GOVA Project Risks/Mitigation

Transitioning GOVA Transit's fleet to Battery Electric Buses (BEBs) presents several risks. Detailed descriptions of these risks and their mitigation strategies are provided in Appendix A of the GOVA Transit Fleet Zero Emission Transition Plan (pages 35-38). Staff will continue to reference this appendix throughout the transition planning process.

Interim Opportunities to Reduce Emissions

HYGN Hydrogen Fuel Technology

The City of Greater Sudbury Fleet department is participating in a hydrogen fuel technology system pilot program that is expected to generate fuel cost savings and significantly decrease vehicle/equipment emissions up to 75% on existing diesel fleet vehicles aligning with CEEP goals; this pilot will include one Transit Bus NOVA LE25 diesel where the cost of one HYGN unit is $10,000.

The City of Kawartha Lakes reported the results from their pilot as promising, where the HYGN hybrid kit has demonstrated substantial fuel savings and emissions reductions aligning with sustainability goals.

Next Steps

Given the above feasibility work, should Council elect to direct staff to begin the transition to BEB, Staff will bring forward a business case for 2026-2027 budget deliberations that further outlines financial requirements to support.

Resources Cited

Evaluating the potential impacts of US tariffs
https://www.bankofcanada.ca/publications/mpr/mpr-2025-01-29/in-focus-1/

Why your city is still waiting on e-buses - and how tariffs could make things worse
https://www.cbc.ca/news/canada/ottawa/ebus-ottawa-canada-usa-tariff-1.7459686

Capital Project Budget Re-allocations and 2024 DRT Bus Order, Durham Region Transit Report November 6, 2024
https://pub-durhamregion.escribemeetings.com/filestream.ashx?DocumentId=5445

Saskatoon Transit 2025 Fleet Renewal Request
https://pub-saskatoon.escribemeetings.com/filestream.ashx?DocumentId=228806

"We're looking at 2025 to get back on track": DRT's zero-emission plans hit speed bump due to lack of federal funds
https://www.durhamradionews.com/archives/190570

Saskatoon pivots after federal funding for electric buses denied
https://thestarphoenix.com/news/local-news/saskatoon-pivots-after-federal-funding-for-electric-buses-denied

City of Edmonton's electric bus fleet plagued with issues, over half not in service
https://globalnews.ca/news/10112257/edmontons-electric-bus-fleet-proterra-issues/

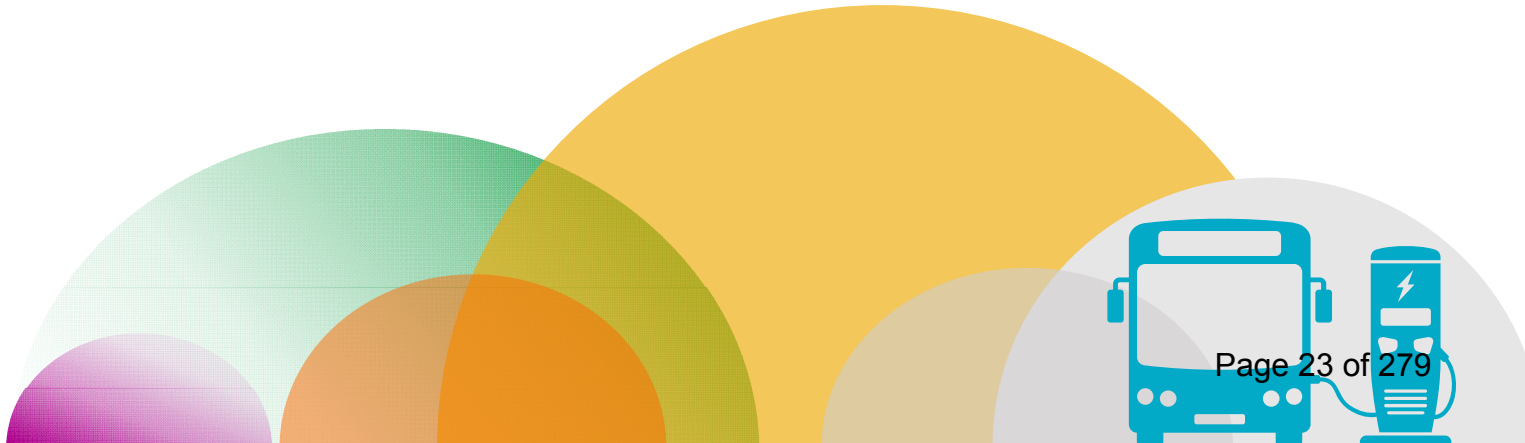
Edmonton's fleet of electric buses failing amid manufacturer's bankruptcy proceedings

https://www.cbc.ca/news/canada/edmonton/edmonton-buses-proterra-1.7035186

TRANSIT FLEET ZERO EMISSION TRANSITION PLAN

CITY OF GREATER SUDBURY

2/6/2025



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EXECUTIVE SUMMARY

The City of Greater Sudbury is committed to reducing energy consumption while fostering a green economy. In response to the Climate Emergency Declaration by the Greater Sudbury City Council in May 2019, the Community Energy and Emission Plan (CEEP) was developed as a long-term strategy aimed at reducing carbon emissions and pollution in Greater Sudbury, with goals of achieving net-zero emissions by 2050.[1]

Transitioning to a zero emission fleet requires more than acquiring new vehicles and fueling systems; it necessitates the integration of new technologies and processes into day-to-day operations. A successful fleet transition plans adopts a comprehensive approach to zero emission mobility, addressing operational requirements, market conditions, infrastructure needs, and associated costs. This Zero Emission Fleet Transition Plan serves as a comprehensive roadmap for GOVA Transit to convert its transit bus fleet to zero emission vehicles by 2035.

This Study utilized energy modelling of battery electric buses (BEBs) using current route data to confirm operational feasibility and develop fleet charging strategies and recommendations for vehicle and charging infrastructure types. The in-depth analysis summarized below provides GOVA Transit with data to guide important decisions involving capital programs and operations necessary to build key partnerships and support transition actions and phases.

This Transition Plan outlines a phased implementation approach that aligns with GOVA's existing fleet replacement schedule and will allow the agency to integrate BEBs into the fleet gradually. GOVA Transit will be able to gain valuable experience with the technology while the market continues to develop and mature. BEBs are impacted by limited range, which can cause difficulties when transitioning as fleet or service modifications may be necessary. As technology advances, batteries will become bigger and lighter, increasing vehicle range and overall availability of a more diverse profile of BEBs. Just as battery and vehicle performance are expected to improve, charging technology and performance are also expected to improve as the technology matures.

Based on today's battery technology, GOVA Transit can electrify a portion of the fleet using depot charging only, but in future years, an expanded fleet or en-route charging would be required to support a full BEB transition. The transition should begin with the installation of the required plug-in depot charging infrastructure and required supporting utility infrastructure at the Greater Sudbury Transit & Fleet Centre located at 1160 Lorne Street. Utility infrastructure should be sized for full buildout to avoid rework and multiple construction phases, but chargers would be installed in phases as the buses are delivered and enter revenue service.

In 2023, GOVA Transit operated a fleet of 59 buses, of which 42 are active operating service and 17 are reserved as spares. GOVA Transit will electrify the fleet in four (4) distinct phases based on fleet and facility requirements, available battery capacity, and potential en-route charging capabilities, shown in the graphic below. During Phase 1, twenty-seven (27) buses will be transitioned to BEBs supported by depot charging only. During Phase 2, nine (9) additional buses will be transitioned to BEBs and en-route charging infrastructure will be installed at the Downtown Hub. During Phase 3, the remaining seven (7) *active* buses will be transitioned to BEBs, and in Phase 4, GOVA Transit will electrify the remaining sixteen (16) *spare* reserve buses to BEBs.

[1] Greater Sudbury Community Energy and Emissions Plan

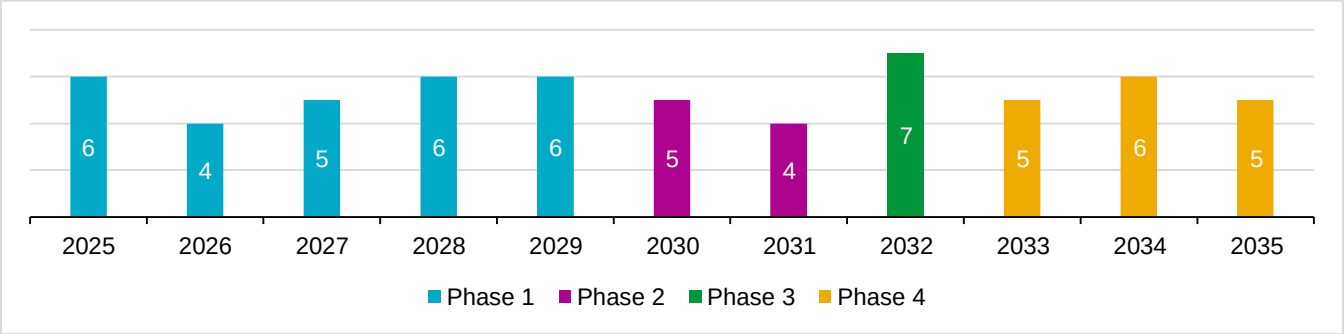


Figure ES-1. Bus Procurement Schedule by Phase, Purchase Year

It is anticipated that a transition of the fleet to BEBs will cost an additional $89.1 million in discounted 2023 dollar terms over the business-as-usual scenario to transition and maintain the fleet and install the necessary charging infrastructure over the 2023-2050 period. The difference in cost is largely due to the capital costs associated with charging infrastructure that otherwise would not be necessary; the next largest contributor to the cost differential is the capital cost premium of purchasing a BEB over a diesel bus. Despite increased capital costs, a significant cost savings is realized on maintenance and fuel expenses, which can help offset the overall net cost to transition the fleet. Operating costs are higher with the BEB fleet due to a higher average number of hours travelled due to bus swaps.

The table below shows the total cost to transition the fleet to BEBs, inclusive of all operating and maintenance expenses and charging infrastructure cost over 2023 to 2050, in discounted 2023 dollar terms. The burdened cost to GOVA Transit could be significantly reduced through available funding streams, such as the Zero Emissions Transit Fund (ZETF), which may provide up to 50% of an applicant's total project capital costs. As the amount and timing of these funds are variable and not guaranteed, they are not included in the analysis.

Table ES-1. Transit Fleet 12-year Lifecycle Cost, Discounted 2023$ millions, 2023-2050

Net Present Value, 2023$	Baseline	BEB	Variance
Bus Purchases	$58.0	$139.3	$81.4
Related Infrastructure	-	$16.8	$16.8
Lifecycle Capital Costs	**$58.0**	**$156.2**	**$98.2**
Operations & Maintenance	$380.1	$388.3	$8.1
Fueling	$51.1	$32.1	-$19.0
Related Infrastructure O&M	-	$1.8	$1.8
Lifecycle O&M	**$431.2**	**$422.1**	**-$9.1**
2023-2050 Total Lifecycle Costs	**$489.2**	**$578.3**	**$89.1**

The lump sum cost per phase for charging infrastructure is shown in the table below, with total costs over the entire 2023-2050 study period include further bus and equipment replacements in later years and are detailed in **Section 7: Financial Planning** and **Appendix C: Budget & Financial Plan**.

Table ES-2. Charging Infrastructure Lump Sum Costing by Phase, 2023$

	Years	Cost	Key Items
Phase 1	2025-2029	$5,217,464	One (1) 2,000 kVA unit substation; (9) 150kW chargers & (27) dispensers
Phase 2	2030-2031	$7,319,188	**Depot:** One (1) 2,000 kVA unit substation; (3) 150kW chargers & (9) dispensers **En-Route:** One (1) 4,000 kVA unit substation; (8) 450 kW pantograph chargers
Phase 3	2032	$1,682,444	(3) 150kW chargers & (9) dispensers
Phase 4	2033-2035	$2,623,969	(5) 150kW chargers & (15) dispensers

Despite increased capital expenses for vehicles and charging infrastructure, as well as increased operating costs attributed to an increase in non-revenue operations to facilitate bus swaps, annual emissions are reduced to achieve CEEP goals.

Over the study period, annual emissions are reduced from approximately 5,600 tonnes of greenhouse gas (GHG) emissions per year to just over 600 tonnes of GHGs per year. Compared to a scenario where the fleet is not transitioned to BEBs, this results in a reduction of approximately 94,300 tonnes of GHGs over the 27-year study period. Residual GHG emissions in the BEB scenario after the fleet is fully transitioned are attributed to the diesel auxiliary heaters installed on the BEBs.

Table ES-3. Total GHG Emissions (CO_2 in Tonnes), Baseline and BEB Scenarios

	2025 Snapshot	2035 Snapshot	2050 Snapshot	Study Period Cumulative Total
Baseline				
Diesel	5,624	5,624	5,624	157,460
BEB	-	-	-	-
Total, Baseline Scenario	**5,624**	**5,624**	**5,624**	**157,460**
BEB Scenario				
Diesel	5,624	1,095	404	59,215
BEB	-	174	203	3,918
Total, BEB Scenario	**5,624**	**1,269**	**607**	**63,133**

1 INTRODUCTION

The City of Greater Sudbury is taking action to reduce energy consumption and greenhouse gas emissions while promoting a green economy. To support this action, the Community Energy and Emissions Plan (CEEP)[2] was developed as a long-term strategy to reduce carbon emissions and pollution in Greater Sudbury. The CEEP was created in response to the Greater Sudbury City Council's Climate Emergency declaration in May 2019, which included a commitment to achieving net-zero emissions by 2050. The goal of achieving a net-zero Greater Sudbury by 2050 will require the combined efforts of many stakeholders in the community, including government, businesses, not-for-profits, and residents.

Greater Sudbury has set 18 sustainability goals to achieve a net-zero Sudbury. These goals outline the actions that the community intends to take to reach net-zero by 2050. Among these goals, four are explicitly focused on low-carbon transportation efforts, and two are explicitly focused on transit; directly impacting GOVA Transit operations. These transportation focused goals include enhancing transit service to increase transit mode share to 25% by 2050, achieving 35% active mobility transportation mode share by 2050, electrifying 100% of the GOVA Transit and Sudbury City fleet by 2035, and ensuring that 100% of new vehicle sales are electric by 2030.

[2] Greater Sudbury Community Energy and Emissions Plan

2 TRANSIT FLEET ZERO EMISSION TRANSITION PLAN

The transition from conventional diesel buses to battery electric buses (BEBs) is a significant undertaking that requires robust planning. The Zero Emission Transit Fund (ZETF) has been established by Housing, Infrastructure, and Communities Canada to support organizations in transitioning their vehicle fleets.[3] In addition to funding planning projects, it has a capital stream that provides opportunities for transit agencies to receive funding for capital projects. To apply for capital funding there are five specific planning elements that applicants must satisfy, and this Fleet Transition Plan has been developed to address those elements:

1. **System Level Planning:** Description of system-level planning undertaken for the project, such as analysis of zero emission bus (ZEB) technologies, energy consumption analysis, and identification of charging/refueling and facility requirements.
2. **Operational Planning & Deployment Strategy:** Outlines a fleet and infrastructure implementation plan that supports innovative and effective ZEB deployments and future operations. This strategy is informed by optimal route selection, service design, and procurement needs.
3. **Financial Planning:** Provides preliminary capital and operating cost estimates, including the anticipated lifecycle cost savings encompassing fuel and maintenance cost savings.
4. **Capacity to Implement the Technology:** Assesses the organization's current resources, skills and training required for the deployment and operation of a new ZEB fleet. It also provides an assessment of potential technological, operational, and system-wide risks associated with the transition and a risk management plan that details mitigation strategies.
5. **Environmental Benefits:** Includes a lifecycle assessment of environmental benefits associated with the transition, including estimates of greenhouse gas (GHG) emissions reduction, noise reduction, and non-GHG pollutant reduction.

This Transit Fleet Zero Emission Transition Plan (Fleet Transition Plan) addresses each of these topics in the following report and the accompanying appendices.

[3] Infrastructure Canada - Zero Emission Transit Fund Applicant Guide

3 SYSTEM LEVEL PLANNING

The foundation of this Fleet Transition Plan begins with the approach to system-level planning. An analysis of BEB technologies was performed to further understand BEB and fueling options on the market for GOVA Transit to consider. An energy consumption analysis was developed for GOVA Transit to create an accurate energy profile, which further works to identify charging, refueling and facility requirements specific to the agency's needs.

3.1 BATTERY ELECTRIC BUSES & CHARGING OPTIONS

BEBs are currently the most popular zero emission bus because they utilize the electric grid as a source of fuel, which is universally available and relatively "easy" to connect to for drawing the required power. One shortfall of BEBs are their limited range compared to conventional diesel buses; for agencies with longer range requirements, BEBs may not be capable of directly replacing conventional diesel buses assigned to long duty cycles at a 1-to-1 replacement ratio. In some cases, it's not possible to adjust the service profile of these longer blocks to accommodate the range capabilities of today's available BEBs. For extended range requirements, either additional vehicles become necessary or en-route charging would be required at layover points along current routes.

En-route charging is an enhancement that can greatly improve the feasibility of BEBs in many situations; it can extend the range of a BEB and facilitate one-to-one replacement of diesel vehicles when routes are conducive to this charging strategy. This is particularly helpful with circular routes where the same en-route charger can be used by a vehicle multiple times throughout the day. En-route charging infrastructure is ideally located at places such as transit centers where buses operating on multiple routes all have scheduled layover time.

3.2 ENERGY CONSUMPTION ANALYSIS

Understanding energy consumption is a key component of fleet transition planning, as it informs the choice of vehicle technology, infrastructure requirements, finances, and fleet replacement strategies. The following sections outline the methodology and key findings.

3.2.1 METHODOLOGY

GOVA Transit's contracted zero emissions consultant, HDR, Inc., provided a comprehensive understanding of the potential impacts BEB technology may have on GOVA Transit's existing service using a proprietary energy consumption model, Zero+. **Figure 1** shows the Zero+ Model inputs, outputs, and process.

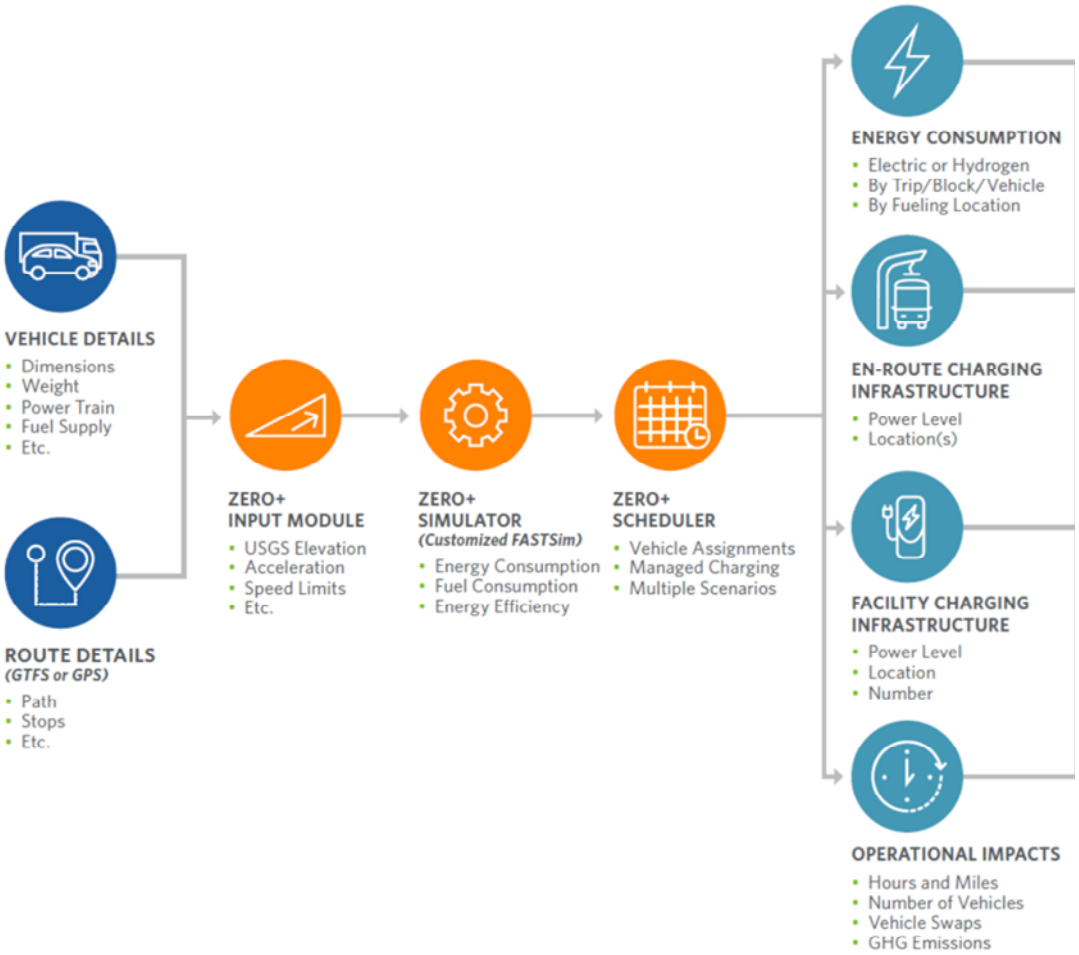


Figure 1. Zero+ Inputs, Outputs, and Modelling Process

Energy consumption is impacted by several factors including slope and grade of the bus routes, number of vehicle stops, anticipated roadway traffic, and ambient temperature. The Zero+ model also analyzes variables known to impact lifetime vehicle performance, like energy density, battery degradation, operating environment, HVAC and auxiliary power loads, as well as the lifecycle of bus batteries. The model is fed by General Transit Feed Specification (GTFS) data, GIS data, and vehicle profile assumptions to create an accurate energy consumption profile unique to GOVA Transit's existing service. Zero+ results include many data variables, yielding the most accurate results possible to influence strong and effective decision making.

The Zero+ model results, combined with discussions with GOVA staff, provide the basis upon which the preferred vehicle technology and refueling strategy will be determined. This modelling evaluated the optimal charging strategy, which nameplate battery capacity and auxiliary heater type is optimal and identifies potential strategies that best complement GOVA Transit's service and fleet plans. Simulations were performed at a granular level so as to inform individual vehicles, routes, and blocks as well as the full GOVA Transit fleet. Examining each vehicle individually drives decisions for the right technology at the system, depot, route, and block levels. This analysis balanced impacts to operations, overall fleet size, and infrastructure requirements, ultimately providing GOVA Transit with the information to support a data-driven determination of the preferred BEB transitional technologies and deployment pace.

3.2.2 MODELLED SCENARIOS

The energy consumption modelling effort included the analysis of five scenarios. Each scenario assumes vehicles are equipped with diesel auxiliary heaters with either a 525 kWh battery or 675 kWh battery used for vehicle propulsion. Electric heaters deplete the battery much faster in the winter, severely reducing the usable range of a vehicle. Given the relative infeasibility of electric heating in northern climates, it is almost always most feasible to install diesel auxiliary heaters on BEBs.

Different battery capacities were modelled to determine if a vehicle with a greater battery capacity would significantly improve the feasibility of a transition to BEBs.

- Baseline (Diesel)
- Full BEB Fleet (525 kWh) with Depot Charging Only
- Full BEB Fleet (675 kWh) with Depot Charging Only
- Full BEB Fleet (525 kWh) with Depot and En-Route Charging
- Full BEB Fleet (675 kWh) with Depot and En-Route Charging

Based on the evaluation and collection of data described above, a baseline diesel scenario was simulated using Fall 2023 GOVA service to validate both the data provided and the functionality of the model, by comparing simulation results to observed GOVA existing diesel operations. This validation provides confidence that the simulations of BEB scenarios are not missing critical data points that influence the transition.

Depot charging only was modelled first to establish a baseline feasibility. This scenario allows the Zero+ Model to identify which existing service blocks can be electrified without an increase in peak vehicle requirements, the need for en-route charging, or the need for schedule modifications, to achieve the same level of service. In the depot charging only scenario, the model indicates how many additional vehicles would be required to maintain the same level of service, without the use of en-route charging.

The model also included the analysis of a scenario where GOVA Transit implements a combination of depot and en-route charging. Layover times in the existing schedule were used to identify the most ideal locations for en-route chargers, with three existing transit centers identified as having a significant amount of layover time available for charging.

3.2.3 KEY TAKEAWAYS

In the depot charging only scenarios, approximately half of the fleet (27 of 59 buses) can be transitioned to BEBs at a 1-to-1 replacement ratio before an increase in active fleet size or the installation of en-route charging would be required.

Ultimately, based on modelling results, the recommendation is that GOVA Transit's transition scenario is toward a full fleet of 675 kWh buses, supported by depot charging and en-route charging at the GOVA Transit Downtown Hub. The detailed results of the route modelling analysis for the baseline, depot charging only, and en-route charging scenarios, can be found in **Appendix A: Energy Modelling Analysis.**

4 OPERATIONAL PLANNING & DEPLOYMENT

The following sections highlight critical fleet and infrastructure implementation needs, including actions that will be taken to effectively deploy BEBs and ensure efficient future operations. The fleet deployment plan highlights each phase of the plan, offering a purchase schedule and insight into the phased deployment effort. The facility and infrastructure plan for the depot facility is also provided, covering existing conditions and facility infrastructure implementation. The feasibility of en-route charging is also considered, with potential locations that may be beneficial for GOVA Transit to assess in the future.

4.1 FLEET DEPLOYMENT PLAN

GOVA Transit does not currently operate any BEBs. To achieve goals of the CEEP, diesel buses that have reached the end of their life cycle will be considered for replacement with BEBs beginning in 2025. The fleet will be electrified in phases based on the facilities necessary to maintain existing service levels, number of vehicles, available vehicle battery capacity, and potential en-route charging capabilities. The vehicle battery capacity of each bus remains constant at 675 kWh across all phases, with plug-in depot charger capacity to be 150 kW, with three dispensers each. **Table 1** depicts recommended BEBs purchased during each phase, while **Figure 2** shows the transition phases in graphic form.

Phase 1: BEBs purchased will be one-to-one replacements with 675 kWh buses; vehicle charging will be supported by plug-in chargers at the depot that are powered by a 2,000 kVA unit substation to be installed in 2025.

Phase 2: BEBs purchased will be one-to-one replacements with 675 kWh buses; vehicle charging will be supported by plug-in chargers at the depot and en-route charging infrastructure that would be installed at the Downtown Hub. All en-route charging infrastructure will be installed in 2030. Additional depot chargers will be powered by a second 2,000 kVA unit substation, to be installed in 2030.

Phase 3: BEBs purchased will be 675 kWh buses; vehicle charging will be supported by plug-in chargers at the depot and existing en-route charging infrastructure at the Downtown Hub. Depot chargers will be powered by the existing substation referred to in Phase 2. At the conclusion of Phase 3, the active fleet will be 100% BEB.

Phase 4: BEBs purchased will be 675 kWh buses; vehicle charging will be supported by plug-in chargers at the depot and existing en-route charging infrastructure at the Downtown location. At the conclusion of this phase, the full fleet (active + spares) will be 100% BEB.

Table 1 below shows the number of BEBs purchased in each phase of the transition alongside the cumulative BEB fleet count and the years each phase spans. The BEB purchase schedule and fleet composition are further broken down by year in **Figure 2** and **Figure 3**, respectively. This phased deployment plan allows GOVA Transit to procure a 100% BEB fleet by 2035.

Table 1. Phased Fleet Deployment Plan

Phase	Purchased BEBs	Cumulative BEBs	Purchase Year(s)
Phase 1	27	27	2025 – 2029
Phase 2	9	36	2030 – 2031
Phase 3	7	43	2032
Phase 4	16	59	2033 – 2035

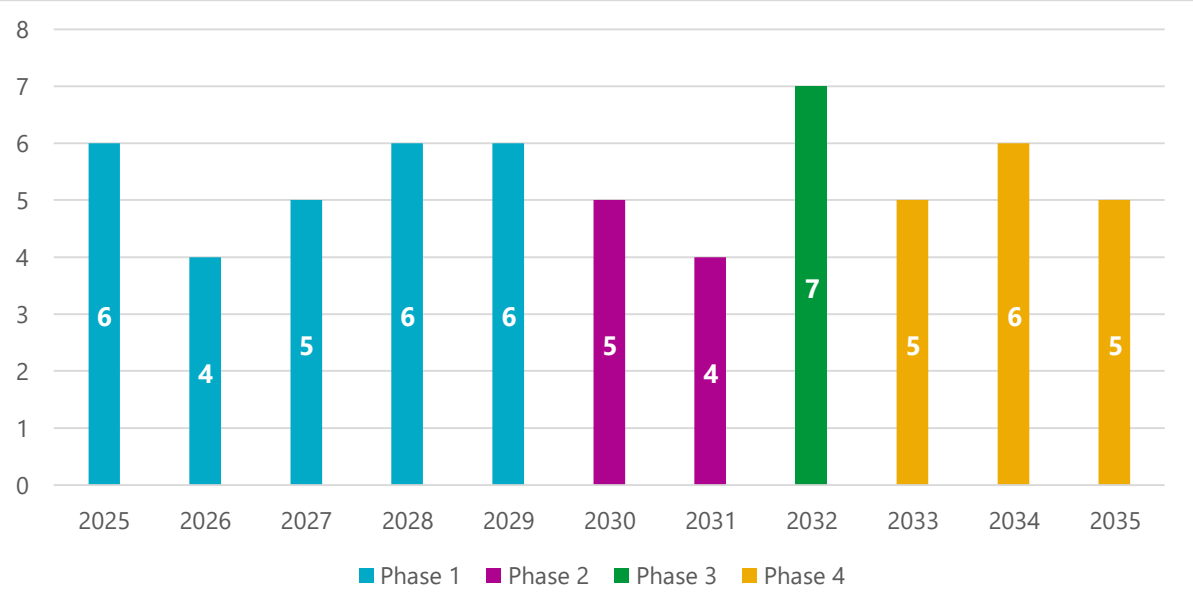


Figure 2. BEB Fleet Procurement Schedule (2025 - 2035)

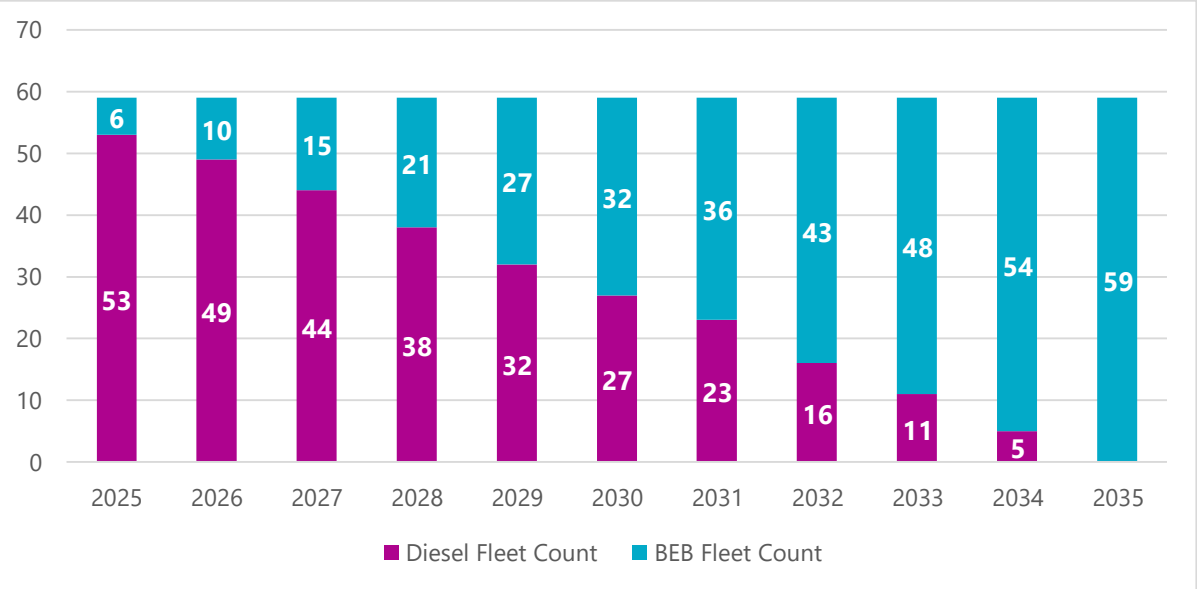


Figure 3. Fleet Composition (2025 - 2035)

Figure 4 shows the charger installation per year to match bus procurement as well as the installation of unit substations, shown in lighter shades, in 2025 and 2030 at the depot facility. GOVA Transit will consolidate charger installation prior to receiving buses and plans to install adequate capacity for growth during each phase. For example, the unit substation installed in 2025 would be adequate to support all nine Phase 1 chargers and conduit would be planned and designed to avoid major modifications and equipment downtime when constructing subsequent phases.

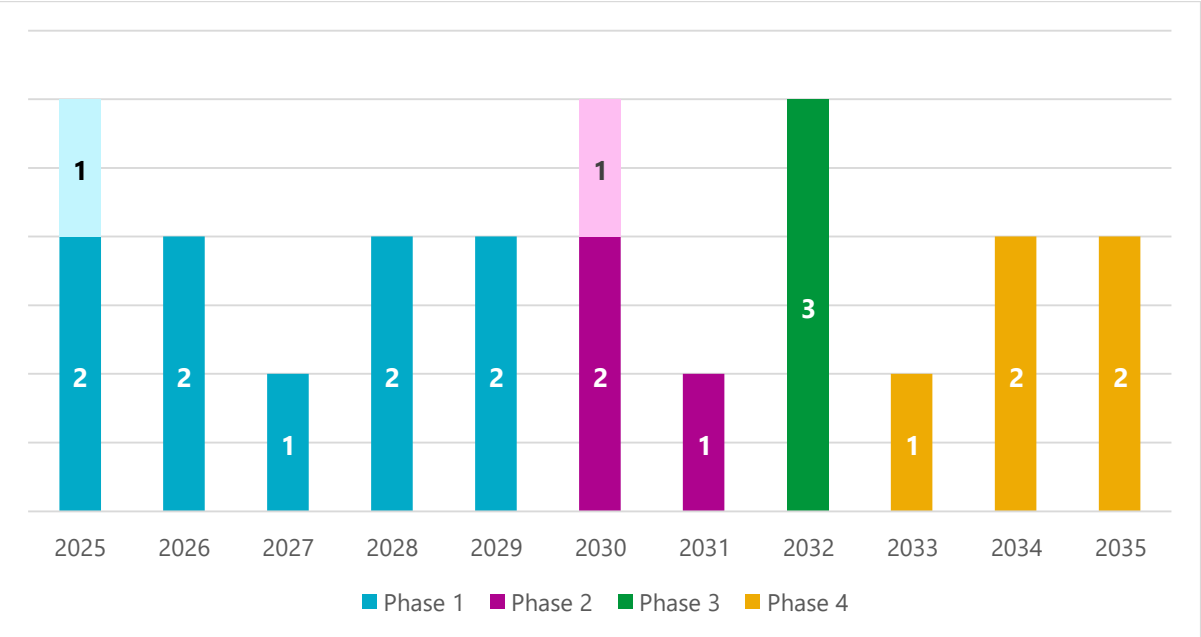


Figure 4. Phased Depot Charging Infrastructure Implementation (2025 - 2035)

4.1.1 FUTURE SERVICE CRITERIA

GOVA Transit will begin by electrifying the fleet and operate service without increasing the fleet size in Phases 1 and 2, adding en-route charging infrastructure at the Downtown Transit Hub in Phase 2. In Phases 3 and 4, GOVA will continue to electrify the fleet at a greater than one-to-one replacement ratio; this will include electrification of routes that do not layover at the Downtown Transit Hub and can't utilize en-route charging at this location. In September 2024, GOVA Transit expanded service and may further expand in the future. Because the nature of the service was unknown, the exact vehicle requirement to support this new, expanded service could not be predicted. **Table 2** outlines the feasibility criteria for expanded service; the feasible distance for a one-to-one conversion is the maximum duty cycle, or block, distance a 675 kWh BEB can complete without the need for bus swaps or en-route charging.

Table 2. Expanded Service Feasibility Criteria

	Easiest Route	Average Route	Hardest Route
Average Vehicle Efficiency	1.23 kWh/km	1.52 kWh/km	1.82 kWh/km
Feasible Distance for 1:1 Conversion	Up to 307 km	Up to 248 km	Up to 207 km

In the table above, "easiest" refers to the most energy efficient route (i.e., least number of stops, flattest terrain, etc.), while "hardest" refers to the least energy efficient route (i.e., many stops, difficult/steeper terrain, etc.). If expanded service exceeds 307 km, either en-route charging or additional vehicles to facilitate bus swaps would be required. In a scenario where extended service does not layover at a location with en-route charging, the duty cycle could be as long at 614 km at best and 414 km at worst with only one bus swap required.

4.1.2 SOFTWARE SYSTEMS

Introducing BEBs into GOVA Transit's fleet will increase the number and types of systems the agency will need to monitor, such as dynamic vehicle scheduling, vehicle battery health, charger health and energy management. There are several software packages available for transit agencies to monitor vehicles and chargers, both live and retroactively. Some may be available from OEMs, and others are third party software packages that would be acquired separate from vehicle or charger procurements.

- **Vehicle Monitoring Systems –** This software will provide constant monitoring and logging of all vehicle data transmitted by BEBs. This information will be critical to quickly identify mechanical component or hardware failures and expedite maintenance repairs. Some OEMs offer this software as part of the rolling stock procurement, but other third-party vendors may be preferred as they are typically manufacturer agnostic which allows the agency to view all vehicles in the same interface regardless of bus manufacturer. GOVA Transit's vehicle monitoring interface will include vehicle telematics information including energy consumption, battery state of charge, and vehicle propulsion efficiency that can all be used to evaluate vehicle performance for future procurements.

- **Charging and Energy Management Systems –** This software will be utilized to schedule and manage charge sessions between different vehicles which may provide a significant operational cost savings through demand peak shaving. This optimizes costs where utility rates are priced in a time of use utility rate structure. Some providers offer options with additional functionality like management of other energy resources like battery energy storage and solar generation, which GOVA transit will explore.

- **Digital Yard Management Systems –** This software will help staff know which buses are ready or not ready for service. Tools are now available that allow staff to know the real time location and status of vehicles in

the yard. Some solutions can also help by providing parking information for the vehicle depending on the status and state of charge (SOC) of the vehicle. For example, a digital sign at the entrance of the facility can let drivers know, based on vehicle information, to park vehicles in designated areas, whether they are scheduled for maintenance, or have a high SOC or low SOC. This tool will also be shared with operations to let them know where vehicles are parked in the yard, whether a given vehicle is ready for service and/or if a substitution needs to be made.

- **Scheduling Software –** This software can be particularly helpful with BEB fleets to ensure vehicles assigned to routes are fully charged by the time they are due to pull out of the garage for revenue service. In many cases, this software can be tied into charge management and digital yard management system interfaces so that dispatchers can see the current vehicle state of charge when assigning vehicles to service blocks. In some cases, this can also provide an operational safeguard if a dispatcher attempts to assign a BEB to a block that exceeds the vehicle's capable range, reducing the probability of needing to do in-service bus swaps.

4.2 FACILITY AND INFRASTRUCTURE PLAN

This section discusses the three locations, or types of locations, GOVA Transit will implement or explore implementing BEB charging infrastructure. The Greater Sudbury Transit and Fleet Centre will be used for depot charging; the GOVA Transit Downtown Hub will be used for en-route charging; and future mobility hub locations will be considered for alternative or additional en-route charging.

4.2.1 GREATER SUDBURY TRANSIT & FLEET CENTRE

GOVA Transit's primary facility is located at 1160 Lorne Street in the City of Greater Sudbury. This facility has multiple maintenance bays and indoor parking for all 59 fixed route 40-foot diesel transit buses; a number of non-revenue and municipal vehicles are also maintained and housed here. The garage currently has two existing Level 2 chargers, located near the bus wash, that are powered by the existing building utility infrastructure for use by non-revenue transit BEVs.

All transit buses will be charged overnight using Direct-Current Fast Chargers (DCFCs), and transit non-revenue vehicles will likely be charged by a mix of Level 2 chargers and DCFCs. Though the implementation of BEBs and charging infrastructure will be phased, it is important that charger placement is designed for a full buildout to limit interruptions to service when installing additional chargers in future phases. **Figure 5** shows a conceptual charger layout to illustrate what an electrified garage could look like when factoring in space requirements for different functions in alignment with planned phasing.

The vehicles will use the existing parking arrangement with remote charging dispensers installed in vehicle storage while the power cabinets will be located in a room to the south of the building. Placing the chargers indoors will provide easier maintenance and longer life than if they were exposed to harsh outdoor winter conditions. All chargers are assumed to be 150 kW DCFCs with three dispensers each, capable of charging three buses simultaneously at 50 kW per bus.

Phase 1 primarily accommodates twenty-seven (27) BEBs capable of daily service using depot charging only (27 total). During Phase 2, nine (9) additional buses will be converted to coincide with the downtown en-route charging facility (36 total). Phase 3 will include seven (7) additional BEBs to complete conversion of the active fleet (43 total), and Phase 4 will include the conversion of the sixteen (16) spare vehicles (59 total). Because the indoor parking

space is maxed out, the property would not allow for any additional expansion beyond the Phase 4 service without facility modifications or purchase of additional property.

Figure 5. Greater Sudbury Transit & Fleet Centre Conceptual Site Plan

4.2.1.1 Depot Charging Considerations

GOVA Transit will avoid ground mounting of the dispensers where possible due to space constraints. Aligning with indoor bus storage, dispensers could either be ceiling mounted pantographs or retractable cable reels for plug-in charging; based on cost and ease of implementation, GOVA Transit plans to utilize retractable cable reels. With the current facility plan, the charging modules are located indoors and are designated to specific areas. GOVA Transit will ensure that the chargers meet code requirements and fit within the existing space, and placement and selection of dispenser type is subject to a detailed design and structural analysis.

4.2.2 FUTURE EN-ROUTE CHARGING LOCATIONS

In Phase 1, GOVA Transit will begin electrifying the fleet with depot charging only. Buses will be assigned where they can be replaced at a one-to-one replacement ratio, without the need for extra vehicles or en-route charging, to maintain existing levels of service. In Phase 2, en-route charging infrastructure becomes necessary to maintain the same level of service as current operations without a significant increase to the overall fleet size.

En-route charging is typically installed at terminus locations (hubs) where vehicles layover between runs and already have time built into the schedule to charge. Transit stops are often located at public streets or on properties that are owned by third parties. GOVA Transit is committed to finding appropriate locations for en-route charging and will seek to locate en-route charging where the agency already owns property or where property owners are amenable to the installation of en-route chargers.

Through this study, GOVA Transit evaluated the potential benefits of installing en-route chargers at the Downtown Transit Hub. This location is ideal because of the scheduled layover times and the number of routes that share the same layover point, but other alternative sites may provide the same benefits in place of or in addition to the Downtown Transit Hub. As part of GOVA Transit's ongoing Mobility Hubs Study, additional suitable sites may be identified, although further modelling analysis would be needed to determine exact requirements and feasibility.

4.2.2.1 GOVA Transit Downtown Hub

The existing GOVA Transit Downtown Hub has been identified as the primary location for en-route charging; this location is ideal because 17 fixed routes layover here. Located at 9 Elm Street, buses enter the Transit Hub and park at gates in a sawtooth pattern depending on route assignment as shown in **Figure 6**.

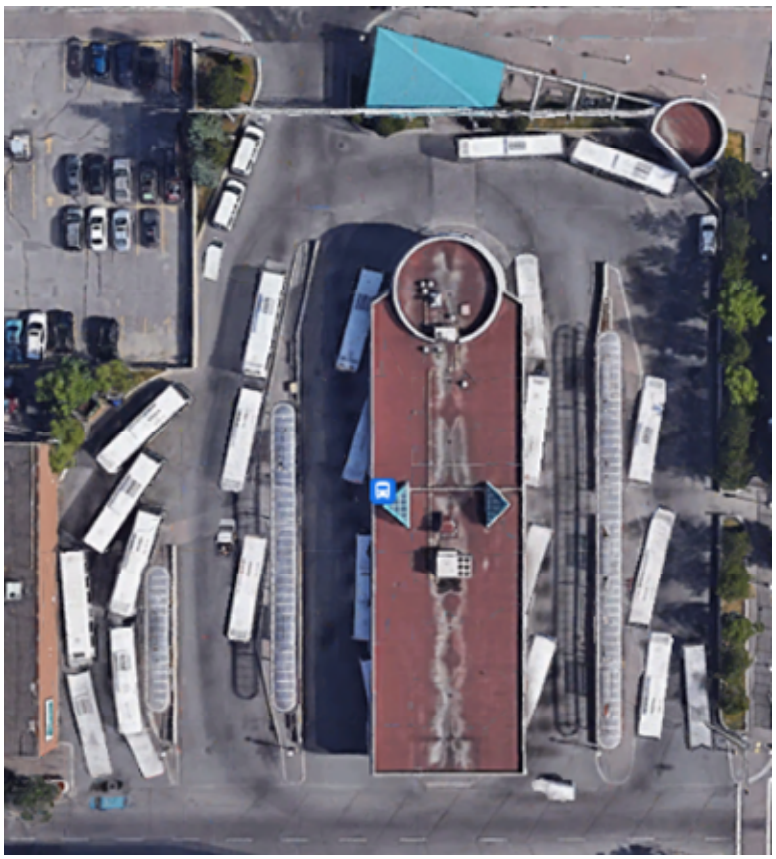


Figure 6. GOVA Transit Downtown Hub Aerial View

Figure 7 and **Figure 8** illustrate two potential charger layouts to accommodate the 8 pantograph chargers that would be required at this location to support en-route charging of the entire fleet.

Conceptual charging infrastructure layouts for the GOVA Transit Downtown Hub have not been confirmed or refined through a site assessment; GOVA Transit will coordinate with the electric utility to determine appropriate placement of the infrastructure. If the utility is not able to bring power to this location to support charging, or if chargers cannot be installed without interfering with existing traffic flow, alternate locations for en-route charging infrastructure will be evaluated. This may also create a need for service modifications to accommodate the required layover times for vehicles at the alternate en-route charging location(s) chosen.

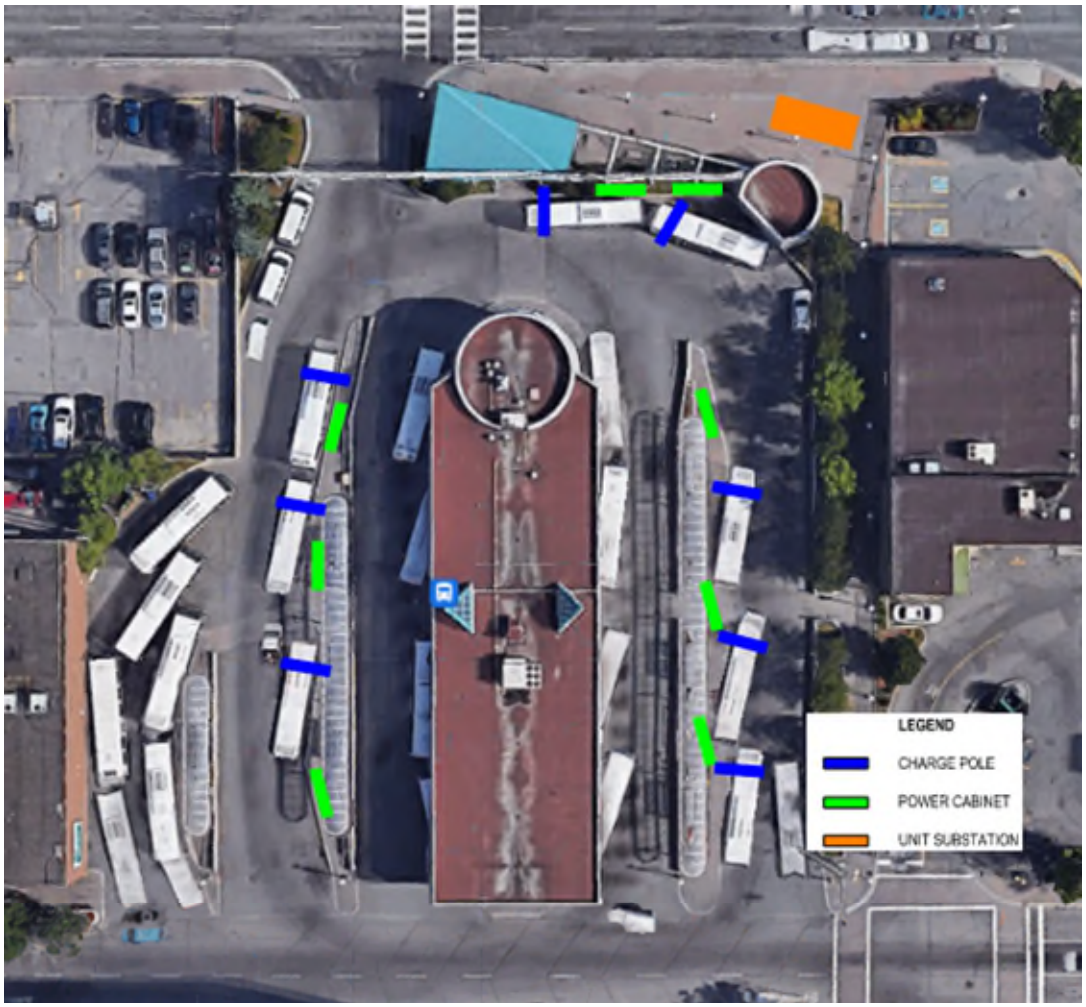


Figure 7. GOVA Transit Downtown Hub Conceptual Charger Layout Option 1

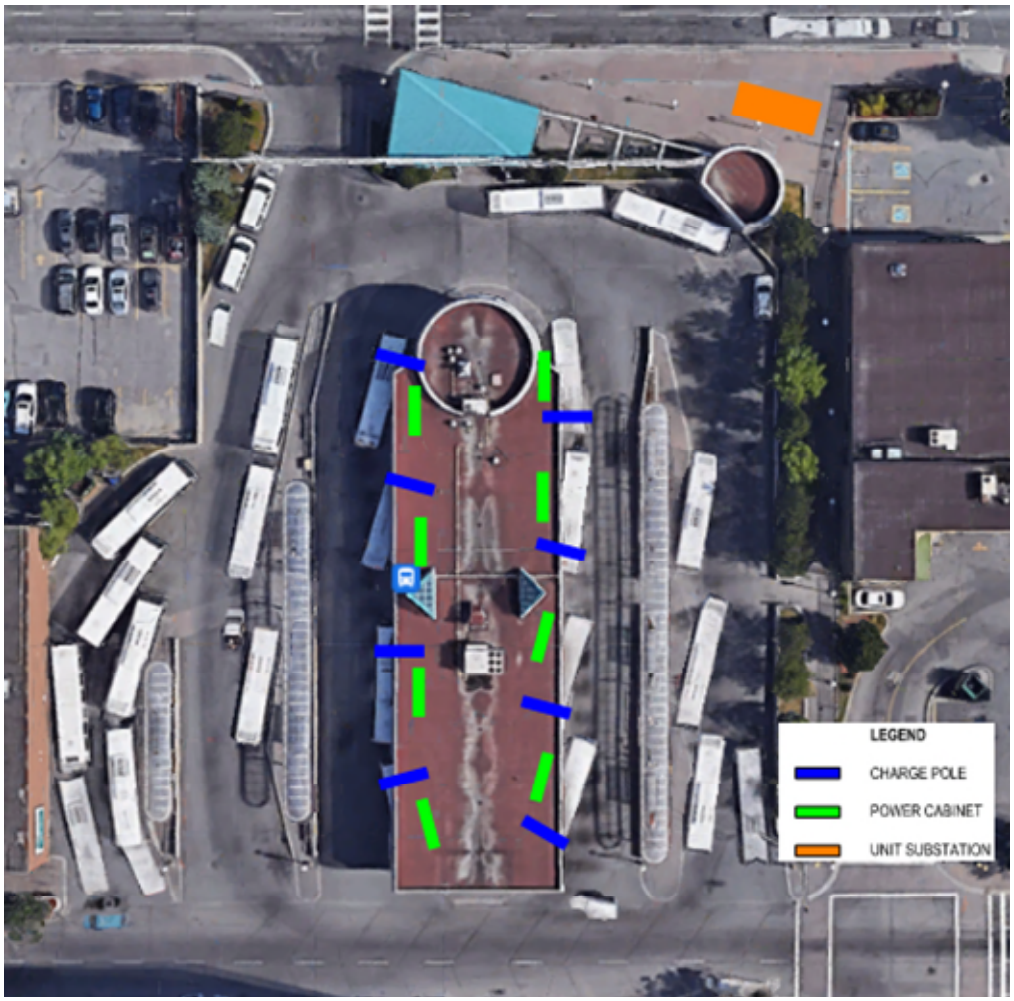


Figure 8. GOVA Transit Downtown Hub Conceptual Charger Layout Option 2

4.2.2.2 Future Mobility Hubs

The City of Greater Sudbury will evaluate en-route charging at Mobility Hubs in the future based on operational need and financial feasibility. This evaluation may include the existing Mobility Hubs included in this study, or future Mobility Hubs being evaluated as part of an ongoing, parallel study. Future expansion of the transit system may require additional infrastructure.

5 CAPACITY TO IMPLEMENT THE TECHNOLOGY

In this section of the plan, GOVA Transit's current resources, skills and training required for the deployment and operation of a new BEB fleet are evaluated to develop a staffing and training plan which will meet the agency's needs. An assessment of potential technological, operational, and system-wide risks associated with the transition and a risk management plan that details mitigation strategies is also provided.

5.1 STAFFING & TRAINING PLAN

With the introduction of battery electric technology to GOVA Transit's fleet, proper training on bus systems and subcomponents unique to BEBs is critical to ensure safe, efficient operation and maintenance of the transitioned fleet. GOVA Transit will work with internal and external training programs while in close coordination with OEMs and neighboring transit agencies to acclimate the existing workforce to the new technology, avoiding any displacement of the existing workforce.

This section will address the necessary steps to evaluate the skills of the existing workforce, identify skill gaps on an individual basis, and develop a plan to build and implement an effective training program for bus operators and bus maintenance personnel. In addition to the further development of the existing workforce, this chapter describes a workforce growth strategy for attracting new employees, retaining new and current employees, and funding opportunities to sponsor the required growth.

5.1.1 SAFE WORKPLACE LEGISLATION AND STANDARDS

In Ontario, employers have a legal obligation through the Occupational Health and Safety Act, R.S.O. 1990 (OHSA) to develop and implement a workplace safety program that ensures the health and safety of their workers. This includes a written policy, hazard identification and control, worker training, worker involvement in program development, procedures for accidents and illness, and regular review and updates. Failure to comply with OHSA can result in harm to workers and penalties for the employer.

The Canadian Standards Association (CSA) developed CSA Z462:21, an electrical safety standard for Canadian workplaces to prevent electrical injuries and fatalities. It provides guidelines and requirements for identifying and assessing electrical hazards, selecting and using personal protective equipment (PPE), establishing safe work procedures, and training workers. CSA Z462:21 is updated periodically to reflect changes in technology, regulations, and best practices. The standard is widely adopted in Canada by a variety of industries where electrical hazards exist, including manufacturing, construction, and utilities.

CSA Z462:21 is largely based on its American counterpart, developed by the National Fire Protection Association (NFPA), called NFPA 70E. Both standards are focused on fixed electrical infrastructure (such as charging infrastructure) and do not directly address "mobile" high-voltage systems, such as the battery drivetrains in battery electric vehicles. Transit agencies are identifying principles from these standards to apply to battery electric workplaces, and it is possible that updated versions of the standards will include consideration of battery electric vehicles.

5.1.1.1 Personal Protective Equipment (PPE)

Personal Protective Equipment (PPE) is designed to protect users from health and safety hazards. It should be considered the last line of defense against hazards and not a preventative measure to stop accidents from occurring. PPE must be implemented when elimination, substitution, engineering and administrative controls fail to reduce or

remove hazards.[4] Canadian and Ontarian law requires employers to provide PPE and employees to wear said PPE to maintain safe working conditions. The following policies and standards related to PPE are applicable:

Canada Labour Code (R.S.C., 1995, c. L-2)

- Section 122.2 states that "Preventive measures should consist first of the elimination of hazards, then the reduction of hazards and finally, the provision of personal protective equipment, clothing, devices, or materials, all with the goal of ensuring the health and safety of the employees."
- Section 125 (l) requires the employer to provide the prescribed safety materials, equipment, devices, and clothing and Section 126 (1) requires employees to use safety materials, equipment, devices, and clothing intended for their protection.

Occupational Health and Safety Act, R. S. O. 1990

- Section 25 of the Act outlines the duties of the employer requiring them to provide equipment, materials and protective devices in good condition ensuring safety measures and procedures are enforced in the workplace.
- Section 27 of the Act outlines the duties of the supervisor to ensure that protective devices, measures and procedures are conducted and that they wear equipment, protective devices or clothing required by the employer.
- Section 28 outlines the duties of the worker to work within the provisions of the Act and use or wear equipment, protective devices or clothing required by the employer.

Battery electric buses are classified as high voltage systems, and as such, require specialized tools and PPE that may not be necessary when working on the typical 12/24 V systems found in diesel buses. Examples of additional PPE that may be required for working on high voltage systems are offered by the International Transportation Learning Center (ITLC). The ITLC[5] provides a list of typical tools and PPE that are needed to work on BEBs, shown in **Table 3** and **Table 4**.

Table 3. Recommended Insulated Tools

Tool	Recommended Quantity
CAT III rated digital multimeter(s) (rated up to 1000 VDC)	1 for each BEB technician
Insulated hand tools that follow ASTM F1505-01 and IEC 900 standards and compliance with OSHA 1910.333 (c)(2) and NFPA 70E standards (as recommended by the OEM)	1 set for each BEB technician that could be working on a BEB at any given time

[4] https://www.ccohs.ca/oshanswers/hsprograms/hazard/hierarchy_controls.pdf
[5] ITLC_ZEB_Report_Final_2-11-2022.pdf (transportcenter.org)

Table 4. Recommended PPE for BEB Maintenance

Tool	Recommended Quantity	Notes
ASTM Class 0 insulated gloves with red label	1 pair, properly sized for each technician	Insulated gloves need to be tested and replaced at specified intervals.
Leather gloves to be worn over ASTM insulated gloves	1 pair, properly sized for each technician	
Insulated EH Rated Safety Shoes	1 pair, properly sized for each technician	
NRR 33 rated ear plugs	Ample supply for each technician that could be working on a BEB at any given time	
NRR 331 rated (overhead) earmuffs	Ample supply for each technician that could be working on a BEB at any given time	Combining NRR 33 rated ear plugs with NRR 31 ear muffs can provide a NRR protection level of 36.
Arc flash suits	Ample supply for each technician that could be working on a BEB at any given time	
Combination arc flash shield and hardhat	Ample supply for each technician that could be working on a BEB at any given time	
Arc flash hoods	Ample supply for each BEB technician that could be working on a BEB at any given time	Arc flash shield, hardhat and hood may be procured as one integrated item depending on manufacturer and agency preference.
Insulated electrical rescue hook(s) (Sheppard's Hook) sized for use on BEBs	1 set for each BEB technician that could be working on a BEB at any given time (certain HV operations require a second worker to be available to extricate primary worker in an emergency)	

5.1.2 EXISTING TRAINING PROGRAMS

GOVA Transit currently has two in-house driving instructors and provides a 3-week Driver Certification Program (DCP) which consists of in-class and 36 hours of in-vehicle instruction. The DCP provides bus operators with commercial licensing (B, C, D, and Z) as needed. GOVA Transit also provides Corporate Health & Safety Training consisting of customer service, Accessibility for Ontarians with Disabilities Act, and health and safety topics. GOVA Transit does not currently have in-house maintenance training programs and instead contracts with an outside maintenance training provider.

In early 2021, The Ontario Public Transportation Authority (OPTA) recommended the establishment of a Zero Emission Bus (ZEB) Committee to allow members to learn from one another as revenue and non-revenue fleets are transitioned to zero emission technology. The OPTA ZEB Committee's mandate is to establish and maintain a forum for OPTA members to develop and share best practices, lessons learned, standard documentation, and key metrics for the implementation of zero emission vehicle technology. This forum is defined by three Workstreams:

- WS1 - Operations and Maintenance Work Plan
  - WS1A – ZEB Planning, Scheduling, and Operations

  - WS1B – ZEB Safety, Training, and Maintenance
  - WS1C – ZEB Performance, Monitoring, and Reporting
- WS2 - Engineering Work Plan
  - WS2A – ZEB Light & Heavy Duty Vehicle Requirements
  - WS2B – ZEB Infrastructure Requirements
  - WS2C – NA Technical Working Group
- WS3 - Procurement and Vendor Engagement Work Plan
  - WS3A – Engage Vendor Community
  - WS3B – Commercial Bus Management
  - WS3C – Paratransit EV Commercial Management
  - WS3D – Non-Revenue Vehicle Commercial Management

5.1.3 TRAINING CURRICULUM

BEBs contain high voltage batteries, requiring all maintenance technicians to be certified to work on high voltage (HV) systems. GOVA Transit is aware of the development of zero emission bus maintenance training curriculum by the OPTA ZEB Committee in conjunction with other transit agencies in Ontario and anticipates implementing these training resources for GOVA Transit staff when they are available. The OPTA ZEB Committee's training curriculum development program aims to establish and maintain safe work conditions for bus operations and maintenance personnel serving Ontario's fleet of BEBs.

5.1.3.1 Training Progression

Training for maintenance and repair work on ZEBs should focus first on electric/electronic principles, then progress to general ZEB familiarization, and finally end with OEM-specific trainings relevant to ZEB models within an agency's fleet. **Figure 9** from the ITLC illustrates this recommended training progression.

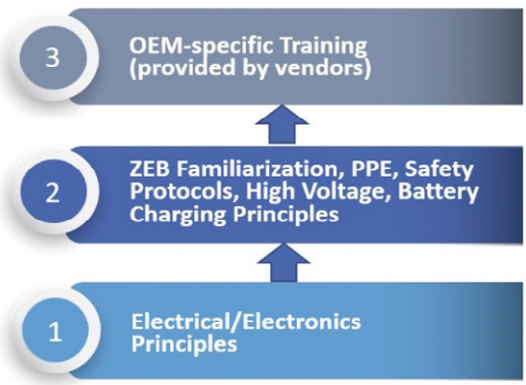


Figure 9. Recommended ZEM Training Progression for Vehicle Maintenance and Repair Staff

5.1.3.2 OPTA Workstream Training Curriculum

The Ontario Public Transit Association (OPTA) is currently working with several Ontario public transit agencies on a peer resources initiative to develop shared curriculum to reduce cost and create uniformity in the training mechanics receive across the province. GOVA Transit intends to review opportunities to participate in the OPTA Workstream Training Curriculum.

5.1.3.3 OEM Training Curriculum

The City of Greater Sudbury currently contracts with an external maintenance training provider. GOVA Transit will look for opportunities to purchase additional OEM training modules with the addition of BEBs to its fleet. As a part of the initial OEM training, GOVA Transit's selected BEB OEM can be anticipated to provide training modules such as Operator Orientation, Maintenance Mechanic Training, and Towing and Emergency Responder Training.

5.1.4 SKILLS ASSESSMENT, CATEGORIZATION, AND GAP IDENTIFICATION

This section outlines workplace hierarchy, authorized responsibilities based on qualifications, skill level requirements, and training guidelines. Operational staff can be grouped into the following four categories:

- **Operations Support**: Staff in this category would include those who are critical to bus operations but do not directly interact with the buses.
- **Bus Operations**: Staff in this category would include operational staff who directly interact with the buses but do not perform any vehicle maintenance.
- **Bus Maintenance Support**: Staff in this category include operational staff who directly interact with the buses and are responsible for the assignment and oversight of maintenance functions.
- **Bus Maintenance**: Staff in this category include operational staff who directly interact with the buses and perform routine and unplanned maintenance functions.

Operations Support staff will require minimal training and should be provided a high-level overview of the technology and its capabilities. For example, it's important for dispatchers to understand the operational range of the vehicles to avoid assigning vehicles to unsuitable routes. Depending upon fleet conversion goals and timelines, route design methodology may need to be updated to consider ZEB capabilities. Route design may also need to accommodate en-route charging or consider variations in performance due to extreme weather. Training for control center staff can help to clarify ZEB capabilities and align expectations with actual performance abilities, which can help reduce state of charge challenges during unexpected service disruptions.

Bus Operations staff will require more training than Operations Support staff given their direct interaction with the vehicles. For example, bus operators must be familiar with all dash indicator lights, the operation of doors and wheelchair access, and safety procedures. Acclimating bus operators to the regenerative braking system will likely be the largest operational difference between ZEBs and conventional diesel buses. On days with extreme weather conditions (hot or cold), bus operators will need to monitor the battery state of charge to ensure that vehicles can complete routes and return to depot. Overall, completing the recommended trainings from the ZEB OEM is expected to address operator skill gaps and adequately prepare operators to drive ZEBs.

Bus Maintenance Support staff include key personnel responsible for the assignment and oversight of maintenance work, both preventative and corrective, and are responsible for troubleshooting and dispatching vehicle road calls. Staff in this category will receive the same training as bus maintenance personnel as their roles include making "game time" decisions that require full familiarity with all vehicle systems and mechanical components.

Bus Maintenance personnel require the most training as they have the most frequent and in-depth interaction with the vehicles. Bus maintenance personnel will be individually assessed on current skills and assigned to training modules as necessary, ensuring that bus maintenance personnel receive all training required without duplicating efforts. For example, maintenance personnel who can demonstrate proficient multiplexing skills will not be assigned

to multiplexing courses. Staff will need to perform routine inspections on insulated tools and PPE to ensure equipment can provide adequate protection against electrical hazards.

Table 5 shows the composition of GOVA Transit's existing operations and maintenance staff, including the number of employees, number of authorized positions, union affiliation, and role categorization with respect to the zero emission transition.

Table 5. GOVA Transit Current Maintenance and Operations Staff

Job Title	Role Category	Part Time/ Full Time	# of Employees	# of Authorized Positions	Union Affiliation	CDL Required?
Dir, Transit Services	Operations Support	FT	1	1	NON-REP	No
Mgr, Transit Operations	Operations Support	FT	1	1	NON-REP	No
Supervisor of Transit Assets and Services	Operations Support	FT	1	1	NON-REP	No
Transit Services Supvsr/Plan	Operations Support	FT	1	1	NON-REP	No
Supervisor of Transit Admin	Operations Support	FT	1	1	NON-REP	No
Cashier (Transit)	Operations Support	FT	1	1	CUPE Local 4705	No
Transit Administration Clerk	Operations Support	FT	3	3	CUPE Local 4705	No
Transit Operations Supervisor	Operations Support	FT	3	3	NON-REP	No
Transit Operations Supervisor	Operations Support	PT	6	3	NON-REP	No
Dispatcher	Operations Support	FT	2	2	CUPE Local 4705	No
Administration	Operations Support	FT	1	1	CUPE Local 4705	No
Driving Instructors	Operations Support	FT	2	2	NON-REP	Yes
Supervisor	Operations Support	FT	1	1	NON-REP	Yes
Bus Operator	Bus Operations	FT	78	79	CUPE Local 4705	Yes
Bus Operator	Bus Operations	PT	58	61	CUPE Local 4705	Yes
Transit Night Leader	Bus Operations	FT	1	1	CUPE Local 4705	No
Transit Serviceperson	Bus Operations	FT	4	4	CUPE Local 4705	No
Transit Serviceperson	Bus Operations	PT	4	4	CUPE Local 4705	No
Maintenance - Parts	Bus Maintenance Support	FT	1	1	CUPE Local 4705	No
Maintenance Supervisor/Foreman	Bus Maintenance	FT	2	2	NON-REP	Yes
Auto Body Repairer	Bus Maintenance	FT	3	3	CUPE Local 4705	No
Mechanic Apprentice	Bus Maintenance	FT- Temp	2	2	CUPE Local 4705	Yes
Mechanic	Bus Maintenance	FT	9	11	CUPE Local 4705	Yes

5.1.5 TRAINING PROGRAM IMPLEMENTATION

GOVA Transit's current technical training approach will continuously evolve. As older buses are retired, replacement buses and onboard systems are integrated into the fleet and new OEM training modules will be procured in order to provide a comprehensive curriculum on all vehicle systems, subsystems, and components. GOVA Transit's outside contracted maintenance program is specialized to provide up-to-date information on new and existing equipment, including modern electronic and mechanical bus systems, OEM changes that impact maintenance practices, and refresher training when necessary.

GOVA Transit plans to take a phased approach to implement ZEB-specific training. As the number of zero emission vehicles in the fleet increases, more mechanics will complete zero emission maintenance training. GOVA Transit will look for opportunities to develop a core group of subject matter experts to serve as BEB fleet specialists. This approach will proactively develop qualified fleet specialists through hands-on experience and learning. In turn, this will influence the transition to an entirely zero emission certified workforce on a timeline that aligns with the integration of new BEBs into the fleet.

5.1.6 FLEET APPRENTICESHIP PROGRAM

City of Greater Sudbury Fleet sponsors an apprenticeship program with CUPE Local 4705 and the Ministry of Skilled Trades (Ontario) and Industry. Applicants must apply through the City of Greater Sudbury, must have completed the academic standard prescribed by the regulations for the trade or must have an Ontario Secondary School Diploma or its educational equivalent, and must successfully pass the agency's regular employment requirements, including testing. The City of Greater Sudbury will give preference to any internal applicants to the Fleet Apprenticeship Program over external applicants.

This program is designed to provide practical training for apprentices, which complements their classroom instruction.[6] The program aims to provide on-the-job (OTJ) training and help individuals become Certified 310T truck and coach mechanical technicians. To achieve this, apprentices must complete 6,000 hours of reasonably continuous employment and 720 hours of in-class instruction, which is divided into three levels/semesters, namely Basic, Intermediate, and Advanced. One of the occupational objectives under this program is to train individuals to become 310T truck and coach mechanical technicians.

5.1.6.1 Academic Training

Program participants are required as a condition of apprenticeship to receive and attend classroom instruction at a technical, trade, or similar school. Credit for time spent in academic training is given in the calculation of the hours of apprenticeship served and are applied against the period total.

As hybrid and battery electric technology becomes more prevalent in the automotive industry, automotive programs will begin to expand course curriculum to include these new systems. GOVA Transit will continue to promote classes offered by local technical and trade schools and are working on partnerships with these institutions to build a workforce that has the technical competency to service zero emission vehicles as they are phased into the fleet.

5.1.6.2 Completion of Apprenticeship

An employee's apprenticeship period begins upon registration with the Ministry of Labour, Immigration, Training and Skills Development (MLITSD) and will be completed when the institution has formally acknowledged that the

[6] Skilled Trades Ontario

apprentice has met all requirements of the program. Apprentices must be in good standing with the educational institution throughout their apprenticeship regarding academic standing and attendance and must provide proof of a passing grade at the completion of each semester. The academic program is 3 semesters long and includes Basic Level 1, Intermediate Level 2, and Advanced Level 3; each semester is 240 hours.

Upon completion of the apprenticeship, the GOVA Transit will recommend to the institution that a certificate of completion be issued to the apprentice. After completion of the Apprenticeship Program, apprentices must successfully write the provincial exam for Journeyperson/Tradesperson status within six months to be reclassified as a Mechanic.

5.1.6.3 Job Postings

While enrolled in the Apprenticeship Program, apprentices are not eligible to apply for posted positions. Additionally, for a period of five years following the completion of their apprenticeship, they are ineligible to apply for posted positions unless they agree to pay back the full amount of the supplementary benefit (i.e., top-up), 50% of the tuition paid by the GOVA Transit, and 50% of any tool allowances provided. The GOVA Transit invests significantly in each apprentice by supporting them through employment while in class, covering the cost of tools and tuition, and providing a top-up of employment insurance benefits following completion of the apprenticeship program. Therefore, the GOVA Transit expects to recoup its investment through each apprentice's commitment to employment.

5.1.7 WORKFORCE RIGHTSIZING

The City of Greater Sudbury Fleet employs nine (9) Tech II bus maintenance mechanics, one (1) Maintenance Supervisor, one (1) Equipment Part Expeditor, and two (2) full-time temporary apprentices to meet current needs. As GOVA Transit transitions to a zero emissions fleet, it will re-evaluate its staffing needs on a rolling basis, based on overall fleet growth. If necessary, it will recommend additional Apprentice Mechanic and Mechanic positions to ensure the smooth functioning of the fleet.

Due to a shortage of qualified BEB OEM training resources, GOVA Transit will look for opportunities to collaborate with other regional transit agencies to optimize limited OEM training resources. This includes exploring partnerships with local agencies and trade schools to maximize class sizes and send mechanics to participate in scheduled training sessions or reserving a centrally located training location or college to host an OEM session. This coordination has received overwhelming endorsement and is a key strategic initiative through OPTA's ZEB Committee Workstreams surrounding Safety and Training. The Committee's other foundational goals include developing and sharing training programs and content, lobbying, and working with colleges to expand battery electric bus training program availability and certifications.

GOVA Transit may leverage local resources such as Cambrian College's Industrial Battery Electric Vehicle Maintenance Certificate Program, which prepares technicians for the maintenance of electric buses. This program can support the development of a skilled workforce capable of addressing the unique challenges of BEB maintenance. enhancing local job readiness and supporting future staffing requirements. [7]

GOVA Transit currently posts job openings on the CGS website, as well as on job search sites, such as Indeed, and in local newspapers. Priority is given to internal candidates pursuant to the applicable Collective Bargaining Agreement. All City of Greater Sudbury employees have the opportunity to apply to the Apprenticeship Program. Whenever there are available mechanic vacancies, GOVA Transit will first evaluate whether any apprentices are

[7] Battery Electric Vehicle Maintenance certificate program | Cambrian College

nearing program completion. If the position cannot be filled internally, GOVA Transit will then post the vacancy externally in partnership with local trade schools. GOVA Transit offers various job positions, including maintenance positions, Transit Supervisors, and Bus Operators.

As post-pandemic service levels have begun increasing, the GOVA Transit is actively hiring Bus Operators. Applicants with a high school diploma, valid "G" driver's license and a clean driver's record can apply for the job; it is not mandatory to possess a commercial driver's license. Through the Driver Certification Program, GOVA Transit provides a three-week training program to all new operators.

GOVA Transit does not have specific plans at this time to hire additional zero emissions-specific staff but acknowledges that specialty skills will be required to support the agency's transition to a zero emission fleet. GOVA Transit will continue to monitor and assess the need for specific zero emissions staff as the fleet transition proceeds and will approve and post dedicated positions as necessary.

5.1.8 FUNDING OPPORTUNITIES

The expenses associated with workforce training are expected to vary, influenced by the widespread adoption of BEBs. Funding is projected to emanate from a number of sources, encompassing procurement, where training costs are incorporated into the allocated budget for vehicle or infrastructure procurement, as well as existing funding streams dedicated to training. Additionally, financial support is anticipated from federal, provincial, and local funding allocations.

While the cost of the training itself is one item to consider, the labor cost to train bus maintenance personnel is anticipated to be high. As highlighted by the International Transportation Learning Center, the following costs will be considered when budgeting for workforce training:

- Classroom training hours
- Instructor hours (instruction and prep)
- Instructor hourly wages and benefits
- Instructor costs per class
- Instructor cost per trainee
- OTJ training hours
- Mentor hours
- Mentor hourly cost
- Mentor cost per trainee
- Facilities costs
- Training materials/mock-ups/software/simulation cost

GOVA Transit will continually work to identify funding sources for worker training and re-training and utilize the training funding offered through federal grants to support the agency's zero emission workforce training.

6 FINANCIAL PLANNING

When undertaking any major transit technology and infrastructure project, the cost to implement can be a major concern. This section of the report compares GOVA Transit's existing diesel fleet to proposed BEB alternatives to identify the best value alternative for the City of Greater Sudbury to reach 100% BEB by 2035. A high-level summary is provided below, while a comprehensive breakdown of the financial analysis assumptions and results can be found in **Appendix C: Budget & Financial Plan**.

6.1 FLEET TRANSITION SCENARIOS

The financial analysis considers two scenarios for GOVA Transit's fleet transition: baseline and a transition to 675 kWh BEB. The modelled scenario for the 675 kWh fleet demonstrated that 40 buses could be purchased before requiring en-route charging, and no overall fleet expansion is required if en-route chargers are implemented at the Downtown Hub. This was selected as a feasible replacement scenario and compared against the Baseline Scenario. Each scenario evaluates the capital, operating, maintenance, and fuel/electricity costs over the 2023-2050 study period. The assumptions used are detailed further below. The two scenarios evaluated reflect the following:

- **Baseline (Business as Usual) Scenario:** Reflects the scenario where no transition to BEBs occurs. All replacements of the current diesel fleet are with new diesel buses.
- **BEB Transition Scenario:** Reflects the full transition of GOVA Transit's fleet to BEBs with 675 kWh batteries, and enroute chargers as part of a phased transition beginning in 2025.

6.2 LIFECYCLE COST ANALYSIS

The lifecycle cost analysis compares the discounted lifecycle cost of implementing each scenario described above. A nominal discount rate of 8% was applied to all costs back to the initial year of 2023 to account for the "time value of money": the principle that a dollar today is worth more than a dollar tomorrow. A nominal discount rate of 8% was selected based on a high-level estimate of municipal borrowing costs of 5% and a 3% general inflation rate. A general 3% escalation rate was applied to estimate future capital expenditures, based on the Bank of Canada's long term inflation target of 1-3%.[8] The upper bound of that range was selected for this analysis as a conservative rate for estimating future cost escalation. The study period for the analysis was selected to be 27 years, from 2023-2050 as this aligns with the federal government's current guidance on reaching net-zero emission targets.[9] While GOVA Transit's technology transition goal ends in 2035, ending the study period in that year excludes operating cost savings for BEBs purchased in the later years of the fleet transition.

6.2.1 CAPITAL COST ASSUMPTIONS

Capital costs include bus unit costs, mid-life rehabilitation costs, and BEB charging equipment and required electric servicing upgrades. Cost estimates were based on recent price data provided by the City of Greater Sudbury, procurement data from other transit agencies, and third-party databases of infrastructure costs for BEB charging infrastructure. **Table 6** contains the capital cost assumptions used in the lifecycle cost analysis.

[8] Our commitment to 2% inflation - Bank of Canada

[9] Net-zero emissions by 2050 - Canada.ca

Table 6. Capital Cost Assumptions, 2023$

Conventional Fleet Capital Assumptions	
Diesel Bus Cost	$780,000
Battery Electric Bus Cost (675 kWh)	$1,874,287
Plug-In Depot Charger (150 kW)	$133,900
Plug-In Depot Cable Dispenser	$44,596
Pantograph Charger (450 kW)	$312,455

In addition to the per unit capital costs above, depot charging infrastructure phasing costs are shown in **Table 7**. Lump sum infrastructure costs were developed in 2024 dollar terms and adjusted to 2023 dollars to be consistent with other costs used in the financial analysis. Lump sum phasing costs include budgetary pricing provided by electrical infrastructure OEMs for unit substations, an estimate of construction materials, and a labor markup. The per-phase costs also factor in a 4% engineering design and a 20% contingency based on concept plan details.

Table 7. Charging Infrastructure Lump Sum Costing by Phase, 2023$

	Years	Cost	Key Items
Transit Phase 1	2025-2029	$5,217,464	One (1) 2,000 kVA unit substation; (9) 150kW chargers & (27) dispensers
Transit Phase 2	2030-2031	$7,319,188	**Depot:** One (1) 2,000 kVA unit substation; (3) 150kW chargers & (9) dispensers **En-Route:** One (1) 4,000 kVA unit substation; (8) 450 kW pantograph chargers
Transit Phase 3	2032	$1,682,444	(3) 150kW chargers & (9) dispensers
Transit Phase 4	2033-2035	$2,623,969	(5) 150kW chargers & (15) dispensers

Table 8 displays a comparison between the capital costs under each scenario. The incremental capital cost of transitioning the fleet to BEBs relative to the Baseline scenario is $98.2 million in discounted terms. This is largely driven by the higher capital costs of BEBs, and the additional electrification infrastructure required.

Table 8. Capital Cost Comparison, Millions of Discounted 2023$

	Baseline	BEB	Variance
Diesel	$58.0	-	-$58.0
BEB	-	$139.3	$139.3
Additional Infrastructure	-	$16.8	$16.8
Total	**$58.0**	**$156.2**	**$98.2**

6.2.2 OPERATING & MAINTENANCE COSTS

Operations and Maintenance (O&M) costs associated with the transition to BEBs considered the regular expenses required to maintain GOVA Transit's conventional diesel fleet, as well as any incremental maintenance costs for new BEB infrastructure. O&M costs for the buses were calculated using historical GOVA Transit operating and maintenance cost data. Operating and maintenance costs represent the hourly labor costs and parts associated with operating and maintaining the transit fleet and were calculated from the City of Greater Sudbury's 2023 dollar per

revenue hour operating cost. Fuel costs for the buses were excluded from the per-hour O&M cost to avoid overstating fuel costs. The per-revenue hour cost was adjusted to a per-total hour (including revenue and non-revenue hours) to reflect the outputs of the Zero+ modelling. Annualized O&M costs for BEB charging equipment were estimated from a published service level agreement of representative in-depot, and pantograph chargers. A more detailed discussion regarding these estimates is included in the Budget and Financial Plan Memo attached as an appendix. **Table 9** contains the key O&M assumptions in the analysis.

Table 9. O&M Cost Assumptions

Conventional Fleet Operating Assumptions	Diesel	BEB
Operating & Maintenance Costs ($/hr)*	$132.00	$132.00
Enroute Charger Maintenance Cost ($/year)	-	$12,000
In-Depot Charger Maintenance Cost ($/year)	-	$5,958
Charger Efficiency	-	95%
Average Useful Life of New Bus	12	12
Bus Fuel Efficiency (L/100 km)	48.4	-
Spare Bus Ratio (Peak Fleet/Total Fleet)	29%	27%
Average BEB:Diesel Transition Ratio	-	1.0

- Operating and maintenance costs exclude fuel costs to avoid double counting

Table 10 displays the comparison of O&M lifecycle costs between the different scenarios. The costs are higher under the BEB Scenario due to combined O&M costs on a per hour basis and additional hours driven due to swaps. Spending on diesel bus O&M is lower in the BEB Scenario, but this spending is replaced by O&M spending on BEBs. Notable differences include the incremental maintenance costs between the Baseline Scenario and BEB Scenario due to additional infrastructure.

Table 10. O&M Lifecycle Cost Comparison, Millions of Discounted 2023$

	Baseline	BEB	Variance
Diesel O&M	$380.1	$178.5	-$201.7
BEB O&M	-	$209.8	$209.8
Related Infrastructure O&M Costs	-	$1.8	$1.8
2023-2050 Total	**$380.1**	**$390.1**	**$10.0**

Fuel and electricity costs associated with the transition include the propulsion of diesel and BEBs, and diesel fuel to operate electric heaters on board BEBs. Diesel fuel costs were estimated using wholesale diesel fuel prices per litre for the City of Greater Sudbury, and escalated to include federal and provincial HST, as well as the federal carbon tax (**Table 11**). The average price of diesel fuel per litre was applied to total diesel consumption. Estimated electricity costs are based on GOVA Transit's average per kilowatt-hour and per kilowatt charges, combined with 2023 year to date Ontario electricity prices. These charges were applied to the total kilowatt-hours and kilowatts to be consumed, respectively.

Table 11. Fuel and Electricity Cost Assumptions

Conventional Fleet Fuel Assumptions	
Diesel fuel cost (2023$/L)	$1.48
Electricity Consumption cost (2023$/kWh)	$0.11
Peak Demand Charge (2023$/kW)	$13.38

In the Baseline Scenario, fuel costs are more expensive due to the increasing price of diesel, driven in part by escalating carbon taxes, and costs $19.0 million more than the BEB Scenario (**Table 12**).

Table 12. Fuel and Electricity Lifecycle Cost Comparison, Millions of Discounted 2023$

	Baseline	BEB	Variance
Diesel Costs	$51.1	$25.2	-$25.9
Electricity Costs	-	$6.9	$6.9
2023-2050 Total	**$51.1**	**$32.1**	**-$19.0**

6.2.3 LIFECYCLE COST COMPARISON

Table 13 below shows the overall lifecycle cost comparison between the Baseline and BEB Scenarios. It is anticipated that the cost of transitioning to BEBs will be $89.1 million over the Baseline in discounted 2023 dollar terms. Additionally, the analysis assumes that capital costs will not be offset by grant or incentive funding; including additional funding sources, such as ZETF, may affect the results of the analysis.

Table 13. Overall Lifecycle Cost Comparison, Millions of Discounted 2023$, 2023-2050

Net Present Value, 2023$	Baseline	BEB	Variance
Bus Purchases	$58.0	$139.3	$81.4
Related Infrastructure	-	$16.8	$16.8
Lifecycle Capital Costs	**$58.0**	**$156.2**	**$98.2**
Operations & Maintenance	$380.1	$388.3	$8.1
Fueling	$51.1	$32.1	-$19.0
Related Infrastructure O&M	-	$1.8	$1.8
Lifecycle O&M	**$431.2**	**$422.1**	**-$9.1**
2023-2050 Total Lifecycle Costs	**$489.2**	**$578.3**	**$89.1**

6.3 FUNDING PLAN

There are several financing opportunities available to GOVA Transit to secure funding for their zero emission fleet transition. The primary funding sources are the Canadian Permanent Transit Fund (CPTF), the Infrastructure for Housing Initiative, and the Zero Emission Transit Fund (ZETF). Funding from these programs can be used to offset capital outlays for buses, chargers, and other infrastructure. The amount funded will vary by program; ZETF provides up to 50% of eligible capital costs in grants, while the Infrastructure for Housing Initiative will offer variable amounts, depending on the loan terms arranged with CIB.

The ZETF is administered by Infrastructure Canada, and targets projects that enable or implement transit fleet electrification. The ZETF offers flexible financing solutions, including grants and loans to applicants. ZETF funding

decisions are determined by project viability, estimated operational savings, and estimated GHG emission reduction. Approximately $2.75 billion in funding is earmarked for the ZETF program to support the numerous municipal transit agencies that may apply for that funding.

Funding from either program may be used to offset planning, capital, and operating costs associated with transitioning diesel fleets to BEBs or alternative fuel technologies. As the timing and delivery of this funding varies, it is not included in this analysis.

In March 2024, Canada Infrastructure Bank (CIB) announced the Infrastructure for Housing Initiative, a $6 billion fund dedicated to "housing enabling infrastructure," which includes public transit.[10] CIB primarily invests in revenue-generating assets. Interested applicants work with CIB to secure a mix of public and private funding. Smaller municipalities are eligible for access to lower borrowing rates, without access to capital markets or federal borrowing programs.

Finally, the Canadian Permanent Transit Fund plans to begin disbursing funds in 2026.[11] This fund is allocated $3 billion annually over the next 10 years. It includes a funding stream specific to fleet electrification, along with funding that can flow from the federal government to provinces or municipalities. The program has begun accepting intake for Metro-Region and Baseline funding agreements. The majority of funding will be through the Metro-Region Agreements stream, which is accessed through collaboration with the provincial government.

With a clear understanding of capital, O&M, and fuel/electricity costs associated with a zero-emission bus transition, GOVA Transit can begin to incorporate these costs into future operating and capital budgets. Federal and provincial funding will be essential in helping GOVA Transit meet the ambitious goal of reaching their zero emission targets by 2035. GOVA Transit will use this information to apply for funding from relevant programs at the local, regional, provincial, and federal level such as the ZETF.

[10] Infrastructure for Housing Initiative | Canada Infrastructure Bank (CIB) (cib-bic.ca)
[11] The largest public transit investment in Canadian history | Prime Minister of Canada (pm.gc.ca)

7 ENVIRONMENTAL BENEFITS

Greenhouse gas (GHG) emissions reduction is a significant benefit of transitioning from a diesel fleet to BEBs. This section helps quantify the impacts that a conversion to BEBs may have on GHG emissions relative to the baseline diesel scenario; results do not consider GHG emissions associated with fabrication and construction of new BEB infrastructure or with resource extraction for the vehicles.

7.1 ASSUMPTIONS & METHODOLOGY

The analysis quantified GHG impacts based on estimates of diesel fuel and electricity usage by transit buses over the 2023-2050 study period. The following assumptions were used to quantify emissions based on litres of fuel and kWh of electricity consumed. GOVA Transit's current fleet consumes diesel fuel, and the emission factor selected reflects this.

The emission rate for diesel fuel is 2.681 kilograms (kgs) of carbon dioxide (CO2) per litre of fuel. This value was obtained from the Canadian National Inventory Report, 2023. The emission rate was multiplied by the annual litres of fuel consumed per year by GOVA conventional transit, to calculate the annual kgs of CO2 emitted. To quantify the impact of electricity usage on GHG emissions, the total kWh of electricity used per year was multiplied by the corresponding Electricity Emission Intensity factor for Ontario from 2023 to 2050. This factor represents the kg of CO2 per kWh based on the average electricity grid mix for the province. The intensity factor declines over time due to anticipated introduction of new renewable power generation sources. The Electricity Emission Intensity Factor was obtained from the Average Grid Electricity Emission Intensities table in the ZETF GHG+ Guidance Modules, Annex C.

7.2 GHG EMISSION REDUCTION IMPACTS

Based on the assumptions above, the greenhouse gas (GHG) emissions from BEB operations are summarized in **Table 14** and **Figure 10**. Over the study period, annual emissions are reduced from approximately 5,600 tonnes of greenhouse gas GHG emissions per year to just over 600 tonnes of GHG emissions per year; this translates to approximately 157 tonnes of CO_2 saved per year, per bus. Compared to a scenario where the fleet is not transitioned to BEBs, this results in a reduction of approximately 94,300 tonnes of GHGs over the 27 year study period. Residual GHG emissions in the BEB scenario after the fleet is fully transitioned are attributed to the diesel auxiliary heaters installed on the BEBs.

Table 14. Total GHG Emissions (CO_2 in Tonnes), Baseline and BEB Scenarios

	2025 Snapshot	2035 Snapshot	2050 Snapshot	Study Period Cumulative Total
Baseline				
Diesel	5,624	5,624	5,624	157,460
BEB	-	-	-	-
Total, Baseline Scenario	**5,624**	**5,624**	**5,624**	**157,460**
BEB Scenario				
Diesel	5,624	1,095	404	59,215
BEB	-	174	203	3,918
Total, BEB Scenario	**5,624**	**1,269**	**607**	**63,133**

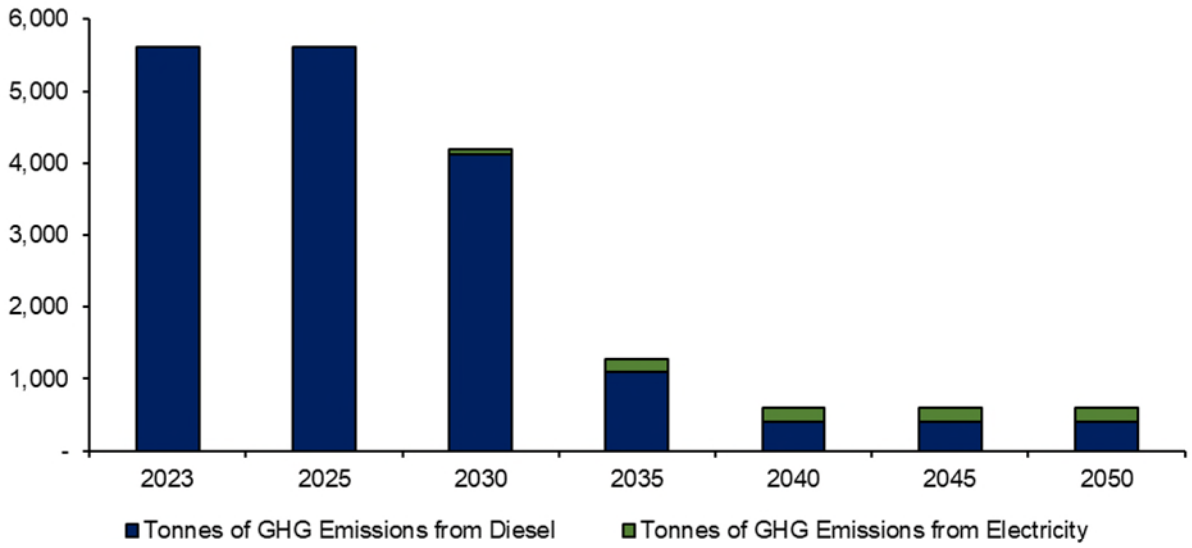


Figure 10. Annual GHG Emissions (CO_2 in Tonnes), BEB Scenario

The cumulative reduction in GHG emissions is shown in **Figure 11**. The annual reduction in emission grows substantially over time as the diesel fleet is converted to BEBs. By the end of the transition to BEBs, emissions are reduced by approximately 89%.

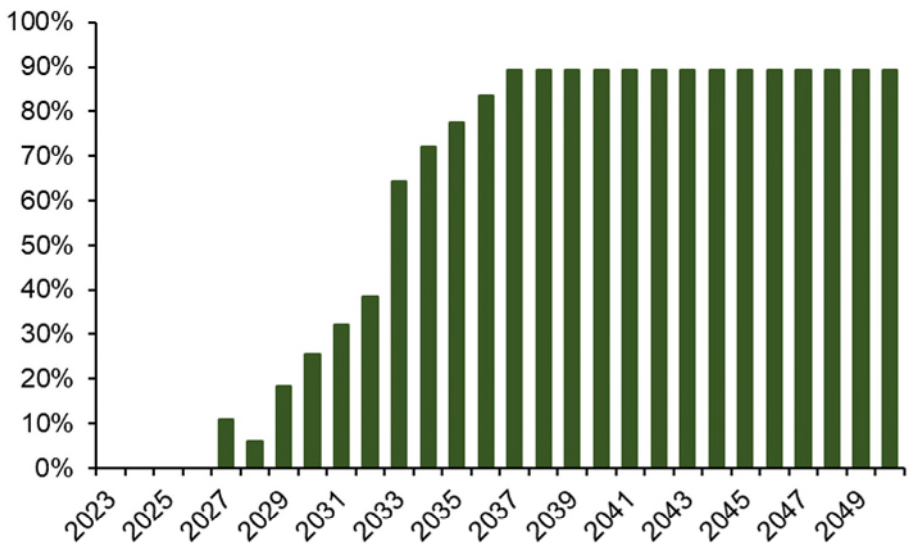


Figure 11. Cumulative Percent GHG Reductions from Baseline in BEB Scenario

8 PROJECT RISKS & MITIGATION

There are risks associated with transitioning GOVA Transit's fleet to a new technology and fuel source. The table below highlights potential areas of risk associated with implementation and operation of BEBs into GOVA Transit's fleet and the proposed response or countermeasure for each risk. It should be noted that risk exposure is subjective by nature and the plan's risk exposure will continuously evolve throughout the transition.

Risk	Risk Description	Risk Response
Infrastructure Transition	As BEBs are introduced to the fleet, it is essential that the necessary infrastructure is in place to enable their integration into the service. Coordination with third parties, such as local utilities and infrastructure manufacturers, can often result in lengthy timeframes and disruptions to current operations.	Initiate planning for infrastructure and ensure construction considerations are made while maintaining current operations. See that infrastructure upgrades are completed at least six months in advance of vehicles arriving. Following infrastructure installation, it is critical to conduct comprehensive testing and commissioning before placing vehicles and infrastructure into active service.
Internal Resource Availability to Support Implementation	The implementation of BEBs will require program management and operational support and may result in resource limitations, additional costs, and delays.	Identify key personnel for the management of procuring the vehicles and infrastructure upgrades as a coordinated program. See that existing resources are supplemented by hiring new roles to address gaps that have been identified. Engage consultants as necessary to offer support during project delivery to support the procurement process, construction, delivery and commissioning. Continue to leverage the Metrolinx TPI Group Purchasing program for procurement and contract administration for BEB and required charging infrastructure.
Service Planning and Scheduling	The BEB fleet will introduce new variables and processes into service planning and scheduling. Adjusting to these new requirements may take additional time and resources, which could result in an increased cost of service delivery and potential delays in implementation. It is important for service planning and scheduling to be flexible to the changes brought about by the new fleet to ensure smooth and efficient operations.	Initiate service planning adjustments at an early stage to gain insights into the attributes and operational limitations of BEBs using data from the Transition Plan. Ensure staff to identify necessary information and tools, assist them in acquiring additional capabilities, and support optimization of schedules with BEBs to maximize fleet utilization and minimize operating costs. Collaborate with BEB OEM on monthly business review calls to address any reliability and performance issues. This includes bench-marking Mean-Distance-Between-Failures (MDBF) data with other transit agencies and, in comparison, to conventional diesel bus fleet.

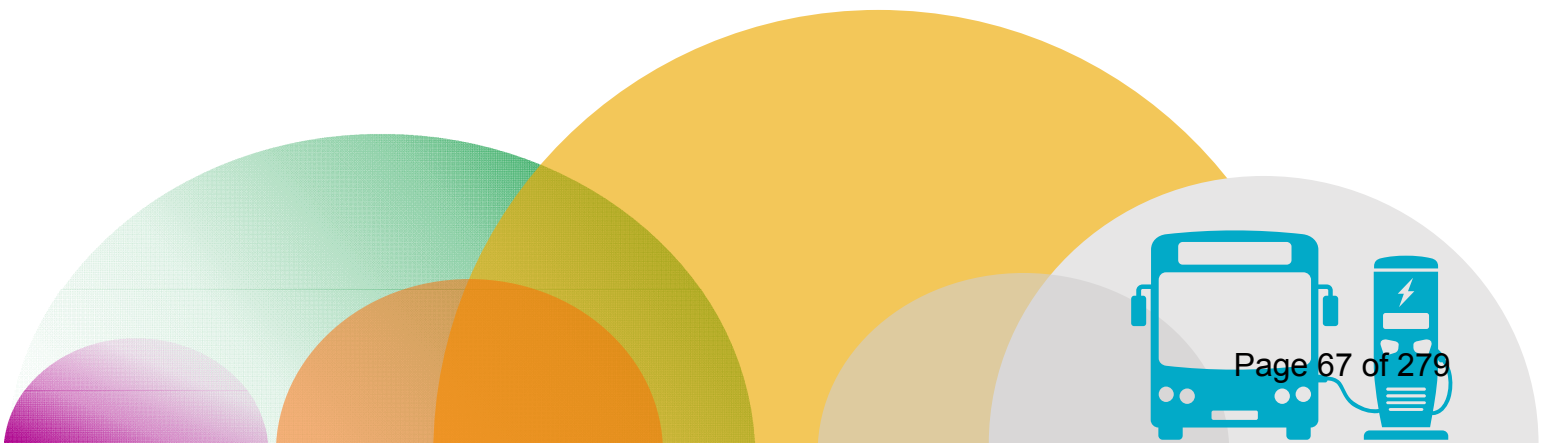
Risk	Risk Description	Risk Response
Revenue Operations Assumptions	The modelling forecasts the fleet size required to maintain current operations considering operator hours and associated operating costs. However, the underlying assumptions may not consider the full range of operations which may underestimate operational costs.	Initiate the adjustment of service planning practices to align with the characteristics and operational constraints of BEBs using insights from the Transition Plan. This approach aims to minimize the chance of adverse impacts. Additionally, start early and engage in a constructive dialogue with unions to mitigate the impact of any deviations from expected models. The use of on-board AVL / Electric Bus Telematics Software has been critical in creating critical alerts around battery state of charge and operating metrics.
Supply Chain Disruptions	The ongoing global shortage of electrical subcomponents, replacement parts, and heightened production demand due to the increased funding available for zero-emissions bus fleets may result in shortages of parts and tooling which would increase costs and delay procurement. Delays in vehicle procurement and delivery would also result in increased maintenance requirements for the current diesel fleets.	Consider supply chain disruptions, as they are applicable to both buses and fixed electrical infrastructure. Plan for adequate lead time to account for potential manufacturing and delivery delays. Ensure that enough local spare parts are maintained either through contracts or storage at the transit facility. Lists of types and quantities of critical spare parts should be provided by both vehicle and charging system suppliers. Strategies to address some of these challenges have been built into the Metrolinx TPI procurement contract (e.g. late delivery penalties, parts availability, etc.).
Resiliency	Utility blackouts, primary and secondary infrastructure failures, as well as natural disasters or extreme weather events, have the potential to significantly disrupt operations.	Assess the impact and frequency of power outages to evaluate mitigation options that will meet the organization's risk tolerance. Consider the options provided in the facilities report to determine what level of resiliency is required. Having a plan to replace major critical electrical components with long lead times, such as transformers, should be evaluated.
Insufficient Grid Capacity	The planned fleet will require significant power demand which may not be available with current infrastructure and require additional costs to install new transmission lines or substations.	Begin constructive engagement with local utilities to ensure necessary infrastructure upgrades are in place in time to support the charging equipment in the early stages. Engagement was done as part of the facilities assessment and currently, there are not expected to be capacity constraints to support the required electric upgrades at the sites identified. Upgrades will also need to consider impacts from other facility related electrification.

Risk	Risk Description	Risk Response
Technology Interoperability	Potential incompatibility between buses and chargers from different manufacturers may be discovered during testing and commissioning which would result in additional costs and delays.	Thoroughly inquire and assess the compatibility of the equipment to be purchased during the procurement phase. Ensure contracts include testing and commissioning of vehicles with any equipment that is expected to be used. Plan would be to standardize on infrastructure provider and develop Service Level Agreement.
Technology Obsolescence	The technology for EVs is quickly evolving and older generation vehicles and chargers may not be compatible with newer ones. These changes can be driven by updates to charging standards, advancements in battery technology, or changes in design principles. As a result, retrofitting older models with the latest technology	Prior to the procurement of additional vehicles and infrastructure, regular and periodic market scans of the current state of the industry are recommended. Vehicle and charging manufacturers should be expected to maintain spare components for the expected lifespan of vehicles. Additionally, a sufficient supply of spare components should be purchased to ensure equipment is able to be kept serviceable. Leverage Metrolinx TPI Group Purchasing contracts to assist with contract administration as well as obsolescence and parts availability throughout the life of the contract. Evaluate alternative delivery options to lease / finance infrastructure through the utility or another 3rd party.
Software Issues	The smart charging software available in modern chargers is subject to minor malfunctions, such as software "bugs", and disruptions which would negatively impact operations.	Ensure thorough testing and commissioning are carried out after installation of new infrastructure servicing BEBs and that timely support is available for software that is essential to operations. Leverage Metrolinx TPI Group Purchasing contracts to assist with contract administration and language surrounding obsolescence, reliability and parts availability throughout the life of the contract. Utilize charge-management software to pro-actively alert any charging faults, etc. Review option to have the utility manage charging infrastructure under a service contract.

Risk	Risk Description	Risk Response
Software Adoption	Delays or failure to adopt necessary software tools for electrification, such as smart charging, dispatch, and control, planning and scheduling, depot management, and fleet telematics, may cause implementation delays for electrification.	Before procuring new infrastructure for BEBs, conduct a comprehensive assessment of software and data needs. Once installed, thoroughly test and commission the new infrastructure. Leverage Metrolinx to share ideas and best practices around software deployment. (i.e. use of ChargePoint, etc.) This should also tie into Municipal Zero Emission Fleet Plans and Infrastructure Planning.

APPENDIX A

ENERGY MODELLING ANALYSIS



APPENDIX A: ENERGY MODELLING ANALYSIS

The service data used was based on GTFS data for service in Fall 2023, which is representative of current (post-COVID) service conditions. Four BEB scenarios were modelled with a fleet of either 525kWh or 675kWh BEBs: baseline, depot charging only, depot and en-route charging at Downtown only location, and depot and en-route charging at three. All of the scenarios are detailed below.

KEY ASSUMPTIONS

To develop a model relevant for GOVA Transit's fleet and operations, a set of assumptions and variables were identified and displayed in **Table 15**. It is noted that the assumptions regarding vehicle Original Equipment Manufacturer (OEM) attributes, represent a typical, commercially available BEB model. Subsequent procurement following this analysis, may result in vehicle OEM specifications which differ from these assumptions, which may impact the results of this analysis. Additional energy consumption modelling, based on the selected OEM, should be conducted to confirm energy and infrastructure requirements.

Table 15. BEB Simulation Assumptions

Variable	Input
Service Data	Fall 2023
Battery Capacity	525 kWh (Existing vehicle battery size) 675 kWh (Expected future vehicle battery size)
End-of-Life Battery State of Health	80% (max battery degradation)
Energy Reserve	20% state of charge (SOC)
Heating	Diesel Auxiliary Heat
Ambient Temperature	-27C (Cold weather, 10th percentile) +29C (Hot weather, 90th percentile)
Passenger Capacity	100% seated capacity
Depot Charger Power	150 kW @ 95% Efficiency
En-route Charger Power	450 kW (Vehicle Limited) @ 95% Efficiency

BASELINE SCENARIO

The first modelled scenario assumes depot charging is allowed all day with no modifications to block schedules. Buses are reused if a vehicle has a minimum state-of-charge (SOC) of 60% or higher. In this scenario, if a short block is completed and the bus has at least 60% SOC, then the vehicle is used again in the same day to start another block that it can complete. This gives an indication of how feasible the blocks will be based on how GOVA Transit currently operates. The results of the baseline scenario indicate that both 525kWh and 675kWh vehicles were not able to complete several of the blocks, so this scenario was discounted as it is not a viable option.

DEPOT CHARGING ONLY SCENARIOS

This scenario evaluated a fleet of either 525kWh or 675kWh BEBs with on-board diesel auxiliary heaters that would utilize plug-in depot chargers. It was assumed that buses would be swapped out part way through the block with a fully charged vehicle when the first vehicle reaches 20% SOC. From a scheduling perspective, this would be done by swapping the buses, so they run in shorter blocks that are conducive to BEB capabilities.

The model also assumes that when swaps occur, the bus that would normally stay in service would return to the depot, and another bus and operator would drive from the depot to take its place. This has impacts both on fleet

size required (peak vehicle requirement) as well as operational costs due to the increased amount of deadhead miles incurred (non-revenue hours and kilometres between the depot and the first/last stop).

MODEL RESULTS: 525 KWH BATTERY CAPACITY

Below is a review of the main components of the transit service and operations that are likely to change and should be considered when transitioning to a 525kWh BEB fleet using depot charging only. **Figure 12** shows an estimate of the increase in non-revenue hours and kilometres as well as the estimated number of vehicles required to continue the current transit service.

- Revenue hours and kilometres remain the same
- Non-revenue hours: **86 to 126 hours (47% increase)**
- Non-revenue kilometres: **4,398 to 6,508 km (48% increase)**
- Peak Vehicle Requirement: **40 to 60 vehicles (50% increase)**
- 8 depot chargers will be required:
    - (8) 150 kW plug-in chargers
- (26) 525kWh BEBs can be deployed before an increase in fleet size is required

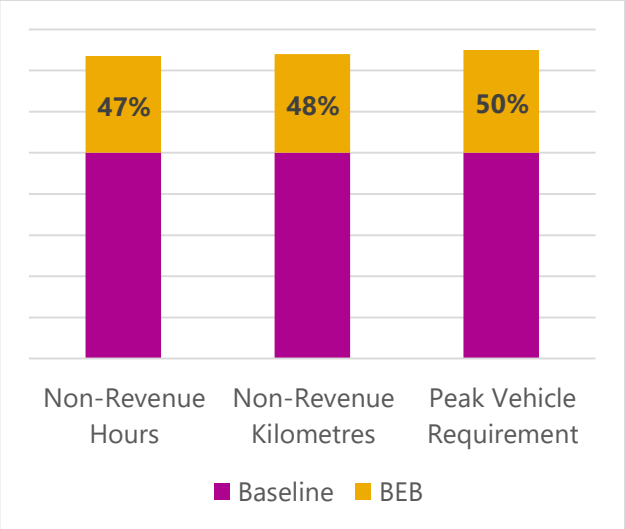


Figure 12. 525kWh BEB Depot Charging Only Model Outputs

The vehicle battery states of charge on each block during weekday service are shown in **Figure 13**. Weekend service was also modelled, but fleet and charging requirements are driven by weekday service which illustrates the most demanding operations for GOVA.

Each block is represented by a line on the chart with the color of the line corresponding to the state of charge of the vehicle (**Figure 13)**. The color changes from green to yellow to red to black as the state of charge drops from 100 to 0 percent. Bus swaps (shown in blue) are introduced only between trips to minimize service impacts. Bus swaps are also inserted in locations shown in blue to guarantee the minimum SOC does not dip below the required 20 percent reserve capacity, including the energy needed to return the vehicle to the depot when a swap is needed. Whenever a vehicle is swapped out, it is replaced with a BEB that has a fully charged battery. Swapping buses is only helpful when the bus either stays near the depot all day or returns within a close distance to the depot at multiple points throughout the day. If a block is scheduled to travel a long distance away from the depot, then there is no convenient opportunity for a swap.

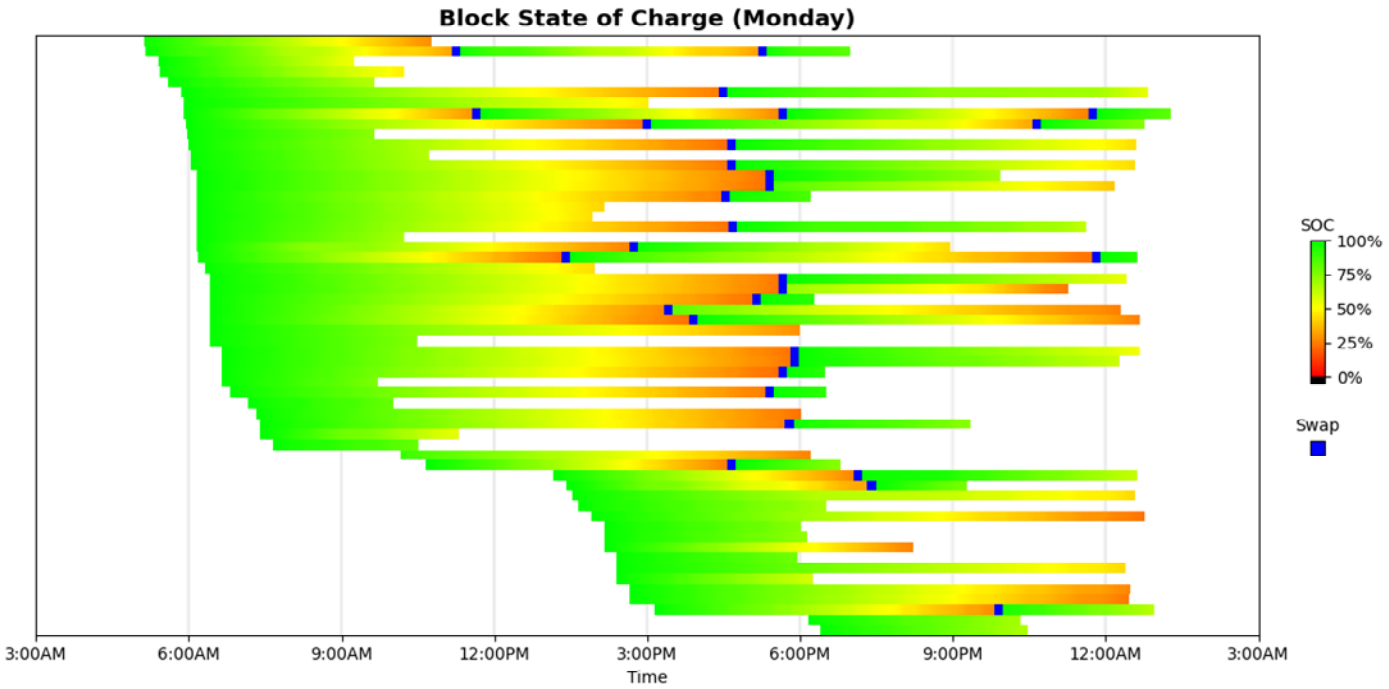


Figure 13. 525kWh BEB Depot Charging Only - Weekday Service Block SOC Heatmap

The modelling reveals which existing service blocks are feasible without the need for en-route charging or a bus swap to complete service**.** A total of 32 blocks (55%) can be replaced with BEBs at a 1-to-1 ratio without the need for en-route charging. The remaining 26 blocks (45%) would require either en-route charging or a bus swap to complete service.

Power Requirements

Figure 14 shows the daily power demand profile for 525kWh BEBs at the depot facility if GOVA elects to continue with depot charging only. The demand is greatest in the evenings and overnight, peaking at 1,200 kW. When buses return to the depot facility and are all plugged in, there are peaks between 5pm to 11pm and 1am to 6am, and demand is relatively low between 6am to 3pm.

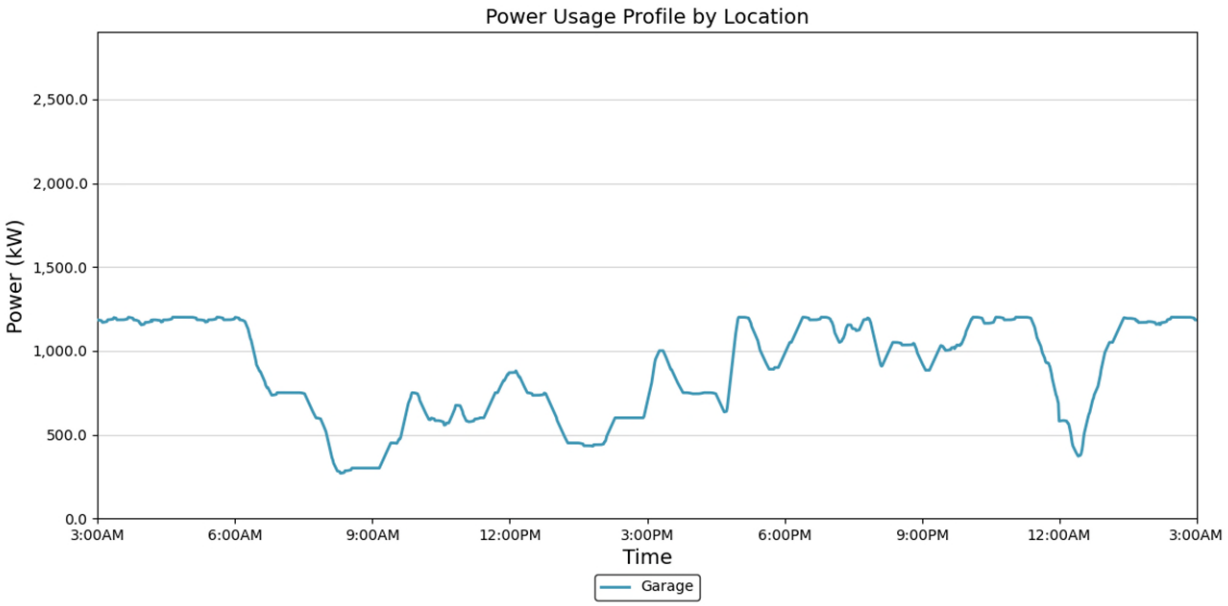


Figure 14. 525kWh BEB Depot Charging Only Maximum Daily Power Profile at Depot Facility

Vehicle Battery Capacities

Figure 15 shows what percentage of GOVA's service becomes feasible without en-route charging by battery size, where the pink area shows feasibility as battery capacity is greater than 525 kWh. With 525 kWh buses, 55% (32 blocks) of weekday services blocks can be replaced one-to-one without en-route charging. Increasing to 675 kWh, feasibility increases to 64%

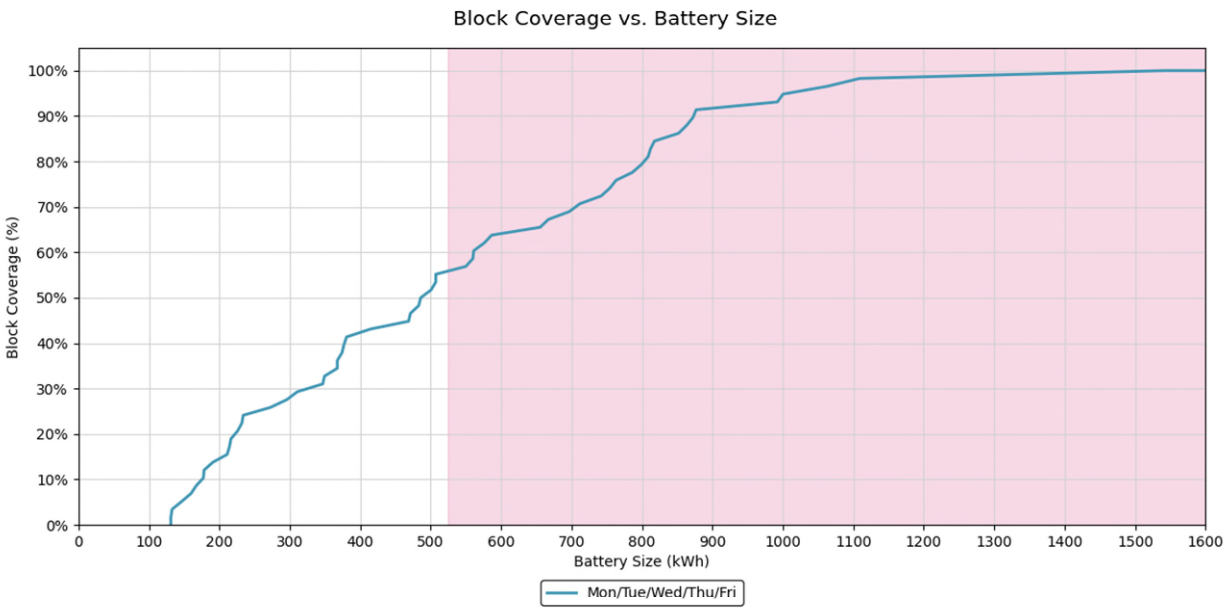


Figure 15. Block Feasibility by Required Vehicle Battery Size

MODEL RESULTS: 675 KWH BATTERY CAPACITY

Below is a review of the main components of the transit service and operations that are likely to change and should be considered when transitioning to a 675kWh BEB fleet using depot charging only. **Figure 16** shows an estimate of the increase in non-revenue hours and kilometres as well as the estimated number of vehicles required to continue the current transit service.

- Revenue hours and kilometres remain the same
- Non-revenue hours: **86 to 127 hours (49% increase)**
- Non-revenue kilometres: **4,398 to 6,598 km (50% increase)**
- Peak Vehicle Requirement: **40 to 50 vehicles (25% increase)**
- 11 depot chargers will be required:
  - (11) 150 kW plug-in chargers
- (27) 675kWh BEBs can be deployed before an increase in fleet size is required

With the increased battery capacity of 675kWh BEBs, 5 additional blocks (+9%) become feasible without swaps, in addition to a reduction in peak vehicle requirement. The vehicle battery states of charge on each block during weekday service are shown in **Figure 17**.

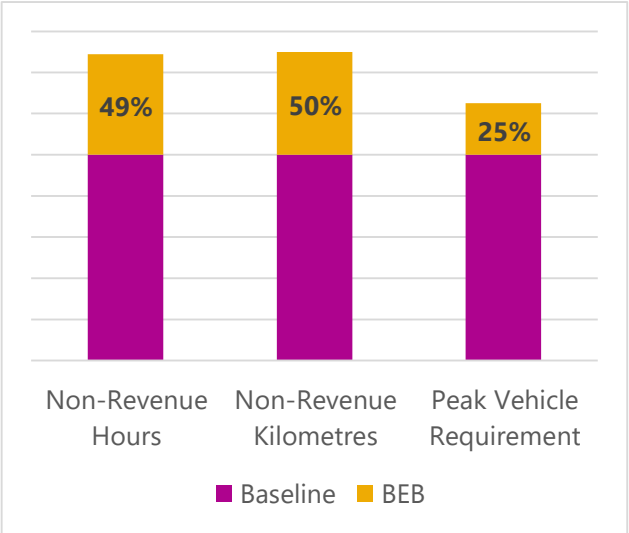


Figure 16. 675kWh BEB Depot Charging Only Model Outputs

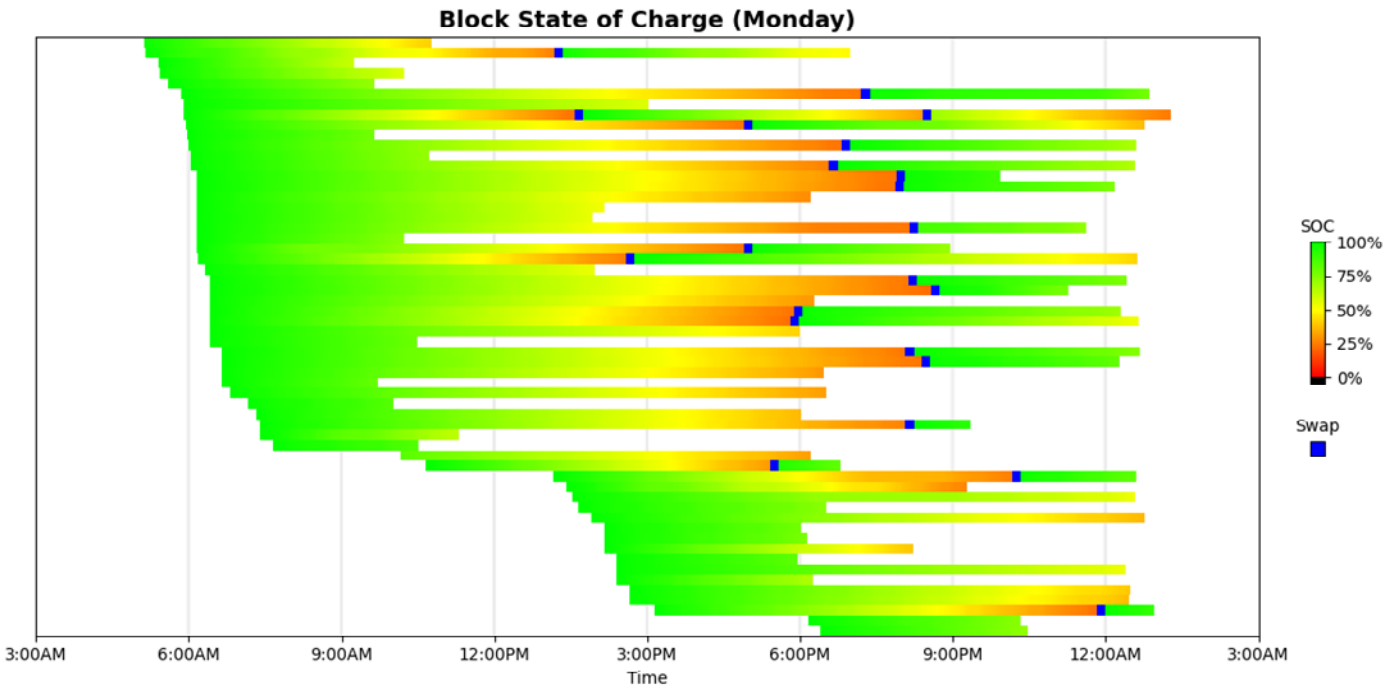


Figure 17. 675kWh BEB Depot Charging Only - Weekday Service Block SOC Heatmap

Table 16 shows which service blocks are feasible with 675 kWh buses and infeasible, respectively. A total of 37 blocks (64%) can be replaced with BEBs at a 1-to-1 ratio without the need for en-route charging. The remaining 21 blocks (36%) would require either en-route charging or bus swaps to complete service.

Table 16. Summary of Feasible Service Blocks without Swap for 675 kWh BEB

Feasible with 675 kWh Bus			Infeasible with 675 kWh Bus	
24024	24015	24004	24007	24037
24033	24034	24011	24008	24045
24038	24046	24047	24009	24029
24039	24006	24016	24012	24043
24040	24032	24017	24026	24049
24041	24013	24014	24027	24028
24042	24030	24002	24023	24035
24052	23995	24018	24025	23998
24051	24000	23996	23999	
24020	24019	24001	24044	
24021	24036	24048	24031	
24022	24010		24005	
24050	23997		24003	

Power Requirements

Figure 18 shows the daily power demand profile for 675kWh BEBs at the depot facility within a depot charging only scenario. The demand is greatest overnight, peaking at 1,650 kW, when buses return to the depot facility. There is a peak between 1am to 4am, and demand is relatively low between 9am to 6pm.

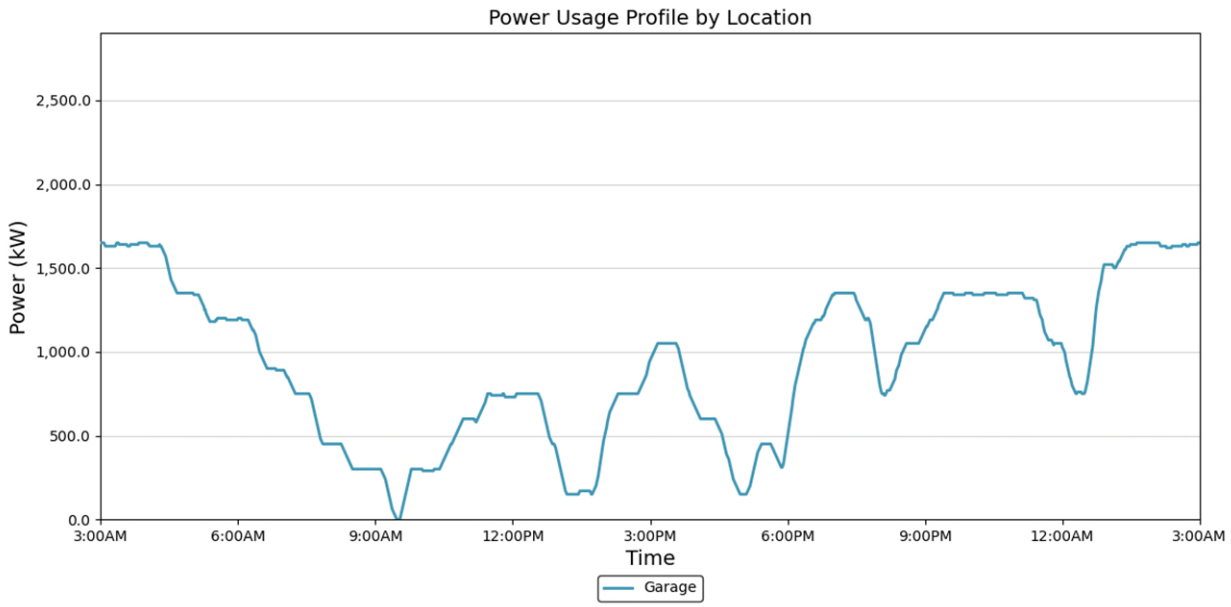


Figure 18. 675kWh BEB Depot Charging Only Maximum Daily Power Profile at Depot Facility

DEPOT & EN-ROUTE CHARGING SCENARIOS

These scenarios evaluated a fleet of either 525kWh or 675kWh BEBs with diesel auxiliary heaters that would utilize plug-in depot chargers and overhead pantograph chargers en-route positioned at either the Downtown Transit Hub only or at the Downtown Transit Hub plus two additional sites. Layover times in the existing schedule were used to identify the most ideal locations for en-route chargers. A total of three locations were identified as having a significant amount of layover time available for buses to charge. While a scenario with en-route charging at three locations was initially modelled for feasibility, this scenario was not ultimately selected but details are included in this appendix for completeness.

The review of the en-route charging locations does not consider the complexity associated with property ownership, access, existing utilities, and other site constraints that may limit or be prohibitive for these activities. This illustrative exercise would require additional study prior to committing to this work.

MODEL RESULTS: 525 KWH BATTERY CAPACITY; DOWNTOWN LOCATION ONLY

Below is a review of the main components of the transit service and operations that are likely to change and should be considered when transitioning to a 525kWh BEB fleet utilizing enroute charging at the Downtown location in addition to depot charging. **Figure 19** shows an estimate of the increase in non-revenue hours and kilometres as well as the estimated number of vehicles required to continue the current transit service.

- Revenue hours and kilometres remain the same
- Non-revenue hours: **20% increase**
- Non-revenue kilometres: **20% increase**
- Peak Vehicle Requirement: **10% increase**
- 8 en-route chargers will be required:
    - (8) 450 kW pantograph chargers at Downtown Transit Terminal
- (38) 525kWh BEBs can be deployed before an increase in fleet size is required

With the introduction of en-route chargers at Downtown Transit Terminal, there are operational improvements in GOVA's service as the 525kWh BEB can service 19 (+33%) more blocks without a swap when compared to depot only charging. The vehicle battery states of charge on each block during weekday service are shown in **Figure 20.**

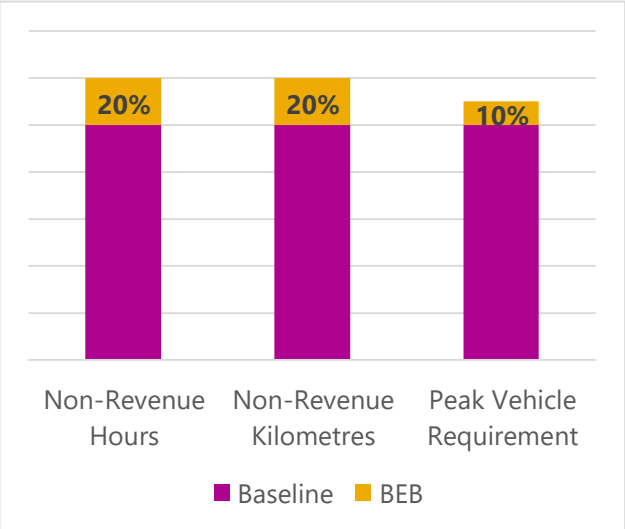


Figure 19. 525kWh BEB Depot and En-Route Charging Model (Downtown Location Only)

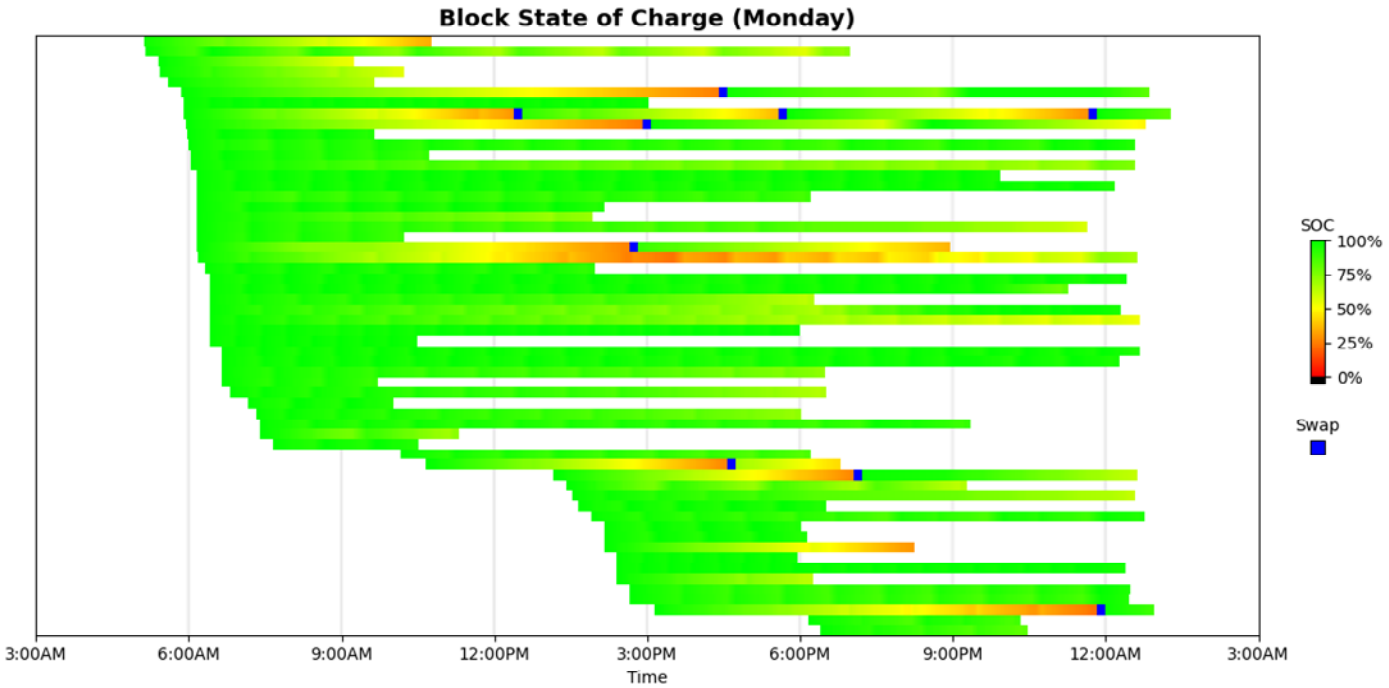


Figure 20. 525kWh BEB Depot and En-Route Charging (Downtown Location Only)- Weekday Service Block SOC Heatmap

Power Requirements

Figure 21 shows the daily power demand profile at the depot facility, peaking at 600 kW, if GOVA elects to deploy en-route chargers only at the Downtown location with 525kWh BEBs in the future. The overnight peak demand is reduced and the demand during the day is lower and more uniform in nature than in the depot charging only scenario.

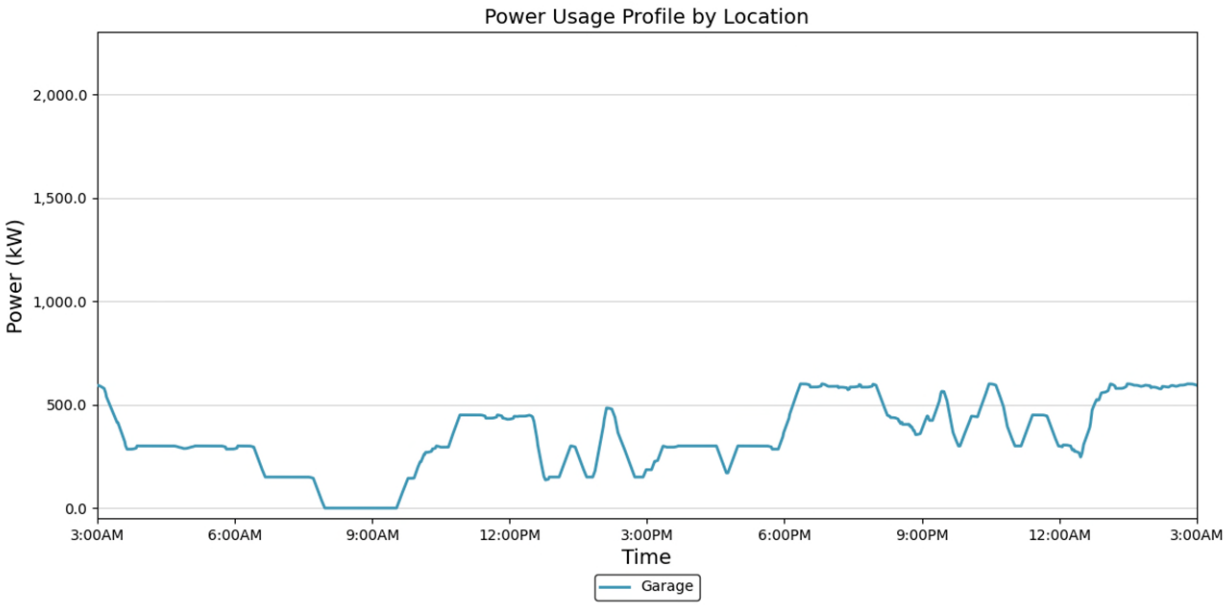


Figure 21. Depot and En-Route Charging (Downtown Only Location) Maximum Daily Power Profile at Depot Facility with 525kWh BEB

MODEL RESULTS: 525 KWH BATTERY CAPACITY; THREE LOCATIONS

Below is a review of the main components of the transit service and operations that are likely to change and should be considered when transitioning to a 525kWh BEB fleet utilizing depot charging and enroute charging at three locations. **Figure 22** shows the estimated increase in non-revenue hours, kilometres, and the estimated total number of vehicles required to provide the examined transit service.

- Revenue hours and kilometres remain the same
- Non-revenue hours: **16% increase**
- Non-revenue kilometres: **19% increase**
- Peak Vehicle Requirement: **5% increase**
- 11 en-route chargers will be required:
    - (8) 450 kW pantograph chargers at Downtown Transit Terminal
    - (2) 450 kW pantograph chargers at New Sudbury Transit Hub
    - (1) 450 kW pantograph chargers at South End Transit Hub
- (40) 525kWh BEBs can be deployed before an increase in fleet size is required

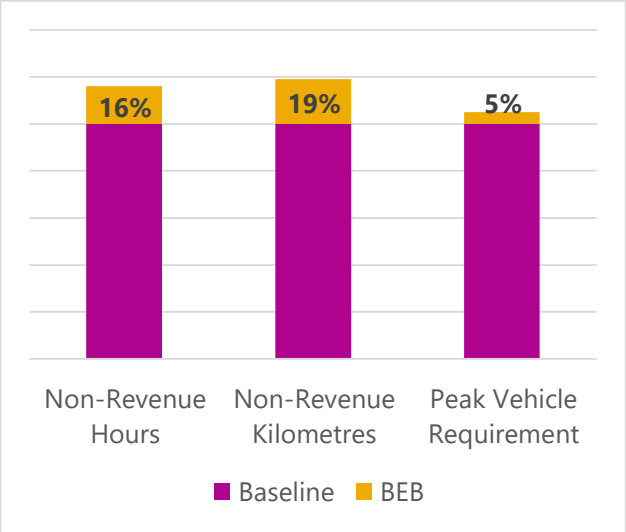


Figure 22. 525kWh BEB Depot and En-Route Charging Model (Three Locations)

With the introduction of en-route chargers at three locations, there are operational improvements in GOVA's service as the 525kWh BEB can service 24 (+42%) more blocks without a swap when compared to depot only charging. The vehicle battery states of charge on each block during weekday service are shown in **Figure 23.**

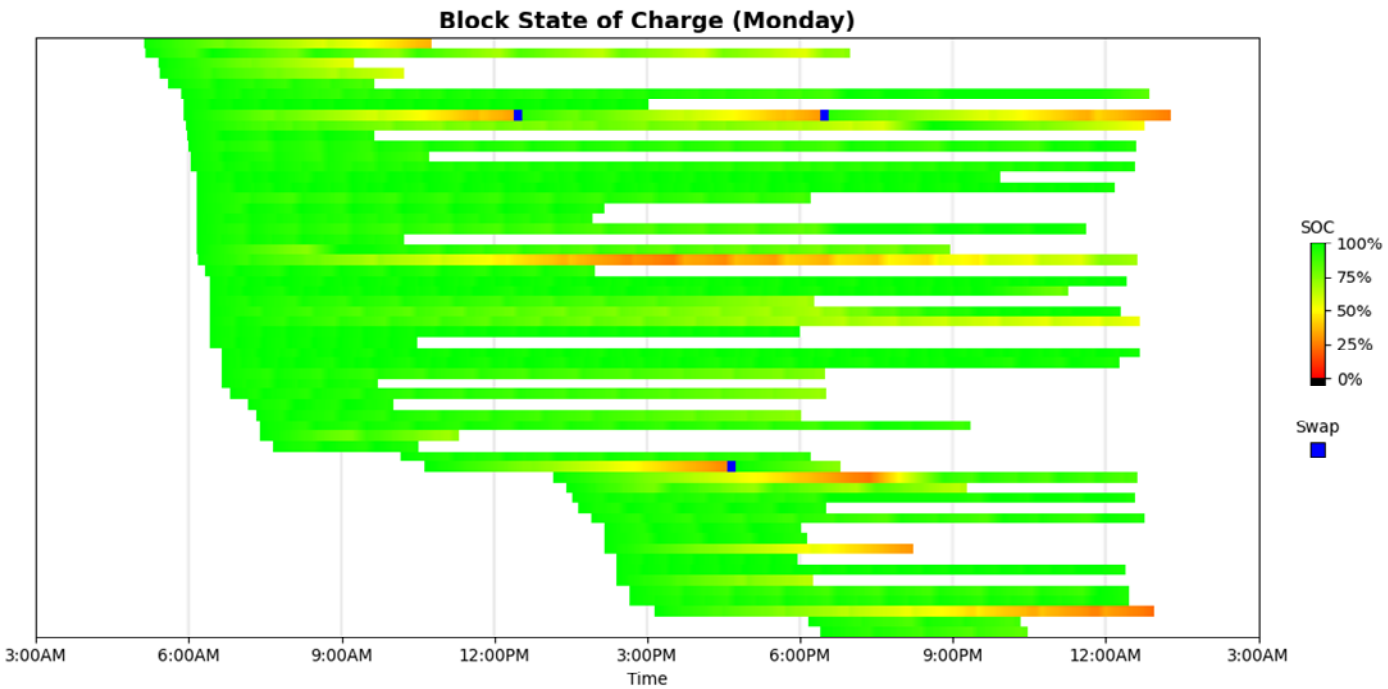


Figure 23. 525kWh BEB Depot and En-Route Charging (Three Locations)- Weekday Service Block SOC Heatmap

Power Requirements

Figure 24 shows the daily power demand profile at the depot facility, peaking at 450 kW, if GOVA elects to deploy en-route chargers at three locations with 525kWh BEBs in the future. The overnight peak demand is further reduced and the demand during the day is lower, and more uniform in nature, than in the depot charging only scenario.

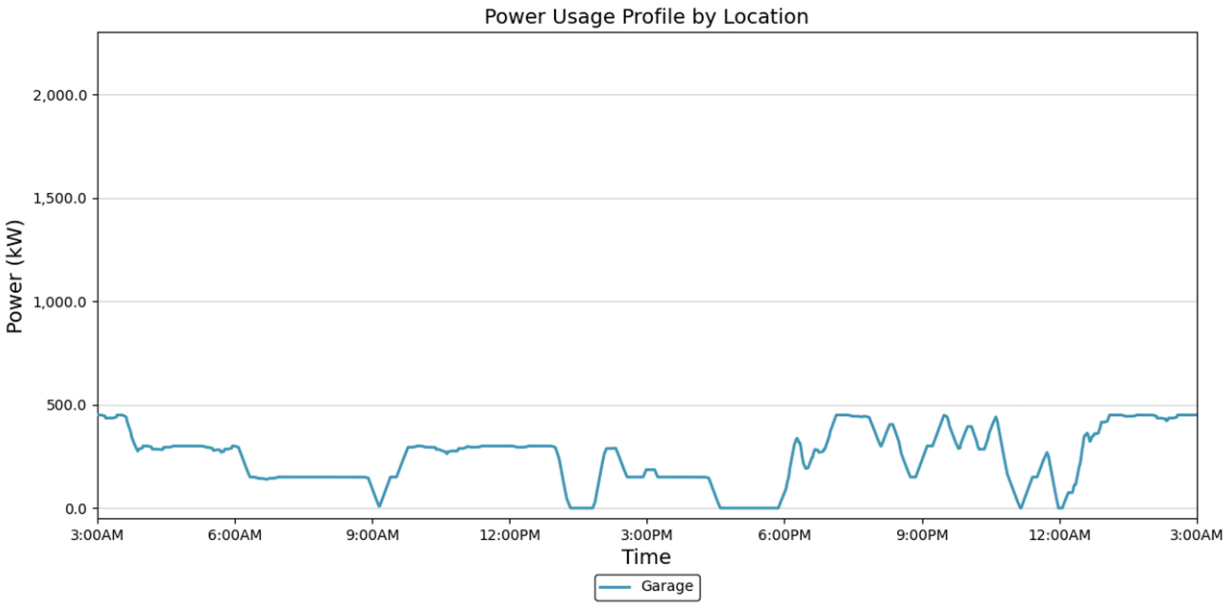


Figure 24. Depot and En-Route Charging (Three Locations) Maximum Daily Power Profile at Depot Facility with 525kWh BEB

MODEL RESULTS: 675 KWH BATTERY CAPACITY; DOWNTOWN LOCATION ONLY

Below is a review of the main components of the transit service and operations that are likely to change and should be considered when transitioning to a 675kWh BEB fleet utilizing enroute charging at the Downtown location in addition to depot charging. **Figure 25** shows the estimated increase in non-revenue hours, kilometres, and estimated total number of vehicles required to provide the examined transit service.

- Revenue hours and kilometres remain the same
- Non-revenue hours: **27% increase**
- Non-revenue kilometres: **30% increase**
- Peak Vehicle Requirement: **7% increase**
- 8 en-route chargers will be required:
    - (8) 450 kW pantograph chargers at Downtown Transit Terminal
- (36) 675kWh BEBs can be deployed before an increase in fleet size is required

With the introduction of en-route chargers at the Downtown Transit Terminal, there are operational improvements in GOVA's service, as the 675kWh BEB can service 15 (+26%) more blocks without a swap, when compared to depot only charging. The vehicle battery states of charge on each block during weekday service are shown in **Figure 26**.

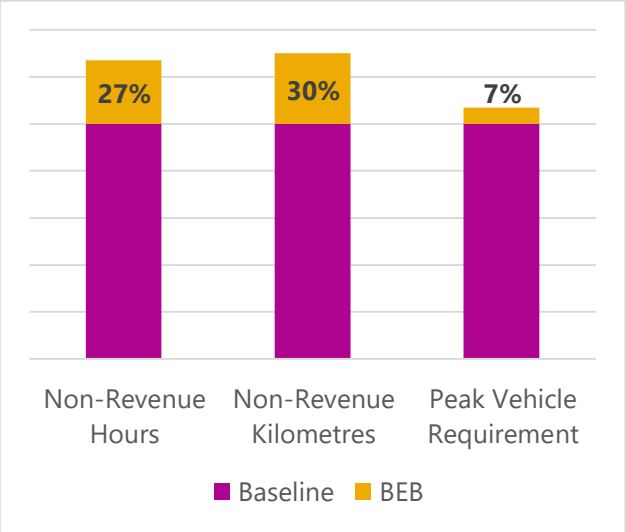


Figure 25. 675kWh BEB Depot and En-Route Charging Model (Downtown Location Only)

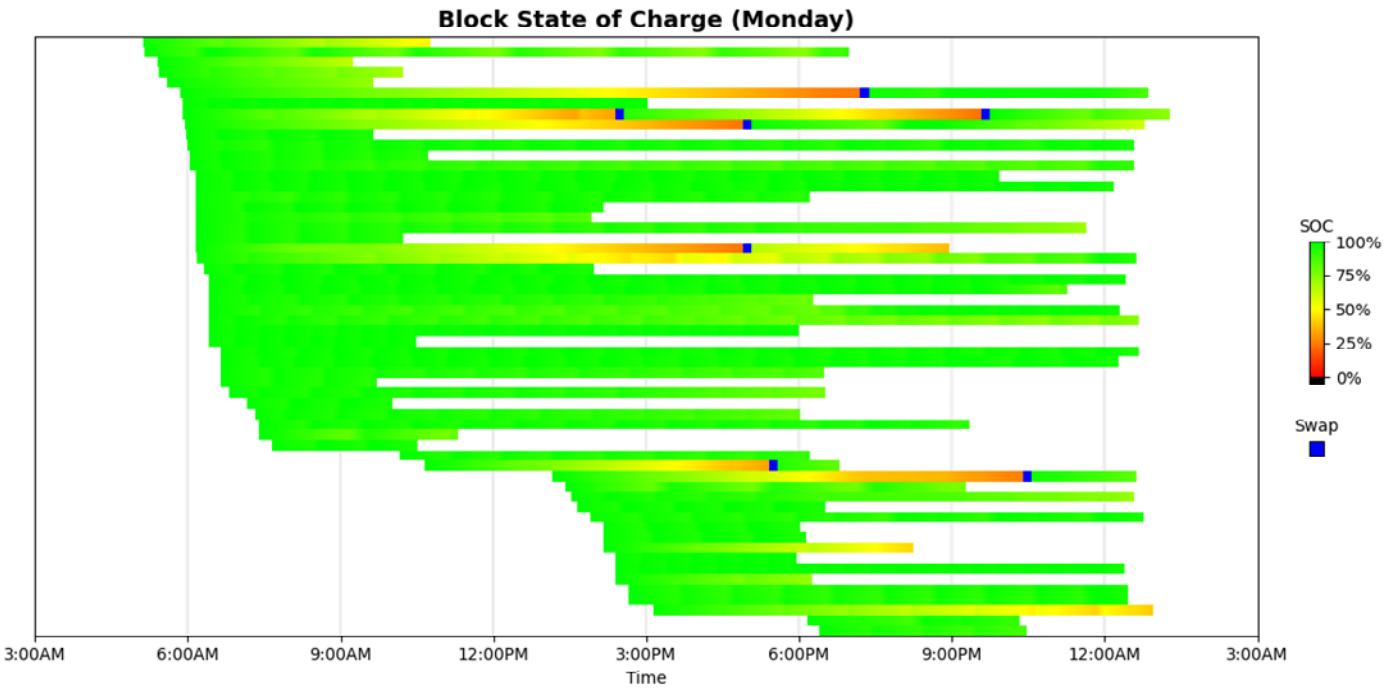


Figure 26. 675kWh BEB Depot and En-Route Charging (Downtown Location Only)- Weekday Service Block SOC Heatmap

Power Requirements

Figure 27 shows the daily power demand profile at the depot facility, peaking at 600 kW, if GOVA elects to deploy en-route chargers only at the Downtown location with 675kWh BEBs in the future. The overnight peak demand is reduced and the demand during the day is lower and more uniform in nature than in the depot charging only scenario.

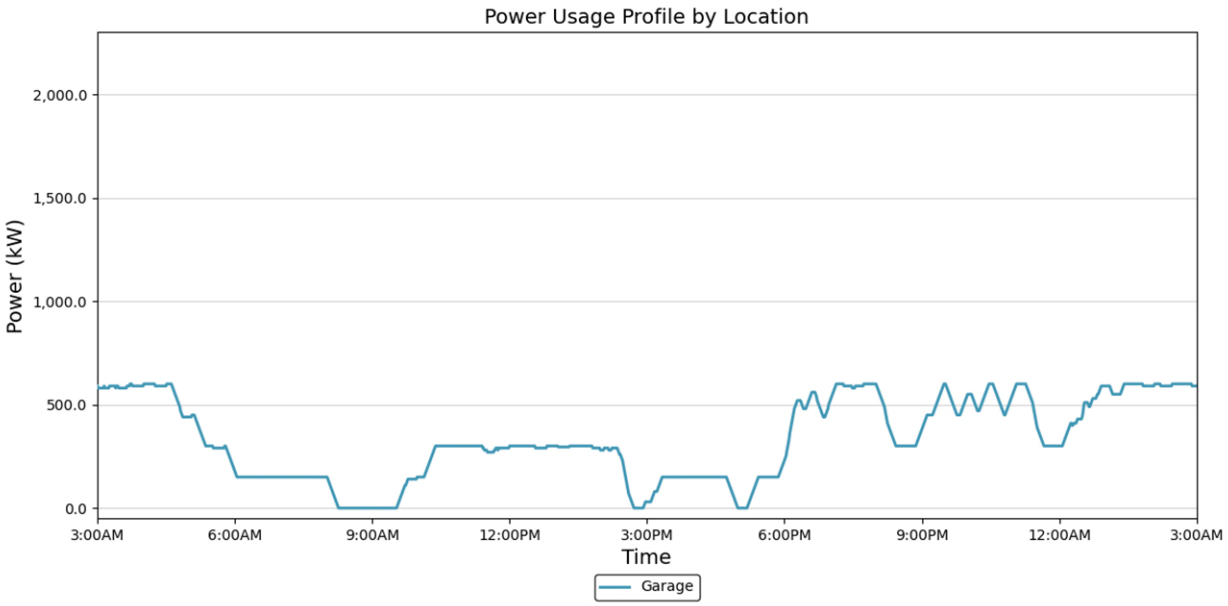


Figure 27. Depot and En-Route Charging (Downtown Only Location) Maximum Daily Power Profile at Depot Facility with 675kWh BEB

MODEL RESULTS: 675 KWH BATTERY CAPACITY; THREE LOCATIONS

Below is a review of the main components of the transit service and operations that are likely to change and should be considered when transitioning to a 675kWh BEB fleet utilizing enroute charging at three locations in addition to depot charging. **Figure 28** shows an estimate of the increase in non-revenue hours and kilometres as well as the estimated number of vehicles required to continue the current transit service.

- Revenue hours and kilometres remain the same
- Non-revenue hours: **16% increase**
- Non-revenue kilometres: **19% increase**
- Peak Vehicle Requirement: **5% increase**
- At least 10 en-route chargers will be required:
    - (7) 450 kW pantograph chargers at Downtown Transit Terminal
    - (2) 450 kW pantograph chargers at New Sudbury Transit Hub
    - (1) 450 kW pantograph chargers at South End Transit Hub
- (40) 675kWh BEBs can be deployed before an increase in fleet size is required

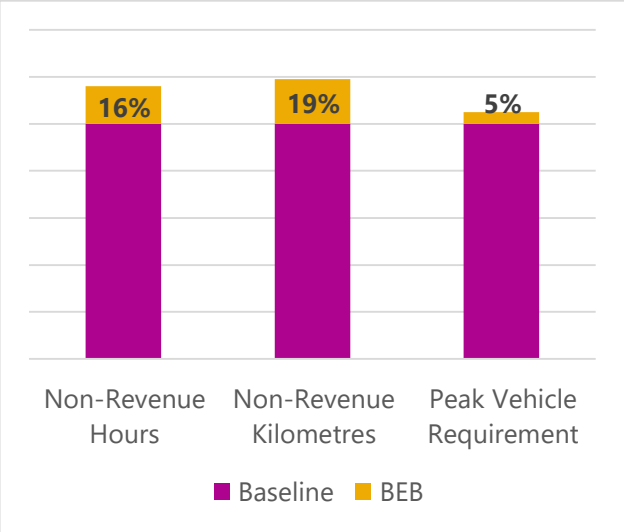


Figure 28. 675kWh BEB Depot and En-Route Charging Model (Three Locations)

With the introduction of en-route chargers at three locations, there are operational improvements in GOVA's service as the 675kWh BEB can service 19 (+33%) more blocks without a swap when compared to depot only charging. The vehicle battery states of charge on each block during weekday service are shown in **Figure 29.**

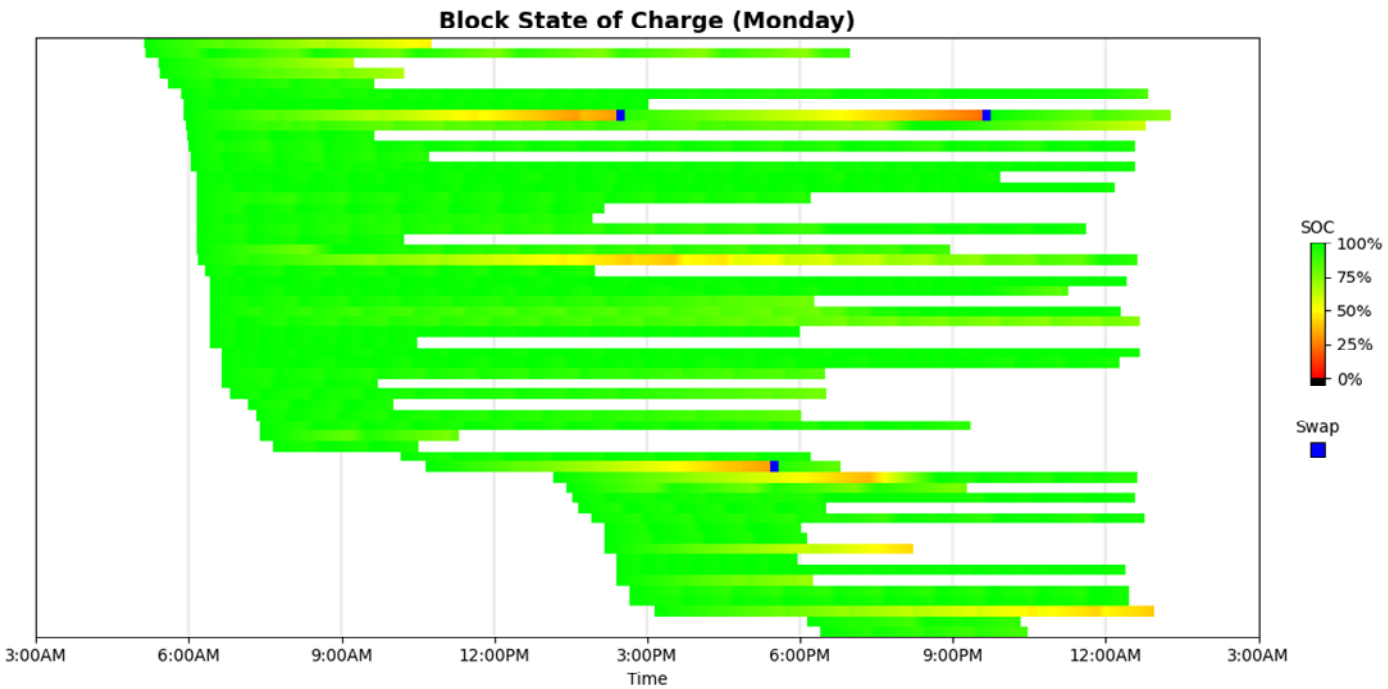


Figure 29. 675kWh BEB Depot and En-Route Charging (Three Locations)- Weekday Service Block SOC Heatmap

Power Requirements

Figure 30 shows the daily power demand profile at the depot facility, peaking at 450 kW, if GOVA elects to deploy en-route chargers at three locations with 675kWh BEBs in the future. The overnight peak demand is further reduced and the demand during the day is lower and more uniform in nature than in the depot charging only scenario.

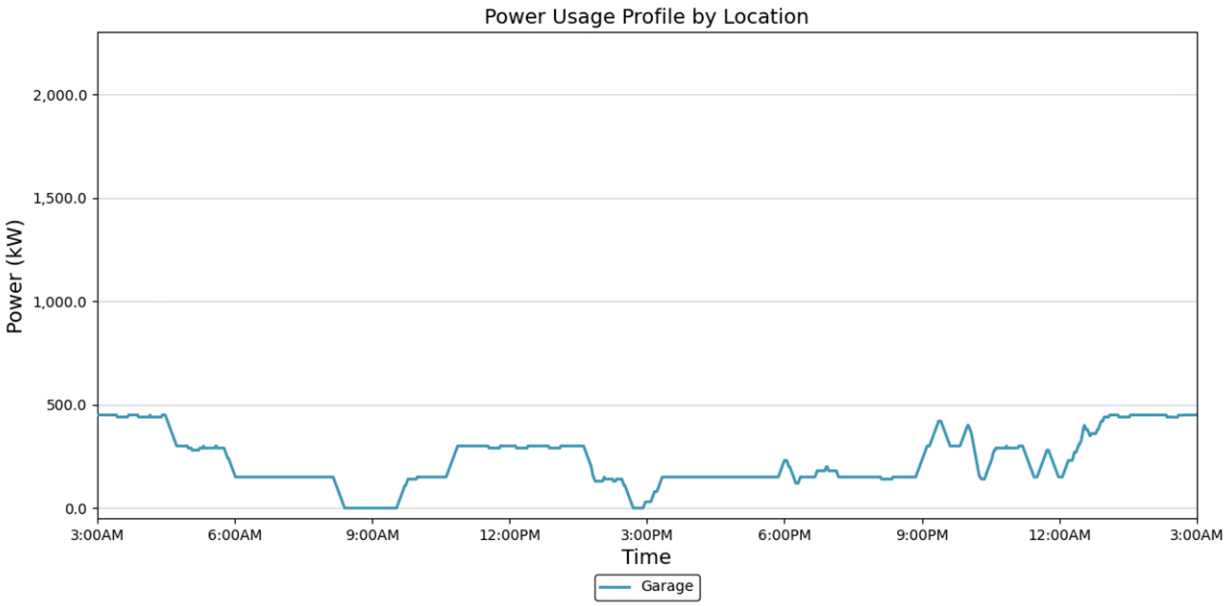
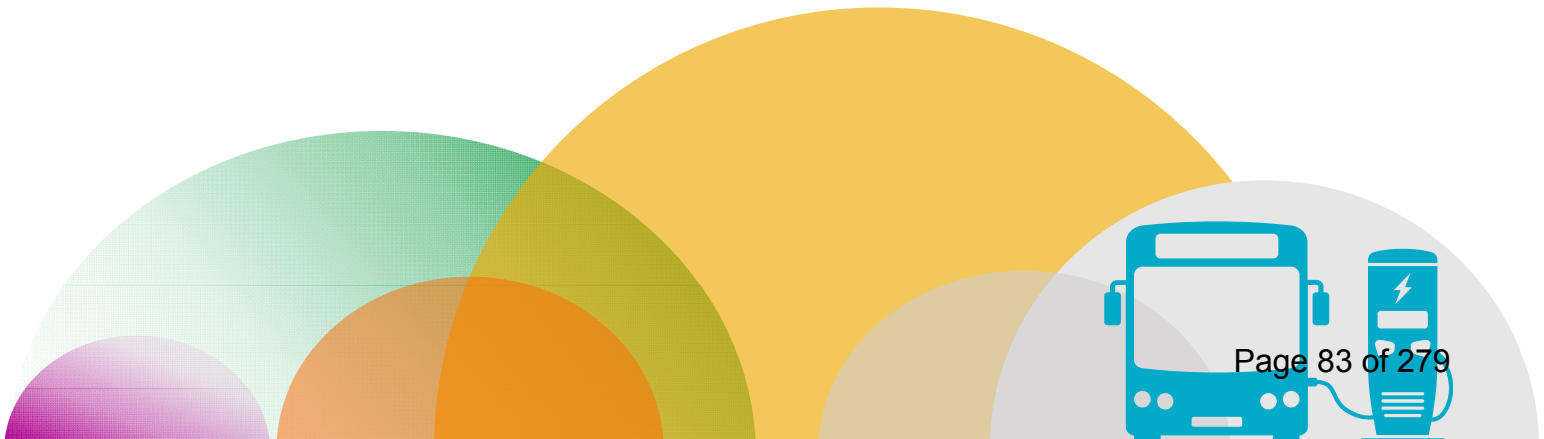


Figure 30. Depot and En-Route Charging (Three Locations) Maximum Daily Power Profile at Depot Facility with 675kWh BEB

APPENDIX B

FACILITY ASSESSMENT



APPENDIX B: FACILITY ASSESSMENT

DEPOT CHARGING

Depot charging refers to the siting and use of charging infrastructure at the facility where buses are typically stored overnight. At the depot, the main difference between plug-in and pantograph dispensers is the way the vehicle is connected to the charger. Charging speeds will be similar because both dispensers use the same charging modules to deliver the same amount of energy.

There are trade-offs with picking either plug-in or pantograph as the connection option. Pantographs take up less space if mounted to existing overhead structures and can offer an automatic way of connecting the vehicle that doesn't require an operator or service person to physically plug in a cable. Some of the drawbacks are that they're heavier, more expensive, require more maintenance, require precise vehicle alignment under the pantograph, and interference with wireless communication between the dispenser and the bus may lead to disruptions in the charging process.

Plug-in charging (**Figure 31**) has the benefits of typically being less expensive, with fewer physical alignment issues and typically fewer communication issues (since there is a hard-wired communication between the charger and dispenser and dispenser and the bus). The downsides are that someone must physically plug the bus in, it typically takes up more floor space (but can also be mounted to the ceiling), requires cable management, and plug-in connectors are more easily damaged.

For the depot facility, a dispenser for each bus is recommended to ensure that when the fleet is parked at night all vehicles can be charged without the need to circulate buses through a limited number of charging bays. It is likely that there will be times when a charger or dispenser will occasionally be out of service due to failure or routine maintenance. Since transit fleets typically maintain a fleet size that includes several spare buses beyond the number required to meet peak service each day, having at least one dispenser per bus will also provide for resiliency in that there will effectively be spare chargers.

Manufacturers offer products that enable several dispensers to be powered from a single charging module. This can be achieved either through "sequential charging," where buses are put in a queue and charged individually, or through "parallel charging," where power is shared among multiple connected vehicles. This infrastructure reduces the amount of charging modules required and provides multiple dispensers and charging options. Despite this advantage, the failure of a single charging module can impact the charging of multiple buses.

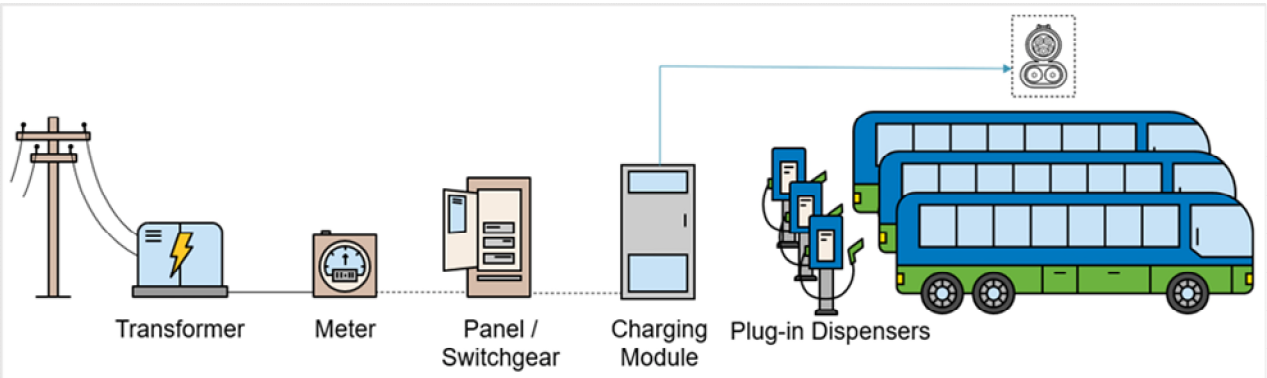


Figure 31. Equipment Required to Feed a Single Charging Module with 3 Plug-In Dispensers

Charging modules come in different sizes and power levels depending on the amount of charging required. Some modules can serve up to four dispensers, with the majority of chargers capable of serving up to three dispensers. Regardless of size, it's important to match the number of dispensers to the number of vehicles stored at the facility.

EN-ROUTE CHARGING

En-route or layover charging is a term used for high-speed charging infrastructure that is placed along a bus route (**Figure 32)**. This infrastructure allows BEBs to charge during layover time, which can be as little as 5 minutes, in order to regain some or all of their energy. The current en-route chargers have a rating of approximately 450 kW; however, buses can currently only accept up to 360 kW, so several charger manufacturers have begun to reduce their largest charger offering to between 300 and 360 kW. Should future bus models begin to accept higher power charging, the charger size may increase in the future.

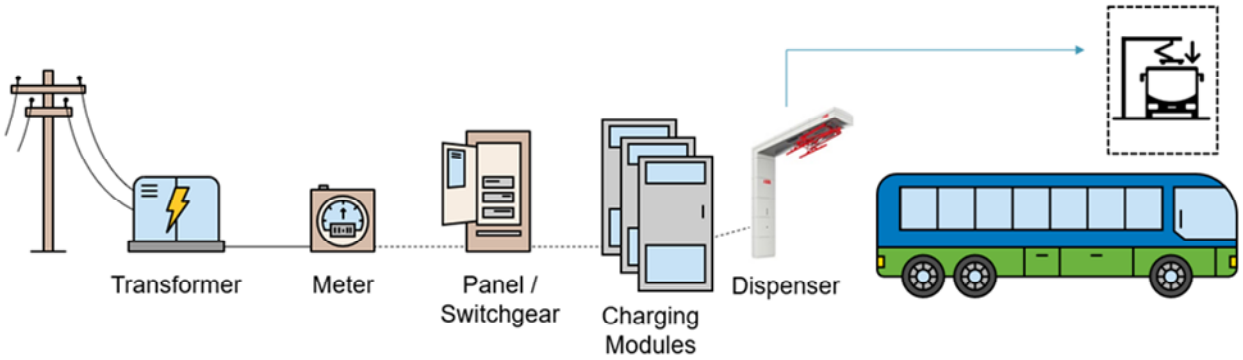


Figure 32. Equipment Required to Feed a Single High-Speed Pantograph Charger

Typically, all the charging equipment in **Figure 32** will be required on each en-route site, but sites with multiple en-route chargers are able to share larger transformers and switchgear. Charging modules can be separated from the dispensers by 100 meters with some manufactures extending to up to 150 meters. Charging modules and upstream electrical equipment should be in "back of house" areas away from passengers, if possible. Having electrical equipment located away from passenger areas makes it easier for repair and servicing without impacting the public. Charging modules also generate heat and minimal noise when in operation which is not ideal for customers. Locating charging modules in fenced compounds is further recommended to avoid risk of vandalism.

En-route quick charging requires a large amount of power for each charging station. Facilities that have separate drop-off, layover and pick-up areas are ideal for en-route charging since a fast charger in the layover location can potentially serve multiple routes. Terminus locations without separate drop-off/layover/pickup locations can also use en-route charging but may require additional pantograph dispensers that will allow for charging at the gate where vehicles normally park for the duration of the layover.

CHARGING INFRASTRUCTURE CONSIDERATIONS

The following sections list factors that were considered when developing the concept plans. They were developed using industry best practices.

DEPOT CHARGER SELECTION

There are currently several charging solutions, including plug-in, pantograph, and wireless inductive charging available for use in transit applications. For GOVA Transit, constraints from facility space may restrict the type of charger dispensers that are operationally feasible. For charging in the indoor parking structure, wall mounted

chargers would be a good option for the parking lanes next to walls; while the inner parking spaces would employ overhead retractable plug-in cable reels or overhead pantograph chargers. These options minimize space requirements within the building by eliminating the need for bay restriping to include space for ground-mounted dispensers and protective bollards.

Ceiling- or wall-mounted cable retractors (**Figure 33**) that have enough cable range to reach the vehicles are the recommended option. However, a detailed design is necessary to identify specific locations and determine whether any conflicts with other infrastructure exist where the equipment would be mounted. Motorized cable reels that raise and lower the connectors when not in use are also available. When using motorized retractors, there should also be consideration given to how the reels will be activated, such as by pull cord, remote switch, or other automated custom solutions, or other available options.

Figure 33. Example of Wall Mounted Cable Reel

ROOF STRUCTURAL LOADING

During the facility design for BEB infrastructure improvements, the structural capacity will need to be designed to accommodate the additional weight of the pantograph or charger reel. The weights of equipment can vary significantly by manufacturer, and this may limit which types of dispensers could be used if mounting to the ceiling structure. In some cases, powered cable reels can be mounted on the wall to avoid putting additional weight on the roof structure of a building.

Table 17 provides information gathered from manufacturer specification sheets. It should be noted that the cable reel dispensers have a significant advantage in terms of the usable range between the dispenser and the bus which can make them a good option for areas with high ceilings.

Table 17. Dispenser Weight and Dimension Specifications of Select Manufacturers

Type	Manufacturer	Model	Weight	Useable Range	Dimensions
Pantograph	Wabtec	ChargePANTO	387 kg	1.50 – 1.7 m	2247 x 1250 x 574 mm
Pantograph	Wabtec	DepotPANTO	90 kg	1.0 m max	1524 x 825 x 475 mm

Pantograph	Schunk	SLS 301	90 kg	0.36 m max	1580 x 1020 x 1000 mm
Cable Reel	Wabtec	ChargeREEL	125 kg	6.7 m max	900 mm reel diameter

EN-ROUTE PANTOGRAPH CHARGERS

It is important to monitor the utilization of pantograph chargers if they are deployed for en-route charging. To secure a charge, drivers must align the vehicle correctly with the charger. One way to help drivers align the vehicles is by implementing a system, such as an indicator, that they can use for positioning. Some agencies have used markers both inside and outside the bus and/or speed bumps to help with positioning as shown in **Figure 34**. Given that potential charging stations at transfer points would be situated outdoors and exposed to snow, relying on on-ground markers may not be the best approach for GOVA Transit. It may be more practical to adopt another method, such as aligning the front bumper with a landmark that won't be obstructed by snow in the winter, like a bus stop sign.

Figure 34. Example of Alignment Markers for Proper Bus Positioning[12]

UTILITY COORDINATION

Unanticipated utility infrastructure costs and long lead times for critical equipment such as transformers are causing delays for implementing fleet electrification. Furthermore, it will be important for GOVA Transit to understand how Greater Sudbury Utilities' (GSU) approved rate tariff will impact its fleet's charging costs.

GOVA Transit is in the conceptual stages of facility planning and design. Coordination with GSU determined the high-level service drop to feed the existing depot with additional electrical capacity. It is anticipated that a new

[12] **Source:** Guidebook for Deploying Zero-Emission Transit Buses | Blurbs New | Blurbs | Publications (trb.org)

utility riser pole would be inserted at the north corner of the property to tap from GSU's existing 44 kV overhead system. Any ancillary pad mounted switchgear, junctions and metering equipment would be located near the base of the pole. An underground power line would run to the southeast corner of the property and eventually feed two unit substations at the facility. One 44 kV to 480V transformer would be installed during phase one and two, responsible to feed 12 chargers within the Transit Depot. Both unit substations are needed to accommodate the phase one and two charging needs. Phases three and four would install an additional 8 chargers.

FACILITY UTILITY CONSIDERATIONS

Currently, most EV charging infrastructure is designed to operate at 480V which is commonly used in the US. If GSU is unable to provide a 480V connection and instead can only provide a 600V connection, a step-down transformer will need to be purchased to serve the charging equipment. By the time the City of Greater Sudbury is ready to construct its facility, more EV vendors may offer 600V equipment rated for Canada.

A secondary option, and the one currently depicted in the conceptual design, is to install a primary metered system. This would provide a utility meter near the source and then the City of Greater Sudbury would own and operate a small portion of medium voltage electrical line that feeds unit substations. The unit substations would operate at the specified voltages (44 kV supply and 480V load). Each unit substation would also consist of the 480V breakers required to supply the chargers.

SITE CONSTRAINTS

Site constraints of the existing facility are only known at a high-level at this time. The concept plans at the facility should have access to electrical utility infrastructure that can provide the anticipated energy needed for the electric bus conversion and will need to be further confirmed with GSU regarding the service drop cost and interconnection details (i.e. final design).

PRIMARY AND SECONDARY METERING

For a primary metered service connection, the utility brings power to the client at distribution and transmission voltage. The client, in this case the City of Greater Sudbury, is responsible for designing, constructing, owning, operating, and maintaining a substation or other medium voltage electrical equipment to step this voltage down and distribute it throughout the facility. Metering equipment for the client is done at the distribution/transmission voltage which is more costly than the equipment required for secondary metering but results in a lower cost per kwh. The client may also choose a primary service even if their power requirement can be provided as a secondary service if the client needs a different voltage than what the utility can supply as a secondary service voltage.

Secondary metering service connections have a transformer owned and maintained by the utility that reduces the voltage from the primary distribution voltage to a standardized lower voltage, either 600V three phase, 208V three phase, or 120-240V single phase. With a secondary metering service, a utility meter is then installed downstream of the transformer. Secondary services are generally preferred because they are less expensive and maintained by the utility. However, secondary services can be limited to a maximum service size that is determined by each utility.

REDUNDANT FEEDS

For critical infrastructure such as that which would power GOVA Transit services, redundant power feeds to a site are used to increase the reliability of the utility service. This is commonly achieved by bringing a separate circuit to the site that is fed from a different utility feeder and power line, preferably from a separate substation.

If the redundant feed comes from a separate feeder within the same substation, this only protects the site from an outage on one of the power lines, such as a tree falling on the power line or a pole breaking. In the event of an

outage at the substation, both feeds may experience an outage depending on how the utility designed or operates the system. For this application, a redundant feed from the same substation is only practical if an alternate circuit is already nearby the site, otherwise a new power line would need to be brought to the site from the nearest location, which can be cost prohibitive. Redundant feeds from a separate substation provides the most robust utility feed for a site and are recommended whenever possible as they can be less costly and more reliable than other redundant sources. Energy resiliency is discussed elsewhere within this appendix.

A separate circuit could also be added from the existing circuit feeding the site; however, this is not very practical as it would only provide redundancy for the taps feeding the site and does not provide much benefit since outages may occur prior to the tap locations, causing both taps to trip.

For a specific site, the nearby circuits and substation feeding them is usually only known by the utility and typically not shared with clients as it is rarely of concern.

ELECTRICAL INFRASTRUCTURE OWNERSHIP

Some municipalities in other regions have looked to partner with their local utilities to install and maintain electrical infrastructure and charging equipment. Business models such as charging as a service (CaaS) and energy as a service (EaaS) are two examples where a third-party service provider offers energy-related assets and services to customers.

CaaS focuses specifically on providing EV charging infrastructure, whereas EaaS encompasses a wider range of energy-related assets and services, including energy storage, renewable energy sources, and energy management systems. Working with local utilities or third parties, there may be an opportunity to leverage their expertise to allow the transit agency to focus on its core business, which is operating transit service. Utilities have expertise in electrical infrastructure maintenance, energy management, energy market trends, renewable energy and regulatory compliance that can ensure that charging infrastructure is installed and scaled to meet the demands of the transit agency, and that energy usage is optimized to minimize costs.

Reliability and backup power are also critical components that can be included in EaaS agreements and are often factored into the service level agreements (SLAs) between the EaaS provider and the customer.

In future utility discussions with GSU, the City of Greater Sudbury can bring up these alternative options for consideration. In doing so, the City may be able to build a mutually beneficial relationship with GSU that leads to longer term cost savings in the future.

UTILITY RATE CONSIDERATIONS

Electrical costs are determined based on the utility's approved rate tariff which in Ontario is regulated and approved by the Ontario Energy Board (OEB). In Ontario's energy system, customers are classified into two categories: Class A and Class B.

A Class A customer in Ontario's energy system refers to a larger business or industrial customer that has an average peak demand of more than 5 megawatts (MW) in any of the previous twelve months. These customers have the option to participate in the Industrial Conservation Initiative (ICI) program, which allows them to reduce their Global Adjustment (GA) charges by reducing their electricity consumption during periods of peak demand.

A Class B customer refers to a residential or smaller business customer that has an average peak demand of less than 5 MW in any of the previous twelve months. These customers are charged a regulated price for the electricity they consume, which is set by the OEB and is based on the Hourly Ontario Energy Price (HOEP). Class B customers

also pay a GA charge calculated on an hourly basis and is included in the overall electricity price that Class B customers pay.

Customers in Ontario also have the option of purchasing electricity from third party energy retailers approved by the OEB. When purchasing electricity through energy retailers, customers are still responsible for other aspects of electricity like delivery, regulatory and global adjustment charges.

APPLICABLE UTILITY CHARGES

The Greater Sudbury Utilities (GSU) has two General Service utility rates[13], which were updated on May 1, 2023. Time-of-use (TOU) rates are available to residential and small businesses, but not available for loads larger than 50 kW peak demand. Based on the predicted energy consumption to electrify the existing bus fleet, four chargers would peak at approximately 600 kW, which would qualify for the greater General Service 50 kW to 4,999 kW rate schedule. Increased fleet size may require additional charging load and may push GOVA Transit to a different rate category or possibly a negotiated rate.

- **Monthly Service Charges:** These base charges are assessed monthly included for every meter location. This likely will not change with adding BEB's to the fleet. The GSU Monthly Service Charges include a $185.60 Service Charge, a $11.12 Rate Rider for Recovery of Advanced Capital Module charge, and a $0.25 Standard Supply Service – Administrative Charge.

- **Demand Charges**: Demand is measured in kilowatts (kW) and the demand charge is a $/KW fee assessed based on the highest kW level drawn in the monthly billing period. This charge is of particular importance to fleet managers of BEBs. For example, if GOVA Transit charged BEBs in the middle of the afternoon at the exact time it is drawing its peak power for its other electric services, this may significantly increase its monthly demand charge. The use of charge management systems can help mitigate the effect of demand charges with BEBs and other EVs. There are numerous demand charges that apply to GSU rates including Distribution Volumetric, Low Voltage Service, Transmission Network and Line Connection, and rate riders. Including the riders, the Demand Charge is $14.533/kW.

- **Energy Consumption Charges**: Energy consumption charges quantify the amount of electrical energy consumed over a monthly period. Charge is based on kilowatt-hours (kWh) that are used, and the price GOVA Transit will pay depends on the time of day and time of year the BEBs are charging vehicles from the grid. Energy consumption charges can be difficult to predict with some rate schedules, but the GSU rates appear to be fairly straightforward. GSU currently charges $0.0052/kWh for energy consumption per their rate sheet.

CHANGING UTILITY RATE STRUCTURES

It's important to note that the demand for electricity is increasing, partly due to the shift towards clean electricity in fleets and building systems. This increase in demand is causing some utilities in North America to modify how they structure their rates. The following are examples of different rate structures that utilities have implemented to accommodate the rising demand. These examples are intended to provide insight into how rates may evolve in the future.

[13] March-23-2023-Tarrif-of-Rates-and-Charges.pdf (gsuinc.ca)

Seasonal Considerations

Many utilities utilize seasonal rates during different times of year. These rates generally reflect the rate changes from the bulk power provider and generally charge less when less is consumed (i.e. summer when daylight hours are longer and temperatures are more moderate).

Time of Use (TOU)

Some utilities also utilize TOU rates to incentivize customers to consume power during off-peak times, when possible, thus creating a peak-shaving effect. This approach allows utilities to defer large infrastructure projects that would otherwise be needed for high peak consumption but then not utilized during the majority of time. TOU rates also help to better regulate generation needs and mitigate costs.

GSU does not currently utilize TOU rates on their General Service rate schedules but may consider doing so in the future. If TOU rates become available to GOVA Transit, a follow up cost benefit analysis would help inform what the cost savings, if any, would be to change rate structures.

Electric Vehicle Charging Rates

Some utilities, including the Ontario Energy Board (OEB), are beginning to incentivize electric vehicle adoption with specific EV tariff structures. These tariff structures are designed to accommodate the unique electricity needs of EV's and EV fleets, and to incentivize EV charging at times that are optimal for the grid. For example, the OEB is introducing an "ultra-low" overnight rate for residential customers. While the initial focus of utilities is on residential applications, in future years EV rate structures applicable to Transit applications are expected; as of 2023, OEB's "ultra-low" rate structure is not applicable to GOVA Transit's fleet.

SEPARATE METERS/FEEDS FOR EV CHARGING

Many utilities have been employing a separate service and meter for electric vehicle charging. This meter is separate from the rest of the facilities at the site and means that it only measures the demand and consumption of EV charging.

Separate meters allow for the utility to isolate the demand and consumption of vehicle charging compared to other loads at the site which can allow them to apply discounted EV electricity rates. Separate meters or sub-meters are typically recommended for EV charging infrastructure even if the utility does not currently offer an EV rate. Utility tariffs are constantly changing and if an EV charging rate becomes available in the future, additional metering modifications will not be required.

Another reason this is preferable is that it allows for more precise data related to cost of services, where costs for conventional bus operation charging administration is segregated from costs such as building electrical and outside lighting. Separate meters, or sub-meters, will allow the City to understand cost for service to move/operate the transit fleet, as compared to normal building loads.

SOLAR GENERATION RATES

There are a few ways the photovoltaic (PV), also known as solar, system can benefit on-site loads. First, PV provides local power generation to offset the loads and reduce, or negate, the overall load during PV generation hours. In instances where the PV system is generating more energy than the load requires, the system can generate revenue through a net metering program. In the case of net metering, the excess solar energy is sold back to the grid/utility at a wholesale rate, which is typically less than the purchase price of energy, and the amount is credited to the owner's utility bill.

Due to most net metering policies, energy generated on-site from PV is most valuable when utilized to feed on-site loads. Further coordination with the utilities is recommended to ensure that future utility rates will allow for net metering and to understand any potential caveats or limits associated with it.

MAINTENANCE AREA CONSIDERATIONS

MAINTENANCE BAY CHARGING

It is not expected vehicles will be routinely charged in maintenance bays, however, there may be instances when having some charging capability in the maintenance bays can be useful. For example, in case of a charging issue with a vehicle, it can be placed in a maintenance bay to diagnose the problem.

Portable chargers are available that could be shared between maintenance bays and deployed as needed. They would require appropriate power for the equipment to be available to the maintenance bays which could be relocated between maintenance bays as needed.

VEHICLE ROOFTOP ACCESS

BEBs have a significant amount of equipment mounted on the roof of the vehicles including electrical converters, battery packs, and charging rails that will require service and/or troubleshooting. Fall protection systems will need to be in place to enable staff to safely work on those components of the vehicle. While personal fall protection equipment, such as harnesses and retractors, can allow this type of work to be done, the preferable way is to have permanent, or portable, scaffolding that allows staff to work on equipment, with personal fall protection equipment providing secondary securement.

LIFTING DEVICES FOR ROOFTOP EQUIPMENT

Along with access to the roof of the vehicle, it may also be necessary to be able to lift items like battery packs on or off the roof for service and replacement. The capacity of cranes that may assist in lifting battery packs should be verified against the heaviest equipment the manufacturer expects will need to be moved on or off the roof of the vehicle.

The weight of the batteries depends on several factors including the bus manufacturer, battery manufacturer, bus length, and battery size. Being a new technology that many agencies have not yet implemented, specificity regarding the recommended crane capacity or rating cannot be provided at this time. As agencies begin to implement BEBs and gain experience with the maintenance of rooftop battery packs, the development of an industry standard for equipment can be expected, but the timing of when a best practice may be developed is not yet know.

SPARE PARTS STORAGE

Having an adequate supply of spare parts that will be unique to the BEBs and charging infrastructure is something that is recommended. With fewer vehicles on the road compared to internal combustion engine (ICE) vehicles, parts can have longer than normal lead times and having critical spares for both BEB and ICE vehicles will be necessary as the fleet transitions. The space requirement for those additional spare parts should be evaluated once information from the supplier has been provided in terms of the recommended quantity and type of critical spares.

To ensure the timely repair of charging infrastructure, certain spare parts should be kept on hand. Below are some parts to consider keeping inventoried for plug in chargers.

- Cables (OEM cable could be purchased with the connector)
- Plug connectors
- Spare cable retractors

- Spare screen interfaces
- 10% spare ratio of cabinet dispensers

On-route chargers will also experience a high workload, due to the number of cycles required each day. Below are some of the parts to consider keeping inventoried on-site for on-route chargers.

- Manufacturers illustrated parts list and manufacturer's recommended parts inventory
- A complete pantograph unit including all attachments – this would be advantageous in the event of catastrophic failure or vehicle accident
- Replacement conductive blades
- Replacement springs
- Replacement electric motor
- Complete set of pins, bolts, electrical bulkhead connectors meeting OEM specifications – the number of parts needed should be determined based on total system size and expected delivery windows from the manufacturer
- Complete set of high voltage cables

FLOOR AND HOIST CAPACITY

The empty vehicle weight of a BEB is typically heavier than that of diesel bus, due to the significant weight of battery packs in the vehicle; this varies by manufacturer and battery pack configuration. Publicly available curb weights of several diesel, hybrid and BEBs are listed in **Table 18** to illustrate the magnitude of the weight difference between the different vehicle types:

Table 18. Curb Weight of BEBs from Select Manufacturers

Propulsion	Manufacturer	Model	Curb Weight
Diesel	Nova	LFS	12,981 kg
Battery Electric	Nova	LFSe+	16,002 kg
Diesel	New Flyer	Xcelsior	12,587 kg
Diesel-Hybrid	New Flyer	Xcelsior Hybrid	13,200 kg
Battery Electric	New Flyer	Xcelsior Charge NG	15,440 kg (480 kWh)*
Battery Electric	Proterra	ZX5 Max	15,131 kg (440 kWh)*
Battery Electric	BYD	K9MD	16,089 kg (496 kWh)*

**Note: Curb weights are from Altoona testing reports. Configuration options such as higher capacity battery packs can significantly impact vehicle weights.*

The structural capacity of the concrete floor inside the garage should be assessed to understand the impacts of operating heavier vehicles. If sufficient as-built information is available for the facility this may be able to be done through a desktop engineering analysis. If capacity of the flooring is unable to support heavier vehicle types, it may be possible to purchase lighter vehicles or consider if modifications could be made to the existing foundation.

The actual weight of vehicles purchased should be compared to the existing hoist capacity at the transit garage to ensure that the current equipment is capable of safely lifting the vehicles. Presently, the ECO 60 hoists are rated to approximately 27,000 kg, which is far greater than the current total weight rating of BEBs on the market today. However, the weight distribution of BEBs can be more disproportionate than diesel buses, so it's important that manufacturers are able to provide not only total curb weight but also the specific weight on a per axle basis.

SOLAR AND BATTERY ENERGY STORAGE

Some transit agencies deploying BEBs add distributed energy resources like solar panels and battery energy storage systems (BESS) for added benefit. Understanding how these resources could be deployed and operated at existing and proposed facilities will assist in determining potential benefits for GOVA Transit.

SOLAR PHOTOVOLTAICS (PV)

Solar PV is an increasingly popular choice for on-site supplemental energy generation as solar costs have decreased significantly over the last decade. Solar PV is typically not capable of offsetting the entire bus charging energy demand. However, PV can offset a meaningful portion of overall demand resulting in a "net load" that is lower than scenarios without PV. The overall impact of solar PV is dependent on a fleet's charging schedule. A solar installation will have a greater impact on demand charges, and thus, a utility bill, if fleet charging is aligned with solar PV production. Even if day-time fleet charging is limited, the integration of on-site solar may help offset the City of Greater Sudbury's increased load.

The PVWatts® Calculator was used to estimate the solar energy that could be generated at the conceptual site. PVWatts® is a tool created by the National Renewable Energy Laboratory (NREL) and uses the location and weather data for each site to estimate a monthly generated power output of the solar PV system, including overall system efficiency losses.

The existing depot roof has a total area of 12,068 square meters. It is assumed that 80% of the rooftop area can be used for PV. This can accommodate approximately 1,040 kW DC of solar, which would yield 1,290,000 kWh in Year 1.

Aligning a roof-mounted solar installation with an existing roof has some challenges as the roof must be structurally adequate to support the additional load, and in many cases, the roof may already have obstacles in the way of the ideal PV layout. For flat roofs, a ballasted racking system can secure panels and limit any penetrations to a single direction service connection from the roof to the electric service panel. Pitched roofs with a standing seam metal roof can utilize racking systems that clamp to the seam, similarly, reducing roof penetration needs to a single direction service connection.

A new solar installation would likely be connected to the grid through net-metering where any excess generated energy not used by charging infrastructure or building loads would be sold back to the utility and credited to GOVA Transit for future use.

BATTERY ENERGY STORAGE SYSTEM (BESS)

Energy storage devices can play a critical role within a microgrid or distributed energy resource (DER) system. Although energy storage systems (ESS) are not a generation method, they can provide greater reliability and resiliency for a microgrid, along with potential energy bill reduction applications. They are especially useful when utilizing renewable generation methods, as it can help reduce some of the intermittency issues and extract more value out of those types of assets. Battery energy storage systems (BESS) are the most prominent and mature technology for distributed scale systems and microgrids.

For transit facilities, BESS systems are typically utilized for shifting loads in a strategic way that may help reduce demand charges and total energy costs associated with large charging loads that occur during peak rate hours. The size (kW) and duration (kWh) of a potential BESS is heavily dependent on the available space for installation as size of the system will increase as the nameplate capacity and operational duration increases. BESS size will vary from vendor to vendor, but most solutions are typically of a containerized configuration. Systems of this nature are

generally modular and flexible in terms of size with footprints ranging from 2.4 m x 3.7 m upwards to 12 m x 2.4 m (12 m ISO containers).

Agencies that are not subject to a tariff that has time of use charges and those that have access to net-metering may not require BESS since the grid can effectively act as that storage mechanism. Beyond the initial capital cost of purchasing the BESS, they have a usable life and will need to be replaced after operating a certain number of cycles. There are also operating maintenance costs to consider as well as some efficiency losses as energy is put into and taken out of the BESS.

For GOVA Transit, the electric vehicle charging system is already designed to manage the demand and keep it at a consistent level throughout the day. This means there are no significant peaks that would benefit from the addition of a BESS. Since the demand profile is relatively flat, there is no need to shift the load, and it is not recommended to use a BESS with the current tariff structure.

RESILIENCY CONSIDERATIONS

There are a number of technologies and strategies that can be considered at the City of Greater Sudbury Transit and Fleet facility to increase resiliency. Some involve installation of additional infrastructure while others are potential operational strategies that could reduce or mitigate risks which may impact service. These technologies may decline in price, and increase in efficiency, by the time construction commences in 2025-2026. This may include localized generation and battery energy storages systems as described above, along with items such as hydrogen fuel cells, spare buses, or service reductions. Each method provides different levels of support for the fleet and its infrastructure, and their costs to implement should be weighed against the need for increased reliability.

While the electric utility will never be able to maintain a system that provides power 100% of the time to every customer, some improvements can increase reliability to an area or a single customer. GOVA Transit must balance the operational risk and costs with the resiliency and reliability needs.

REDUNDANT GRID SOURCES

Depending on the base location another method to increase resiliency is to employ a redundant feeder from the utility grid. Ideally, this secondary redundant source is served by a separate circuit than the primary feeder and could provide power to the transit base in the event the primary source experiences an outage or fault. There are several main grid components that affect the grid source reliability.

Substations

The electric utility typically takes service from the generation and transmission grid at the utility's substation. The substation converts electricity from a high transmission voltage to the local medium voltage system. Due to land constraints and large load requirements, the local utilities generally operate multiple transformers within each substation and each transformer is connected to multiple medium voltage, distribution feeders. Most outages at the substation level are localized to a single substation transformer. The presence of multiple substation transformers provides redundancy during most normal operations. The utility usually plans maintenance outages to avoid impacting the entire substation; however, when planning for redundant power to the transit base chargers, GOVA Transit should request redundant distribution feeders be fed from separate substations if feasible or at the least from separate substation transformers.

Distribution Feeders

Medium voltage distribution feeders are installed and operated by the utility to supply electricity to their customers. Utility planners work to ensure that the grid will operate as reliably and efficiently as possible. Utility planners

consider how to add new loads to the grid and how to best operate the local grid when maintenance or other outages impact an area or customer. In most cases, impacts to the distribution feeders are seldom known or experienced by the utility customer.

Unexpected outages at the distribution level are often localized and able to be fed from a separate distribution feed. Underground distribution feeder outages are most commonly caused by digging into the line. Underground feeder outages do not happen frequently but occur for a longer duration. To avoid long-duration underground outages, utilities typically operate a loop system that can be switched from one source to another to avoid lengthy delays.

Overhead distribution feeders are installed nearer to the ground than transmission lines, so they are more likely to be impacted by tree branches and animals contacting the bare conductors and shorting the system. Overhead distribution feeders are also not built to the same strength as the transmission lines, so wind and downed trees can also impact these overhead feeders. Overhead feeder outages occur more frequently than underground outages but are repaired much quicker because they are more accessible. Overhead feeders are often configured to allow multiple sources to back feed the line in the event of outage or maintenance.

Some factors for consideration of the distribution feeders may include:

- Whether the charging infrastructure will require a 100% redundant backup source; If 100% redundancy is required, this will increase cost and on-site space required for the utility to provide this level of redundancy.
- Providing separate distribution sources from two separate substations is most desirable but also most costly. If redundant distribution feeds are installed, the Town should consider utilizing sources from separate transformers within that substation.

INTERNAL COMBUSION ENGINE (ICE) GENERATION

There are two traditional methods for generating power: combustion turbines and internal combustion engine driven generators. These technologies are both effective for generating power on a large or small scale, whether for primary power generation or backup power. Combustion turbines usually have a higher power output, ranging from 500 kW to 25 MW, but they can also be used to meet larger distributed loads. These machines require hydrocarbon fuel, such as natural gas, oil, or fuel mix, to operate. ICE generators come in a variety of sizes making them highly scalable. These machines have a high degree of reliability and can operate on demand but also require fuel input and maintenance. This provides high degrees of reliability and some resilience, but they may fall short in terms of environmental concerns due to the utilization of fossil fuels.

Using ICE generation to offset BEB charging load is generally not an optimal solution due to high maintenance costs, fuel input, and emissions that make it unsuitable for consistent use. However, these generation methods can still serve as backup power to enable reduced transit operations during electric service outages.

When selecting an ICE generator, footprint is an important consideration. A typical stationary diesel ICE backup generator will require a footprint of approximately 7 m^2/MW. Therefore, a 1.5 MW stationary backup generator would require approximately 10.5 m^2, not including ancillary equipment such as transfer switches or noise reduction enclosures.

In addition to stationary ICE generators, there are also portable ICE generators available in a variety of sizes up to about 2 MW. Charging infrastructure at facilities can be designed with capacity to connect portable generators. The benefits of having a portable generator at the depot facility should be considered. This option provides flexibility to relocate the generator as needed, in case of power outages, and eliminates the requirement for separate generators

at each site where chargers are installed, including en-route charging locations. This also allows the option to scale up backup generation in the future by purchasing additional generators if reliability continues to be a challenge.

HYDROGEN FUEL CELL GENERATIONS

Hydrogen fuel cells can provide a large amount of power in a smaller footprint than other renewable sources and do not suffer from intermittency. Fuel cells also have low to no emissions depending on the fuel utilized but do require fuel input, additional infrastructure, and safety equipment to maintain high temperatures within the device and to safely store potentially volatile fuels.

Historically, fuel cells have relied on hydrogen as their primary fuel source. To use hydrogen fuel cells, a hydrogen fuel source must be available at the intended site. Hydrogen delivery can be accomplished either through on-site or off-site generation. On-site generation requires raw components that are readily available at the site, such as water or natural gas and electricity. The cleanliness of the hydrogen produced is largely determined by the source of the electricity used in the generation process. Renewable sources, such as hydropower, are considered more desirable than coal or hydrocarbon generation. Generating hydrogen on-site requires significantly more infrastructure than the existing facilities can accommodate. On the other hand, if hydrogen is generated off-site, storage tanks and pumps will be required to store and deliver the fuel to the fuel cells. Truck-and-tank delivery systems are typically used for off-site generation since hydrogen pipelines capable of supporting a 1 MW or larger generator are not currently available.

The size, form factor and fuel cell stack deployment are vendor dependent. A 440 kW containerized fuel cell will have a space requirement of 8.5 m x 3.4 m x 2.7 m or an approximate footprint of 0.07 m^2/kW. The estimated footprint includes only the space required for the fuel cell stacks and does not include the required space for ancillary equipment such as fuel storage or electrolyzers. A 1.5 MW containerized fuel cell installation would utilize 16 units and requires an approximately 100 m^2 footprint.

Similarly, a modular installation would have an approximate space requirement of 4.6 m x 2.7 m x 2.1 m for a 250 kW unit. A 1.5 MW modular installation would require 6 x 250 kW units with an estimated footprint of 100 m^2. These estimates do not include the necessary space for fuel storage and maintenance access.

In general, fuel cells are not ideal for emergency generator applications where the equipment is stored and operated only for a limited number of hours each year. The reason for this is that fuel cells need to maintain high operating temperatures to function effectively and efficiently. If a fuel cell is cold, it can take up to 10 hours to heat up to the optimal temperature. This long startup time is usually not acceptable for emergency generation applications. One potential solution to this problem is to equip the fuel cell to provide a small portion or the entirety of the full load during normal operation. This way, the fuel cell is always operating and maintains its ability to run during an outage. By operating in this way, the primary and backup power sources can effectively swap roles, so that the electrical grid serves as a backup to the fuel cell, providing the desired level of resiliency. Fuel cells have a very fast ramp rate, which means that they can quickly increase their power output to meet sudden demand. If a fuel cell is kept in hot standby mode and ramped up to full load during an outage, it can provide similar starting characteristics as internal combustion engine (ICE) generators. However, it's important to note that keeping the fuel cell in hot standby mode will require the consumption of natural gas or hydrogen during normal operation.

REDUCED BUS SERVICE

In the event of an outage, it's important to have a resiliency plan in place that involves reducing the number of bus services that are offered. This can help ensure that the buses are able to maintain a sustainable level of operation, depending on the severity, type, and duration of the outage (whether it's a utility, local, or software issue). Once the

outage is resolved and the buses are fully charged, services can be returned to normal levels of operation. Different plans can be developed to optimize services for different outage categories to streamline service reductions. It should be noted that in the event of a large-scale outage, such as those caused by a large natural disaster, the overall demand for transit service will likely decrease as the disaster has larger regional impacts beyond local services. This should be considered if reduced operations plans are developed in the future. Overall, service reduction plans are dependent on the type and scale of an outage and are a viable option as a primary or secondary method of operation resiliency.

SPARE BUS CAPACITY

Maintaining a fleet of spare buses is also a viable option to sustain a higher percentage of operational transit routes in the event of an outage. Depending on the type and length of a potential outage, buses can be swapped with fully charged spares from a reserve fleet once they reach a low state of charge. Maintaining a reserve fleet of BEBs would allow GOVA Transit to maintain their emissions goals while enabling a greater sense of resiliency for transit operations. However, a reserve fleet of this style is still limited by the charging infrastructure which may be impacted by the potential outage.

A reserve fleet containing diesel buses can provide a greater amount of bus swaps as they are not limited by potential charging outages. While this method may be viable during a phased fleet conversion, this would no longer be viable and considered once the entire fleet becomes battery electric.

While a reserve bus fleet can provide a greater sense of resiliency and allow for increased transit operations during an outage, there are significant costs and space requirements associated with purchasing and maintaining a reserve fleet that should be weighed against the benefits of developing and storing additional vehicles.

EN-ROUTE/LAYOVER CHARGING

In the event of an outage localized to a transit base, en-route chargers could be utilized to keep transit routes in service. An outage localized at a transit base could affect the charging infrastructure and the charging schedule at the base. As an alternative to significantly reducing transit services, specific routes could be rerouted to utilize en-route charging until the outage at the base is resolved. The duration in which this solution can be utilized for resiliency is dependent on the severity of the outage. Likely, this could be utilized for a short period of time to keep a single day's routes in service without major revision of the transit routes. This would be dependent on the final charging infrastructure design and the location of en-route chargers.

RESILIENCY RECOMMENDATIONS

Historically, power outages experienced by GOVA Transit have been short and infrequent. However, more frequent outages may occur due to extreme temperatures or severe weather events because of global climate change. There are several redundancies that GOVA Transit could implement, but in the short-term these will be limited to a reduction of transit bus services and the potential implementation of a diesel backup generator. If the agency experiences a short, isolated outage, GOVA Transit may be able to operate the existing service routes with decreased frequency, minimizing the impact reduced service has on riders. In the event of a widespread, prolonged outage, GOVA Transit may reduce service to strictly critical operations; this may include the transport of first responders or hospital transport. To support critical operations, GOVA Transit will likely need to operate at least 20% of the fleet although this may change depending on service coverage and requirements within the City's business continuity plans and any commitments to providing transportation during emergencies.

Reduction of services at the beginning of the transition to BEBs would not necessarily require backup power as this service could be supported by the diesel fleet, but alternative redundancies will need to be considered when BEBs make up a larger portion of the fleet.

While a generator may not be required immediately, it is suggested that the infrastructure be included in the initial phases of the transition to allow for the future installation of backup generation. This is a cost-effective option that GOVA Transit can utilize if the grid reliability changes or operational workarounds are insufficient, and a greater number of vehicles must be utilized to maintain critical operations.

Solar PV is being considered as an added improvement to the existing GOVA Transit Facility. BESS is also considered as part of this study and will be further evaluated during design development via cost-benefit and high-level pros and cons assessment. In the future, GOVA Transit may reconsider alternative backup power sources to reach a net-zero carbon footprint with 100% renewable energy.

GOVA Transit will continue to evaluate new ways to mitigate the risk of reduced operations through redundancy in power delivery by fueling a portion of the BEB fleet using backup power or by partnering with the utility power provider for a redundant feed. As other municipalities begin planning for transitions to zero emissions and implementing alternative backup or redundant power methods, GOVA Transit may opt for the same methods depending on performance and realized risk of outages now and in the future.

BUILDING CODE AND FIRE SAFETY

Indoor storage of vehicles is not a new concept, but the introduction of BEBs is an aspect that introduces new risks to facilities. Regulatory authorities are still working to determine if additional requirements will be needed. The biggest change with the introduction of BEBs and charging infrastructure is the increase in high voltage electrical equipment that is now being installed as well as the possibility of lithium-ion battery fires from vehicles stored inside facilities.

Each province and territory in Canada has its own building code, which may adopt the National Building Code of Canada (NBCC) or modify it to suit local requirements. These codes may include specific provisions related to fire safety in buildings that house BEBs or other hazardous materials. While the NBCC it does not specifically address battery electric vehicles currently, it sets standards for fire safety, electrical systems, ventilation, and other aspects that would apply to any building.

The Canadian Electric Code (CEC) is a national standard for electrical installations in Canada. It provides requirements for the safe installation and use of electrical equipment, including charging stations for BEBs. Electrical codes are already in place that dictate measures that would be required for installation of high voltage electrical equipment and their required safety devices. Electrical designs will need to be done by qualified professionals and will be reviewed through the building permit process to ensure the designs meet relevant electrical code requirements.

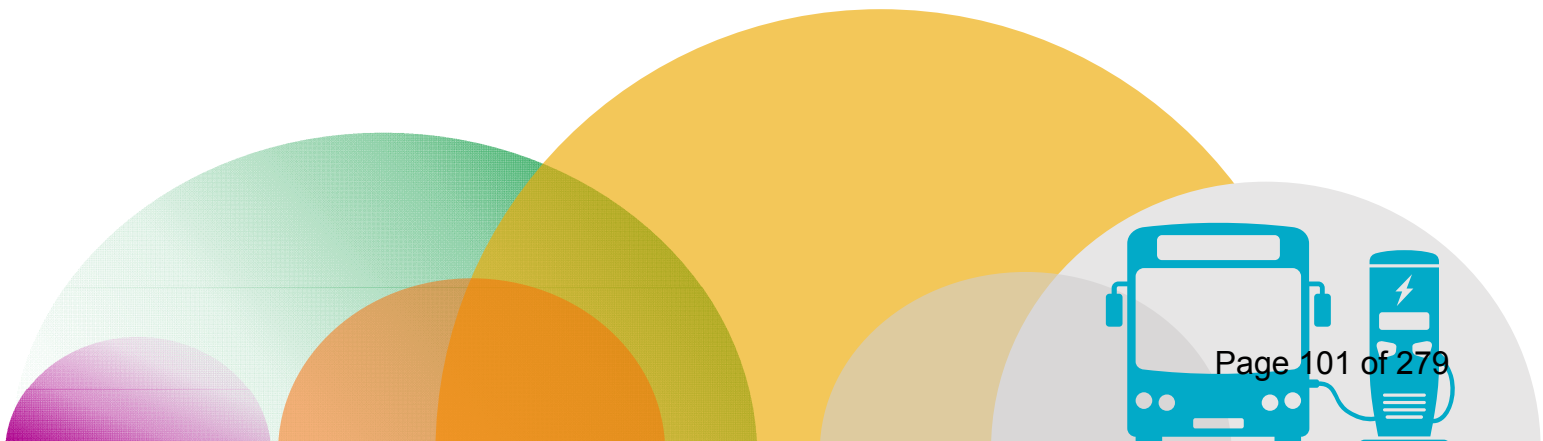
Fire safety standards for BEBs are an emerging area and some codes have not yet caught up to determine what the requirements should be for facilities that house BEVs. Vehicle fires are not a new concept for buildings and while, to date, battery electric vehicle fires are statistically less common than internal combustion vehicles, they do happen and behave differently. For example, if thermal runaway occurs in a battery pack, the fire can be difficult to extinguish and may take hours to put out.

Fleet operators have been proactive in thinking about how to mitigate these risks and while the current building codes may not explicitly dictate requirements, there are suggestions that can be provided based on experience as to what transit agencies should consider in terms of additional fire safety measures:

- Develop a fire safety plan with the local fire department that addresses how to deal with a fire.
- Performing a facility fire safety risk assessment to evaluate aspects such as:
  - Rating of the building fire suppression system in vehicle storage areas.
  - Availability of water for the fire department to be able to extinguish fires.
  - Emergency power shut offs for charging equipment.
  - Manual HVAC controls to exhaust smoke and fumes from a vehicle fire.
- Having an ongoing dialogue with first responders after implementation so that first responders are familiar with the facility, vehicles, and tools available to deal with fires at the facility.

APPENDIX C

BUDGET & FINANCIAL PLAN



APPENDIX C: BUDGET & FINANCIAL PLAN

This appendix breaks down all details of the financial analysis, including assumptions, model results, and supplementary tables for cost breakdowns over the whole analysis period.

FLEET TRANSITION SCENARIOS

The financial analysis considers two scenarios for GOVA Transit's fleet transition. Each scenario evaluates the capital, maintenance, and fuel/electricity costs required between 2023 and 2050.

- **Baseline (Business as Usual):** This reflects the scenario where no transition to BEVs occurs. All existing diesel buses are replaced with new diesel buses.
- **BEB Transition:** This reflects a full transition of the fleet's diesel buses to BEBs in alignment with the existing replacement schedule, beginning in 2025. In this analysis, depot charging is used until enroute chargers are introduced in 2030.

LIFECYCLE COST ANALYSIS

The analysis presents all dollar values in net present value (NPV) terms, unless otherwise noted. NPV analysis accounts for the "time value of money": the principle that a dollar today is worth more than a dollar tomorrow. NPV is used to present costs incurred over the 2023-2050 study period on a consistent basis. Year of expenditure (YOE) costs (costs escalated to reflect anticipated actual costs in a future year) are discounted to 2023-dollar terms by applying a discount factor of 8%. A nominal discount rate of 8% was selected based on a high-level estimate of municipal borrowing costs of 5% and a 3% general inflation rate. This value was used based on HDR experience with similar transit agencies.

KEY COST ASSUMPTIONS

The analysis relies on several assumptions like bus operating statistics and purchasing schedules for the Baseline and BEB Scenario. Capital costs include vehicle purchase costs, BEB charging infrastructure costs, and any required electric utility service upgrades.

VEHICLE CAPITAL COSTS

Table 19 presents the unit cost assumptions for buses. The modelling results indicate the fleet can be replaced at a one-to-one ratio; the transit fleet size is expected to remain the same after transitioning from diesel to BEBs.

Table 19. Vehicle Unit Capital Cost Assumptions, 2023$

Vehicle	Unit Cost
Diesel Bus	$780,000
Battery Electric Bus (675 kWh)	$1,874,287

INFRASTRUCTURE CAPITAL COSTS

Table 20 identifies the capital costs associated with charging infrastructure required for BEVs listed in the replacement schedule. As noted in the fleet modelling analysis, the City of Greater Sudbury Transit & Fleet Centre has been designed to phase in additional infrastructure primarily including substations, 150 kW charging equipment, circuit breakers, and other infrastructure needed to facilitate charging for the BEB fleet. Costs are escalated and discounted similarly to other capital costs modelled.

Table 20. Infrastructure Unit Cost Assumptions, 2023$

Infrastructure	Unit Cost
Plug-In Depot Charger (150 kW)	$133,900
Plug-In Depot Charger Cable Dispenser	$44,596
Pantograph Charger (450 kW)	$312,455

OPERATING AND MAINTENANCE COST ASSUMPTIONS

Ongoing operating and maintenance (O&M) costs for GOVA Transit's conventional diesel fleet and their modelled BEB replacements are part of this analysis.

- **Bus Operations and Maintenance**: The operating and maintenance cost per hour was based on GOVA Transit's submission to CUTA 2023 Conventional Transit Statistics. The cost per revenue hour provided by GOVA was adjusted to a cost per total hours, since Zero+ outputs total hours, the sum of revenue and non-revenue hours. The hourly cost of operations and maintenance was provided in 2023 dollars, then divided by total vehicle hours. To avoid Fuel costs were excluded by converting 2023 annual fuel costs to a dollar-per-hour unit, which was then subtracted from the total hourly operating & maintenance cost. This cost is applied to total estimated operating hours for diesels and BEBs throughout the transition plan. This cost includes labor costs and maintenance costs for buses in the fleet.
- **Fuel Efficiency:** Litres per 100 kilometres (L/100km) was calculated as an average of the diesel consumption divided by total vehicle kilometres travelled recorded by GOVA Transit reported in CUTA 2022 Conventional Transit Statistics. This was confirmed through correspondence with GOVA Transit staff.

OPERATING COST ASSUMPTIONS

The cost of labor in both scenarios is based on the anticipated operating hours in both scenarios. The cost per hour is assumed to be the same, but the total cost in the BEB Transition Scenario is greater due to an increase in non-revenue hours due to deadhead to and from the garage. Fuel costs were excluded from the hourly operating to prevent double counting fuel costs, calculated separately using expected kilometres travelled and fuel efficiency of the transit buses. Annual fuel costs for 2023 were divided by total vehicle hours to estimate a dollar-per-hour value. This was then subtracted from the hourly operations and maintenance cost described above.

Table 21. Unit Operating Cost Assumptions, 2023$

	2023	2025	2030	2035	2040	2045	2050
Operating Cost ($/hour)	$132.00	$140.04	$162.34	$188.20	$218.17	$252.92	$293.20

FUELING COST ASSUMPTIONS

Estimated annual diesel fuel and electricity reflect a combination of growth rate assumptions. Additionally, the following assumptions and sources were used to estimate projected change in cost of diesel and electricity.

Diesel Fuel Costs

The analysis assumed diesel fuel costs in 2023 are $1.48 per litre. This assumption was based on the average wholesale price for diesel fuel in the City of Greater Sudbury, with data available for 2023. The wholesale price had provincial and federal taxes layered on, including the unrecoverable net HST. Wholesale diesel fuel costs were assumed to escalate based on forecasted real changes in diesel estimated in the US Energy Information

Administration's Annual Energy Outlook 2023. The carbon tax was assumed to escalate in line with the latest federal carbon pricing plan, while other provincial and federal taxes were assumed to remain constant for the duration of the analysis. Prices were escalated by 3 percent annual growth rate to be converted to year of expenditure (YOE) dollars. All BEBs are assumed to have diesel heaters to ensure electric power can focus on maintaining maximum driving range. The average fuel efficiency of diesel heaters was obtained based on industry experience to estimate the diesel usage per kilometre travelled.

Table 22. Diesel Unit Cost Assumptions, YOE$

	2023	2025	2030	2035	2040	2045	2050
Diesel Fuel Price ($/L)	$1.48	$1.53	$1.89	$2.24	$2.64	$3.09	$3.64

Electricity Costs

There are two types of electricity costs that are included in the analysis: a per kilowatt-hour (kWh) usage fee, and demand charges per kilowatt (kW). The values used were obtained from GOVA Transit's Greater Sudbury Hydro invoice from January 1, 2023. The dollar per kWh ($/kWh) usage fee is based on the average Hourly Ontario Energy Price and the Global Adjustment Factor for 2023. Prices were escalated by 3 percent annually to be converted to YOE dollars. The analysis assumes a 5% efficiency loss between chargers and BEBs.

Table 23. Electricity Unit Cost Assumptions, YOE$

	2023	2025	2030	2035	2040	2045	2050
Electricity Price ($/kWh)	$0.11	$0.11	$0.13	$0.15	$0.18	$0.21	$0.24
Demand Charge ($/kW)	$13.38	$14.20	$16.46	$19.08	$22.12	$25.64	$29.72

MAINTENANCE COST ASSUMPTIONS

Maintenance costs for buses are included under the operating cost assumptions section above. Other maintenance costs in the model include maintenance costs for in-depot dispensers and enroute charger maintenance. Charger maintenance costs are based on recent industry experience with other transit agencies.

Table 24. Maintenance Unit Cost Assumptions, YOE$

	2023	2025	2030	2035	2040	2045	2050
Depot Charger Maintenance ($/Year)	$5,959	$6,322	$7,329	$8,496	$9,849	$11,418	$13,237
En-Route Charger Maintenance ($/Year)	$12,000	$12,731	$14,758	$17,109	$19,834	$22,993	$26,655

BASELINE SCENARIO

As described above, the Baseline Scenario refers to the current diesel fleet being replaced strictly by new diesel buses in alignment with the current fleet replacement schedule**. Table 25** below shows the annual total number of hours and kilometres operated by the diesel fleet; this service level is assumed to be the same in each year from 2023 through 2050 in the Baseline Scenario.

Table 25. Annual Service Levels, Baseline Scenario

Annual Service Level	Quantity - Modeled	Quantity - 2023 Actuals
Kilometres Travelled	4,330,240	4,246,823
Hours of Operation	181,443	179,118
Litres of Fuel Consumed	2,097,559	2,207,601

Zero+ modeling used in the analysis was representative of the Fall 2023 bus service schedule, which has higher total hours of operation than the Spring and Winter schedule. Unadjusted, this overstates annual operating statistics for the GOVA Transit fleet. To normalize operating data for different seasonal schedules, the proportion of Winter and Spring weekday hours of operation was compared to the value of Fall weekday hours of operation. The weighted average of these quantities was applied to the weekday assumption of kilometres traveled, hours of operations, and kWh consumed. A comparison of modeled results and 2023 actuals provided by GOVA Transit is shown in **Table 25** above.

BASELINE CAPITAL COST ESTIMATES

Under the Baseline Scenario, the fleet mix remains entirely ICE for the duration of the study period. A fleet replacement schedule was prepared based upon the known service life and purchase date for vehicles in the municipal fleet, which was used to determine the capital purchase assumptions by year. **Table 26** illustrates the near-, mid-, and long-term total number of replacement ICEVs purchased based on the fleet replacement schedule. These vehicle purchases also assume that some vehicles are replaced more than once between now and 2050, thus a total that is larger than the 59 vehicles.

Table 26. Baseline Scenario Periodic Diesel Bus Purchase Assumptions Based on the Fleet Replacement Schedule

	2023 - 2030	2031 - 2040	2041 - 2050
Diesel Bus	32	54	53
Peak Service	23	39	39
`Spares	9	15	14
BEBs	-	-	-

Table 27 presents the annual costs estimates based on the unit cost and growth rate assumptions and the annual fleet needs shown in **Table 26**.

Table 27. Baseline Scenario Periodic Total Capital Cost Estimates, YOE $, Millions

	2023 - 2030	2031 - 2040	2041 - 2050
Diesel Bus	$28.6	$61.3	$80.7
BEBs	-	-	-
Total	**$28.6**	**$61.3**	**$80.7**

BASELINE OPERATING & MAINTENANCE COST ESTIMATES

The annual operating and maintenance costs between 2023 and 2050 are calculated by multiplying the hours of operation by the estimated hourly operating cost. **Table 28** presents the near-, mid-, and long-term total periodic operating costs under the Baseline Scenario.

Table 28. Baseline Scenario Periodic Total Operating Cost Estimates, YOE$, Millions

	2023 – 2030	2031 – 2040	2041 - 2050
Operating Costs	$213.0	$347.8	$467.4

BASELINE FUELING COST ESTIMATES

Under the Baseline Scenario, the only fuel required to operate the fleet is diesel. The annual diesel fuel costs are calculated based on the annual kilometres travelled, the average fuel economy, and the cost of diesel. The estimated diesel fuel consumed by buses is calculated by multiplying the average fuel economy from GOVA Transit fleet data and the total kilometres travelled. The litres of fuel are then multiplied by the average price per litre of diesel detailed in the O&M Cost Assumptions section above. The diesel cost calculation is shown in **Table 29** below.

Table 29. Baseline Scenario Periodic Total Fuel Estimates, YOE$, Millions

	2023 – 2030	2031 – 2040	2041 - 2050
Diesel Costs	$27.3	$47.9	$66.4

BASELINE SUMMARY

Under the Baseline Scenario, the total cost of implementation is $489.2 million in discounted 2023 dollars. The total capital costs are $58.0 million. Total lifecycle O&M costs of $431.2 million include operations, maintenance, and fueling costs. Fueling costs are $51.1 million in discounted 2023 dollars.

Table 30. Baseline Scenario Summary, Discounted 2023$, Millions

	NPV
Bus Purchases	$58.0
Related Infrastructure	-
Lifecycle Capital Costs	**$58.0**
Operations & Maintenance	$380.1
Fueling	$51.1
Related Infrastructure O&M	-
Lifecycle O&M	**$431.2**
Total, 2023-2050	**$489.2**

BEB TRANSITION SCENARIO

As described above, the BEB Transition Scenario refers to the current diesel fleet being replaced with BEBs in alignment with the current fleet replacement schedule. In the model, blocks are converted from diesel to electric buses using a two-step prioritization method. Blocks are prioritized first if they can be converted on a one-to-one basis (diesel to BEB) without the need for en-route charging infrastructure. After the initial conversion, BEBs are

reprioritized based on blocks that can be converted on a one-to-one basis with the greatest total kilometers travelled.

Table 31 below shows the incremental annual total number of hours, kilometres, litres of diesel, and kWh of electricity operated and consumed by the fleet. As diesel buses are phased out and BEBs are introduced into the fleet, the total operating hours and kilometres increases due to an increase in non-revenue hours and kilometres, impacting costs and fuel consumption. In later years of the transition, diesel consumption is attributed solely to diesel auxiliary heaters equipped on the BEBs.

Table 31. BEB Transition Annual Service Levels

	2023	2025	2030	2035	2040	2045	2050
Diesel							
Kilometres	4,330,240	4,330,240	579,638	-	-	-	-
Hours	181,443	181,443	20,829	-	-	-	-
Litres of Diesel	2,097,559	2,097,559	408,271	150,725	150,725	150,725	150,725
BEB							
Kilometres	-	-	3,721,827	4,399,936	4,399,936	4,399,936	4,399,936
Hours	-	-	161,092	182,691	182,691	182,691	182,691
kWh	-	-	5,814,093	6,771,952	6,771,952	6,771,952	6,771,952

BEB TRANSITION CAPITAL COST ESTIMATES

The focus for the BEB Transition Scenario is the financial impact of the changes in fleet mix and associated capital infrastructure and service plans over the 2023 to 2050 period for this scenario. **Table 32** illustrates the near-, mid-, and long-term total number of vehicles and chargers purchased based on the fleet replacement schedule. These vehicle purchases also assume that vehicles are replaced more than once between now and 2050, thus a total that is greater than 59 buses.

Table 32. BEB Transition Scenario Periodic Capital Purchase Assumptions Based on the Fleet Replacement Schedule

	2023 - 2030	2031 - 2040	2041 - 2050
Diesel Bus	-	-	-
Battery Electric Bus	32	54	53
Depot Dispensers	33	48	51
En-route Charger	8	-	8

Table 33 presents the annual cost estimates based on the unit cost and growth rate assumptions, as well as the annual fleet needs shown in **Table 32**.

Table 33. BEB Transition Scenario Periodic Total Capital Cost Estimates, YOE$, Millions

	2023 - 2030	2031 - 2040	2041 - 2050
Diesel Bus	-	-	-
Battery Electric Bus	$68.7	$147.2	$194.0
Infrastructure Costs	$14.3	$9.9	$16.5
Total	**$83.0**	**$157.1**	**$210.6**

Figure 35 below shows the implementation of BEBs in line with the number of dispensers in service based on the four-stage dispenser phasing plan. This phasing was determined based on additional infrastructure requirements for installing new dispenser equipment and the planned acquisition of BEBs.

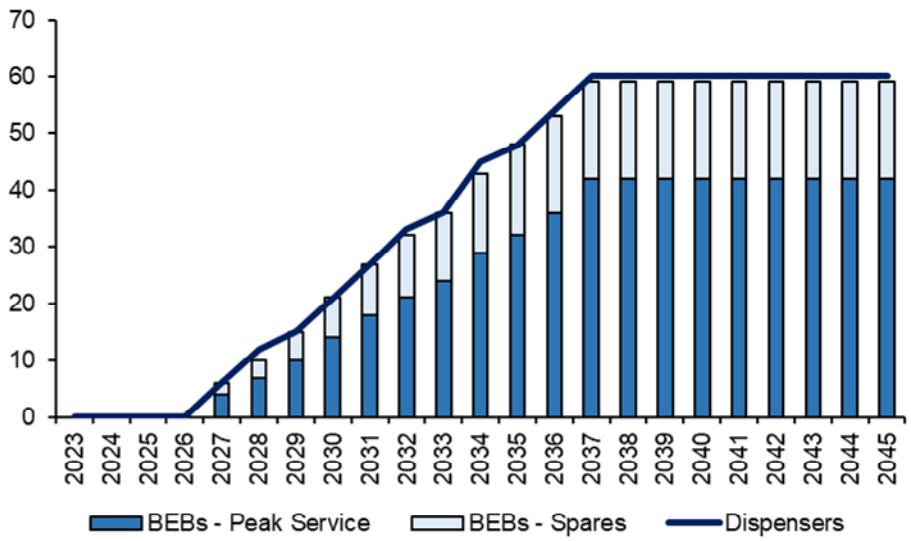


Figure 35. Peak Service BEBs & Dispensers in Service

Over the 2023 to 2050 period, total capital costs for the BEB Scenario are estimated to be $156.2 million in discounted 2023$. As shown on the previous figures and tables, the BEB fleet transition would occur between 2025 and 2035, with the remaining diesel buses in service replaced by BEBs by 2037. To accommodate the BEB fleet, a total of sixty (60) 150 kW in-depot dispensers and eight (8) 450 kW en-route chargers will be acquired between 2025 and 2035.

In addition to the cost of vehicles and chargers, lump sum phasing costs shown in include budgetary pricing provided by electrical infrastructure OEMs for unit substations, and typical unit costs for other civil and electrical work (conduits, grounding, patching), and other anticipated construction expenses. The per-phase costs also factor in a 4% engineering design and a 20% contingency based on concept plan details.

Table 34. Charging Infrastructure Lump Sum Cost by Phase, 2023$

	Years	Cost	Key Items
Phase 1	2025-2029	$5,217,464	One (1) 2,000 kVA unit substation; (9) 150kW chargers & (27) dispensers
Phase 2	2030-2031	$7,319,188	**Depot:** One (1) 2,000 kVA unit substation; (3) 150kW chargers & (9) dispensers **En-Route:** One (1) 4,000 kVA unit substation; (8) 450 kW pantograph chargers
Phase 3	2032	$1,682,444	(3) 150kW chargers & (9) dispensers
Phase 4	2033-2035	$2,623,969	(5) 150kW chargers & (15) dispensers

BEB TRANSITION OPERATING COST ESTIMATES

The annual operating costs between 2023 and 2050 are calculated by multiplying the hours of operation by the estimated hourly operating cost. **Table 28** presents the near-, mid-, and long-term total periodic operating costs under the Baseline Scenario. **Table 35** summarizes the annual incremental labour costs between 2023 and 2050. As noted above, by 2035 the entire fleet has been transitioned to BEBs.

Table 35. BEB Transition Scenario Periodic Total Operating Cost Estimates, YOE$, Millions

	2023-2030	2031-2040	2041-2050
Diesel Operating Costs	$193.5	$56.2	-
BEB Operating Costs	$25.9	$299.1	$470.6
Total	**$219.4**	**$355.3**	**$470.6**

BEB TRANSITION FUELING COST ESTIMATES

Based on the methodology described in **Table 36** summarizes the fuel and electricity cost estimates for the BEB scenario for selected years over the 2023 to 2050 period. Diesel costs remaining after the full transition to BEBs is due to auxiliary heating on board BEBs.

Table 36. BEB Transition Scenario Periodic Total Fuel Cost Estimates, YOE$, Millions

	2023 – 2030	2031 – 2040	2041 - 2050
Diesel Costs	$24.9	$10.9	$4.8
Electricity Costs	$1.3	$9.4	$14.5
Total	**$26.2**	**$20.3**	**$19.3**

BEB TRANSITION MAINTENANCE COST ESTIMATES

Table 37 summarizes the infrastructure maintenance cost estimates for near-, mid- and long-term periodic costs for in-depot dispensers and enroute chargers. Maintenance costs for the diesel buses and BEBs are included in operating costs presented above.

Table 37. BEB Transition Scenario Periodic Total Maintenance Cost Estimates, YOE$, Millions

	2023-2030	2031-2040	2041-2050
Infrastructure Maintenance Costs	$0.1	$2.7	$4.2

BEB TRANSITION SUMMARY

Under the BEB Scenario, the total cost of implementation is $578.3 million in discounted 2023 dollars. The total capital costs are $156.2 million. Total lifecycle O&M costs of $422.1 million include operations, maintenance, and fueling costs.

Table 38. BEB Scenario Summary, Discounted 2023$, Millions

	BEB
Bus Purchases	$139.3
Related Infrastructure	$16.8
Lifecycle Capital Costs	**$156.2**
Operations & Maintenance	$388.3
Fueling	$32.1
Related Infrastructure O&M	$1.8
Lifecycle O&M	**$422.1**
Total	**$578.3**

LIFECYCLE COST COMPARISON

This section provides a comparison of the capital, O&M, and fuel/electricity cost estimates between the two scenarios over the entire 2023-2050 study period. All values are presented in NPV terms, unless otherwise noted.

CAPITAL COST COMPARISON

Table 39 provides a comparison of total capital costs between the two scenarios. As shown in the table, the BEB Scenario is more than twice as expensive due primarily to the difference in vehicle costs as well as the additional equipment and infrastructure investments that would be required for BEB implementation.

Table 39. Capital Cost Comparison, Discounted 2023$ millions

	Baseline	BEB	Variance
Diesel Buses	$58.0	-	-$58.0
BEBs	-	$139.3	$139.3
Total Fleet Purchases	**$58.0**	**$139.3**	**$81.4**
Additional Infrastructure	-	$16.8	$16.8
Total	**$58.0**	**$156.2**	**$98.2**

OPERATING & MAINTENANCE COST COMPARISON

Table 40 provides a comparison of total operating cost estimates over the 2023 to 2050 period for the Baseline and BEB Scenarios, based on the assumptions described in the prior sections. As mentioned earlier the primary unknown for O&M costs is vehicle maintenance costs for BEBs. The technology is still relatively new and long-term detailed

analysis of vehicle maintenance costs is not available. Diesel spending is significantly lower in the BEB Scenario due to the rapid transition to BEBs. Higher BEB operating costs (due to incrementally higher miles travelled from swaps) more than offset the decrease in operating costs attributable to diesel buses. Values in the variance column represent expenditures by bus type under each scenario, and do not represent savings.

Table 40. Operating and Maintenance Cost Comparison, Discounted 2023$ millions

	Baseline	BEB	Variance
Diesel Operating Costs	$380.1	$178.5	-$201.7
BEB Operating Costs	-	$209.8	$209.8
Related Infrastructure O&M Costs	-	$1.8	$1.8
Total	**$380.1**	**$390.1**	**$10.0**

Finally, **Table 41** provides a comparison of total costs for diesel fuel and electricity over the 2023 to 2050 period. Based on the assumptions in this analysis, BEB would have lower fuel and electricity costs on a discounted basis.

Table 41. Fuel and Electricity Cost Comparison, Discounted 2023$ millions

	Baseline	BEB	Variance
Diesel Costs	$51.1	$25.2	-$25.9
Electricity Costs	-	$6.9	$6.9
Total Costs	**$51.1**	**$32.1**	**-$19.0**

NET PRESENT VALUE (NPV) ANALYSIS

A net present value (NPV) was conducted to compare the BEB Scenario to the Baseline Scenario. Costs over the 2023 to 2050 period are presented in 2023 dollars, discounted at 8%. The analysis evaluates the direct cost impacts to GOVA to understand the additional costs of implementing a BEB transition plan relative to operating business-as-usual.

This analysis assumes no changes to ridership or service levels. The analysis only looks at direct cost impacts to the City of Greater Sudbury and does not attempt to monetize public benefits to society.

Additionally, the analysis assumes that capital costs will not be offset by grant or incentive funding. Including additional funding sources, such as ZETF, may affect the results of the analysis.

The transition to BEBs is anticipated to cost $89.1 million (discounted) more than maintaining a fully diesel fleet. The result shows that the higher capital costs of BEB buses is not offset by fueling cost savings relative to the Baseline Scenario.

Table 42. Overall Lifecycle Cost Comparison, Discounted 2023$, millions

	Baseline	BEB	Variance
Bus Purchases	$58.0	$139.3	$81.4
Related Infrastructure	-	$16.8	$16.8
Lifecycle Capital Costs	**$58.0**	**$156.2**	**$98.2**
Operations & Maintenance	$380.1	$388.3	$8.1
Fueling	$51.1	$32.1	-$19.0
Related Infrastructure O&M	-	$1.8	$1.8
Lifecycle O&M	**$431.2**	**$422.1**	**-$9.1**
Total	**$489.2**	**$578.3**	**$89.1**

INFRASTRUCTURE FINANCING OPTIONS

There are several financing opportunities available to the City of Greater Sudbury to secure funding for its zero emission vehicle (ZEV) fleet transition. The primary funding sources are the Canadian Permanent Transit Fund, the Infrastructure for Housing Initiative, and the Zero Emission Transit Fund (ZETF).

The ZETF is administered by the Canadian Infrastructure Bank, and targets projects that enable or implement transit fleet electrification. The ZETF offers flexible financing solutions, including grants and loans to applicants. ZETF funding decisions are determined by project viability, estimated operational savings, and estimated GHG emission reduction. Approximately $2.75 billion in funding is earmarked for the ZETF program to numerous municipal transit agencies.

In March 2024, Canada Infrastructure Bank (CIB) announced the Infrastructure for Housing Initiative, a $6 billion fund dedicated to "housing enabling infrastructure," which includes public transit.[14] CIB primarily invests in revenue-generating assets. Interested applicants work with CIB to secure a mix of public and private funding. Smaller municipalities are eligible for access to lower borrowing rates, without access to capital markets or federal borrowing programs.

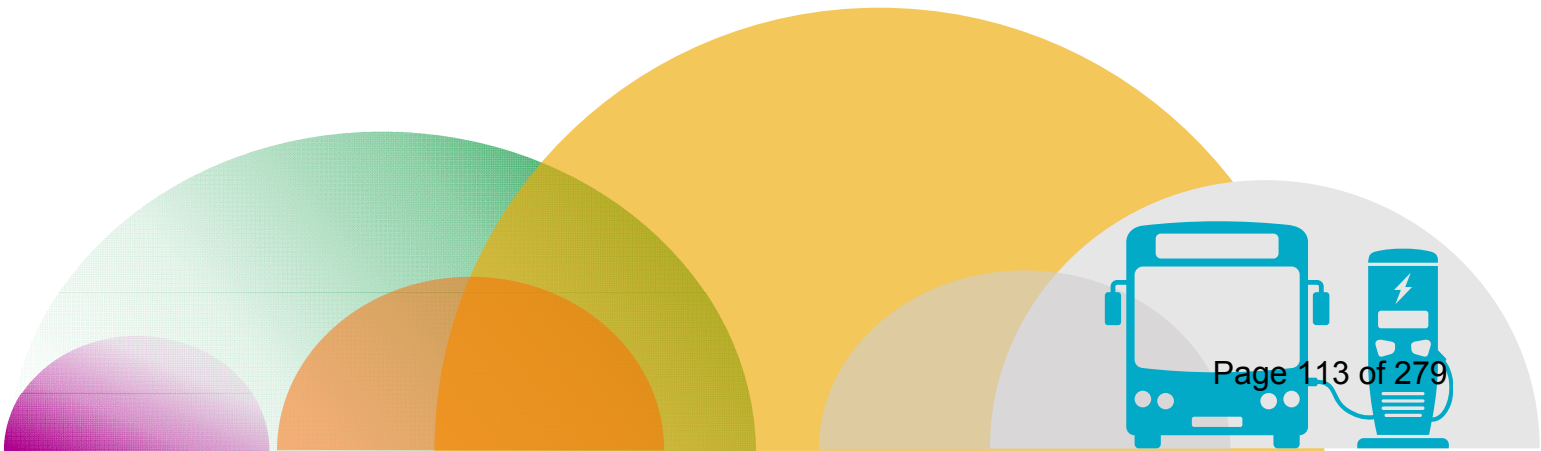
Finally, the Canadian Permanent Transit Fund plans to begin disbursing funds in 2026.[15] This fund is allocated $3 billion annually over the next 10 years. It includes a funding stream specific to fleet electrification, along with funding that can flow from the federal government to provinces or municipalities. The program has begun accepting intake for Metro-Region and Baseline funding agreements. The majority of funding will be through the Metro-Region Agreements stream, which is accessed through collaboration with the provincial government.

Funding from either program may be used to offset planning, capital, and operating costs associated with transitioning diesel fleets to BEBs or alternative fuel technologies. As this funding has not been secured by the City of Greater Sudbury, it is not included in this analysis.

[14] Infrastructure for Housing Initiative | Canada Infrastructure Bank (CIB) (cib-bic.ca)
[15] The largest public transit investment in Canadian history | Prime Minister of Canada (pm.gc.ca)

APPENDIX D

GHG EMISSIONS ANALYSIS



APPENDIX D: GHG EMISSIONS ANALYSIS

Greenhouse gas (GHG) emission reductions is an additional benefit of transitioning from diesel buses to BEBs. HDR performed supplementary calculations to quantify the impacts of BEB operations on GHG emissions relative to the Baseline Scenario.

ASSUMPTIONS AND METHODOLOGY

The analysis quantifies GHG impacts based on estimates of diesel fuel and electricity usage by conventional transit buses over the 2023-2050 study period. The following assumptions were used to quantify emissions based on litres of fuel and kWh of electricity consumed.

The emission rate for diesel fuel is 2.681 kilograms (kgs) of carbon dioxide (CO2) per litre of fuel. This value was obtained from the Canadian National Inventory Report, 2023. The emission rate was multiplied by the annual litres of fuel consumed to calculate the annual kgs of CO2 emitted. To quantify the impact of electricity usage on GHG emissions, the total kWh of electricity used per year was multiplied by the corresponding Electricity Emission Intensity factor for Ontario from 2023 to 2050. This factor represents the kg of CO2 per kWh based on the average electricity grid mix for the province. The intensity factor declines over time due to anticipated introduction of new renewable power generation sources.

GHG EMISSION REDUCTION IMPACTS

Based on the assumptions above, the GHG emissions from BEB operations are summarized in **Table 43** below. Over the study period, BEBs will reduce emissions by approximately 94,300 tonnes relative to the Baseline Scenario. This translates to approximately 157 tonnes of CO_2 saved per year, per bus. Residual GHG emissions in the BEB scenario after the fleet is fully transitioned are attributed to the diesel auxiliary heaters installed on the BEBs.

Table 43. GHG Emissions, Baseline and BEB Scenarios, Selected Years and Total, tonnes

	2025 Snapshot	2035 Snapshot	2050 Snapshot	Study Period Cumulative Total
Baseline				
Diesel	5,624	5,624	5,624	157,460
BEB	-	-	-	-
Total, Baseline Scenario	**5,624**	**5,624**	**5,624**	**157,460**
BEB Scenario				
Diesel	5,624	1,095	404	59,215
BEB	-	174	203	3,918
Total, BEB Scenario	**5,624**	**1,269**	**607**	**63,133**

This reduction is due to the dramatically lower operating emissions of BEBs relative to diesel buses. **Figure 36** below shows the annual GHG emissions from operations as the fleet mix changes in the BEB Scenario. There is a substantial decline from about 5,600 tonnes of GHGs per year to approximately 610 tonnes per year in the full build BEB Scenario.

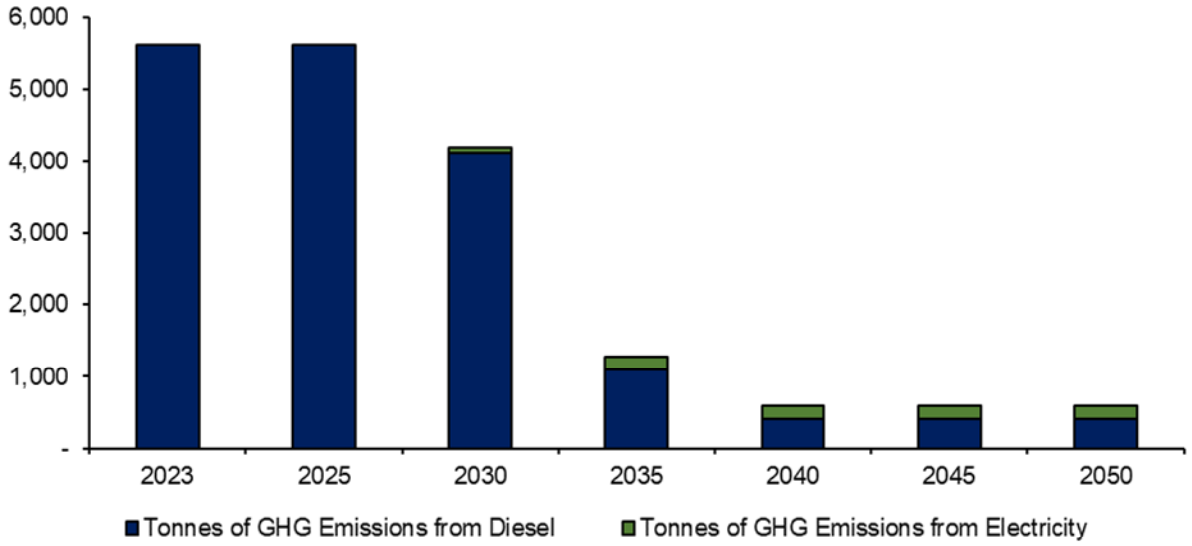


Figure 36. Annual GHG Emissions, BEB Scenario, tonnes

The cumulative reduction in GHG emissions is shown in **Figure 37** below. The annual reduced emissions grow substantially over time as the diesel fleet is converted to BEBs. By the end of the transition to BEBs, annual emissions are reduced by approximately 89%.

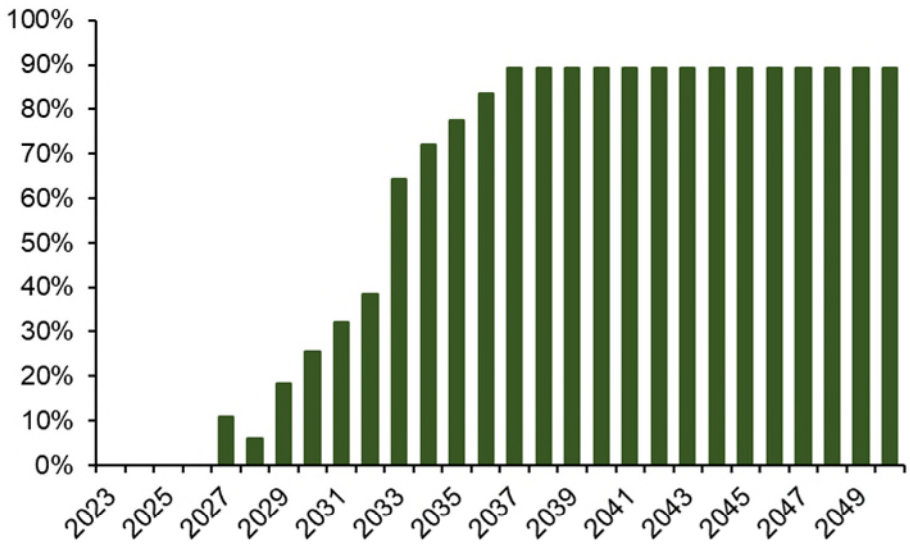
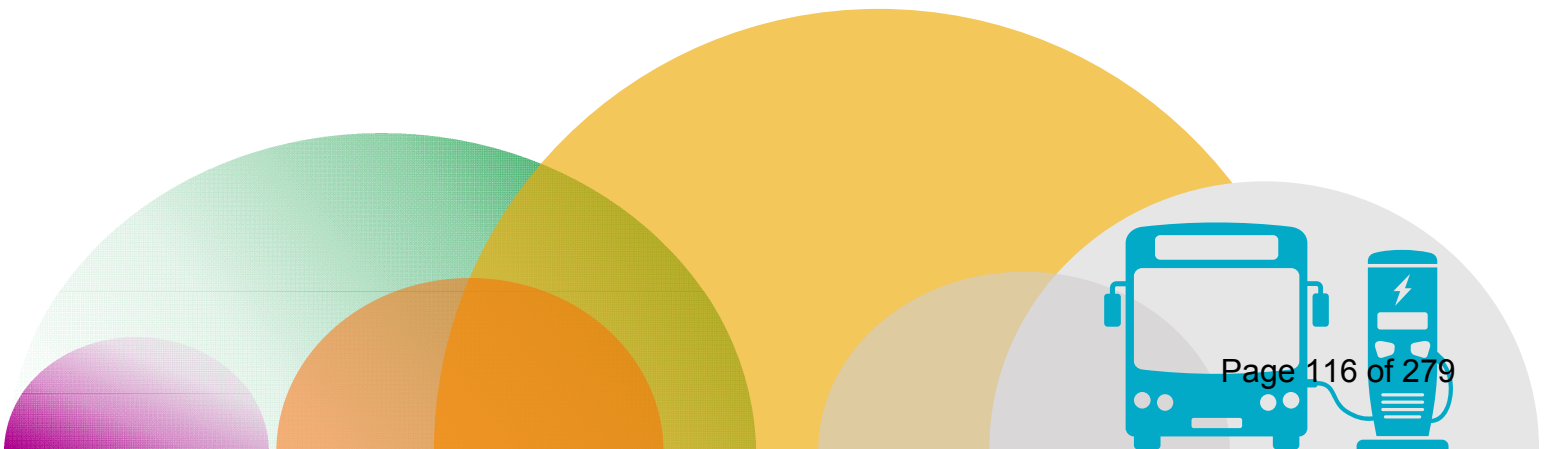


Figure 37. Cumulative Percent GHG Reductions in BEB Scenario, percent

APPENDIX E

SOLAR FEASIBILITY ANALYSIS



APPENDIX E: SOLAR FEASIBILITY ANALYSIS

HDR prepared a solar feasibility analysis to assess the cost effectiveness of installing solar photovoltaic (PV) units on various GOVA Transit properties. The analysis solely considers the overnight capital costs of adding solar PV and does not include an assessment of the existing roof conditions at the GOVA facility. **Table 44** below contains the general assumptions used in the solar feasibility analysis.

Table 44. Solar Analysis Assumptions

General Inputs	Value	Notes/Source
Base Year	2024	
Study Period	30	Assumed
End Year	2053	Calculated using base year and study period
Discount Rate	8%	Assumed
Price Escalation	3%	Assumed
Solar Degradation	-0.5%	Assumed
O&M Escalation	3%	Assumed
$/kW CapEx	$2,326	Natural Survey Report of PV Power Applications in Canada suggests value of $2.10 per Watt (W) in 2021$, escalated to 2023$ terms
$/kW OpEx	$27.90	Index | Electricity | 2022 | ATB | NREL suggests value of USD $18.80 per $kW, which is converted to Canadian dollars and escalated to 2023$.
2020 USD/CAD Conversion	1.3415	Annual exchange rates - Bank of Canada
Watt to Kilowatt Conversion	1,000	Known conversion
2023 Average Electricity Price	$0.11	Average HOEP, summed with Average Global Adjustment Factor, units $ per kilowatt-hour ($/kWh)
Solar Panel Density	150	Watt per square meter (W/m^2)

There is one option considered in the analysis at the 1160 Lorne Facility. Under this option, new solar panels are installed to cover available surface area of the facility roof, including the barn. Approximately 12,300 square meters would be available for solar panels, allowing for a nameplate capacity 1,840 kilowatts (kW). Annual generation would be approximately 2,300,000 kWh.

A summary of assumptions by project is shown below in Table 48. The capital and annual O&M costs are calculated using the $/kW values in **Table 44** above.

Table 45. Project-Specific Assumptions

Variable	1160 Lorne St
Capital Cost ($, millions)	$4.3
Annual O&M ($)	$51,339
BEB Demand (kWh, million)	1.9
Solar Generated (kWh, millions)	2.3
Grid Energy Required (kWh, millions)	0.4
Net Capacity Factor	14%
Construction Year	2024
Nameplate Capacity (kW)	1,840

METHODOLOGY

The analysis defines a No Build case and a Build case for each option defined above to estimate the benefits of installing solar PV arrays. The No Build is defined as where no solar PV is installed, and total electricity demand is supplied by the electricity grid, charged at the Hourly Ontario Energy Price plus any global adjustment charges. The Build case assumes that the solar PV is built, and the solar PV array supplies part of the total electricity demand, with the remainder of the electricity needed supplied by the grid. While there are O&M costs associated with maintaining the solar PV array, the electricity generated from it reduces the costs of electricity purchased from the grid. The analysis assumes a degradation factor on installed solar PV output of 0.5% per year, compounding. The total costs under the No Build case are compared against the total costs under the Build case to determine whether there are cost savings.

RESULTS

The estimated benefits are presented for each scenario below, using the calculated present value of costs to estimate the benefit cost ratio (BCR). All monetary values in the table are in discounted 2023-dollar terms.

Table 46. Solar Feasibility Analysis Results (Discounted 2023$, millions)

	1160 Lorne St
Energy Cost Savings, millions	$3.3
Capital Costs, millions	$4.0
O&M Costs, millions	$0.8
NPV, millions	-$1.4
BCR	0.65

Based on the modelling, the discounted electricity cost savings at the 1160 Lorne St facility are $3.3 million over the study period. The total capital costs are $4.0 million. The NPV of this option is -$1.4 million, and the project has an estimated cost-benefit ratio of 0.65. For every dollar spent on constructing the project, the project will only yield 65 cents of savings, discounted.

Sole Source - Housing First Intensive Case Management Services

Presented To:	Community and Emergency Services Committee
Meeting Date:	March 17, 2025
Type:	Managers' Reports
Prepared by:	Gail Spencer Children and Social Services
Recommended by:	General Manager of Community Development

Report Summary

This report provides a recommendation regarding entering into a sole source agreement with Centre de Santé Communautaire du Grand Sudbury for the continued delivery of Housing First Intensive Case Management Services for one year.

Resolution

THAT the City of Greater Sudbury authorizes staff to enter into a sole source agreement with Centre de Santé Communautaire du Grand Sudbury for the continued delivery of the Housing First Intensive Case Management Program from April 1, 2025 to March 31, 2026, as outlined in the report entitled “Sole Source – Housing First Intensive Case Management Services” from the General Manager of Community Development, presented at the Community and Emergency Services Committee meeting on March 17, 2025.

Relationship to the Strategic Plan, Health Impact Assessment and Climate Action Plans

This report supports Council’s Strategic Plan in the area of Quality of Life and Place as it aligns with the Population Health Priorities of Indigenous Youth, Mental Health, Housing, and Healthy Streets by delivering Housing First supports to persons who have experienced chronic homelessness. This report has no relationship to the Community Energy and Emissions Plan.

Financial Implications

There are no financial implications associated with this report. This contract is funded through the existing operating budget.

Background

The City of Greater Sudbury (City) is the Community Entity (CE) for the Federal Reaching Home funding and a Service Manager pursuant to the Housing Services Act, 2011, and as such is responsible, in accordance with its housing and homelessness plan, to carry out measures to meet the objectives and targets relating to housing needs within the City.

A Community Advisory Board (CAB) is required under the Reaching Home funding; made up of representatives from community sectors, the CAB recommends policy and service delivery to the Community Entity that prioritizes housing and support services for individuals and families experiencing or at risk of homelessness. The City administers and funds housing and homelessness programs and services, such as Housing First Intensive Case Management Services, also partnering with community service providers to provide Housing First programs and other programs intended to meet the needs of persons who are experiencing homelessness.

Housing First Intensive Case Management Services

Housing First Intensive Case Management Services are currently provided through a funding agreement with Centre de Santé Communautaire du Grand Sudbury (CSC), which is scheduled to end on March 31st, 2025. This funding agreement was implemented on January 1st, 2021, following a Request for Proposal procurement process. The funding flows from the Federal Reaching Home program and is recommended by the Community Advisory Board. The current funding allocation is $190,000 annually.

This agreement provides for two additional Housing First Intensive Case Managers to provide more intensive support for a caseload of persons who have experienced chronic homelessness and require a higher level of support to achieve housing stability. This program is integrated with the larger Housing First program that CSC administers for the City of Greater Sudbury through a partnership of agencies called the Homelessness Network. Also integrated within these services are Housing Allowances to provide affordability in the private market, landlord engagement services, homelessness prevention program and a Veteran's homelessness program.

Intensive Case managers each carry caseloads of 7 individuals, for a total 14 receiving support. Of the overall total, 7 individuals are housed, while 7 remain unhoused, receiving support to find housing. Individuals are matched to this program through the City's By-Name List and are identified as experiencing chronic homelessness with very high acuity.

Of those housed, 5 have reached a benchmark of twelve-months of continuous housing, while 1 has reached a benchmark of six months of continuous housing. These are important benchmarks to predict ongoing housing stability and reduce the likelihood of returning to homelessness. Further, of those housed, 1 was assisted to access community housing, while 5 were assisted to find housing in the private market, supported by a housing allowance. The positive benefits of the Housing First Intensive Case Management program to the community include a reduction in hospital and emergency department visits and reduced interactions with the criminal justice system.

Where the funding agreement for Housing First Intensive Care Management Services is set to expire on March 31, 2025, this report recommends that staff enter a one (1) year agreement for continued services in the community. As a fully funded service, which is part of a larger system of supports to those experiencing homelessness, ensuring uninterrupted services for those that depend on the program helps them acquire and maintain stable housing, thus improving their overall quality of life.

Homelessness System Review

In 2025, Social Services staff intend to conduct a complete review of the network of homelessness services funded through Federal, Provincial and Municipal envelopes to ensure a coordinated, outcome-based system that follows recommendations of the Roadmap to End Homelessness by 2030, approved by Council in May

2024. This review will include outreach services, warming centres, emergency shelters, Housing First program, housing allowances, and homelessness prevention, with a focus on shifting away from emergency services to longer term housing support. A report to Committee can be anticipated by Q4 2025/2026.

Resources Cited

Roadmap to End Homelessness by 2030
https://pub-greatersudbury.escribemeetings.com/filestream.ashx?DocumentId=53564

2024 Provincial Communities in Bloom Results

Presented To:	Community and Emergency Services Committee
Meeting Date:	March 17, 2025
Type:	Correspondence for Information Only
Prepared by:	Shelley Walushka Leisure Services
Recommended by:	General Manager of Community Development

Report Summary

This report provides information regarding the City of Greater Sudbury's participation in the 2024 Provincial Communities in Bloom (CIB) competition.

Relationship to the Strategic Plan, Health Impact Assessment and Climate Action Plans

This report refers to work within the 2019-2027 City of Greater Sudbury Strategic Plan to Build Community Pride through Internal and External Promotion of the City. The report supports the Community Energy & Emissions Plan as host communities are judged on items such as waste diversion, environmental action and urban forestry.

Financial Implications

There are no financial implications associated with this report.

Background

Communities in Bloom (CIB) is a volunteer and partnership-driven organization that uses a multi-tiered competitive evaluation process to foster community strength, involvement, and continuous improvement. CIB strives to improve the tidiness, appearance and visual appeal of Canada's neighborhoods, parks, open spaces, and streets through the imaginative use of flowers, plants, and trees. The program fosters community pride and promotes involvement and action by citizens of all ages, municipalities, local organizations, and businesses.

CIB offers both provincial and national editions of the program. As part of the provincial edition, communities participate with other communities in their population category within their province. Up to two communities in each province are invited to participate in the following year's national edition. CIB also hosts an annual symposium and award ceremony, highlighting the efforts of participating communities, showcasing achievements and the positive impact of the CIB program.

Staff applied to participate in the 2024 Communities in Bloom program at the provincial level. The

Communities in Bloom program is based on 6 key criteria: Community Appearance, Environmental Action, Heritage Conservation, Tree Management & Trails, Landscape, Plant & Floral Displays.

Volunteer CIB judges visited and toured Greater Sudbury on August 13 and 14, 2024. City staff organized an extensive tour to showcase Greater Sudbury's achievements, meet with businesses and community members as part of the evaluation, and to experience our community's parks and facilities. City staff also produced a Communities in Bloom Profile Book (Attachment 1) to further demonstrate Greater Sudbury's achievements as it relates to the CIB evaluation criteria. A community engagement photo contest also was organized by the City leading up to the judges visit, with over 50 submissions received.

Summary of Evaluation Results

As part of the Communities in Bloom program, the judges provided a report that details evaluation scoring and includes recommendations for the future. The full completed evaluation form is included as Attachment 2.

The City received 3 out of 5 blooms in for our participation in the 2024 provincial Communities in Bloom competition and received a special award for environmental action. The scoring matrix is detailed below:

Tidiness	109.00 / 150
Environmental Action	113.00 / 150
Heritage Conservation	104.00 / 150
Urban Forestry	115.00 / 175
Landscape	137.00 / 200
Floral Displays	131.00 / 175
Total	**709.00 / 1000**
Percentage:	**70.9%**
Bloom rating:	**3 Blooms**

Bloom rating:

- Up to 55%: 1 bloom
- 56% to 63%: 2 blooms
- 64% to 72%: 3 blooms
- 73% to 81%: 4 blooms
- >82%: 5 blooms

Judges were impressed by the understated beauty of Greater Sudbury and the transformation of what was once a barren remote destination is now a truly beautiful community. Several suggestions were made to help strengthen future Communities in Bloom applications, but also to further advance our community as a great place to live, work, play and do business. Summary of recommendations below:

- Improve signage throughout City around gateway signage to increase visibility of CIB program and participation. Additional signage for educational purposes and best practices for compost, pruning methods, native plants etc.
- Increase in the staffing budget and resources to support parks, forestry, and other maintenance related departments to complete the necessary work to ensure a safe and accessible community.
- Develop / create succession planning for key knowledgeable staff in all areas to ensure that qualified personnel are available to continue with the goals/ plans set out.
- Continue work on community involvement in program. There is opportunity to do more with the commercial/business community in relation to the CIB program as well as with schools.
- Remove invasive plant growth.
- Expand and better promote EarthCare Sudbury and materials/promotions to ensure residents know about this work.
- Start a heritage tree program and create a database for significant trees.
- Focus more efforts on identifying heritage buildings and spaces.

- Remove or cut down the 1,800 dead trees on boulevards throughout the city (Note: this work is currently underway).
- Offer enhanced training and learning opportunities to staff on landscape and horticultural best practices etc.

Community of Capreol National Communities in Bloom Participation

The Capreol Communities in Bloom committee, who have previously been participating in the provincial edition of the event, competed nationally in 2024. The Capreol CIB committee received a 5 Blooms Silver rating, with special recognition for the local heritage restoration program.

The Capreol Communities in Bloom committee have also expressed interest in submitting a bid for a hosting opportunity for the CIB National Symposium and Awards Ceremony in 2026 or 2027. To host, the City of Greater Sudbury would be required to be an active Communities in Bloom participant at the National level. The National Symposium is a four-day conference that would attract upwards of 200 participants, the majority of whom would be travelling to Greater Sudbury from out of province.

Summary and Next Steps

The City's participation in the provincial CIB program was an excellent demonstration of collaboration amongst various departments across the organization to engage the community to celebrate our community and receive valuable feedback on areas for future improvement.

The CIB judges' recommendations received will be used to review municipal services. Recommendations may be used as the basis of future business cases for service level changes or enhancements where there is a need for additional resourcing and/or budget. As the City is currently in the second year of a two-year operating and four-year capital budget cycle, the City will look to participate in the program again in 2026 or beyond, to allow sufficient lead time to implement some of the recommendations highlighted, with a goal of improved scoring.

Staff are evaluating the merits of hosting the National Symposium in the future and determining if there is a strong return on investment from an economic development perspective.

Resources Cited

Communities in Bloom official website
https://www.communitiesinbloom.ca/

Communities in Bloom
Collectivités en fleurs
CANADA

Growing Great Places Together
Cultivons ensemble de beaux espaces

Greater | Grand Sudbury

The City of Greater Sudbury
in bloom

Land Acknowledgement

The City of Greater Sudbury acknowledges that we are situated on the traditional territory of the Anishnaabe of the 1850 Robinson Huron Treaty, shared by the Atikameksheng Anishnawbek, Wahnapitae First Nation, and Sagamok Anishnabek.

We understand our role and responsibility to honour and respect the inherent and Treaty Rights of all Indigenous Peoples across this land. We are committed to integrating the principles of reconciliation into our community initiatives, including our efforts in sustainable landscaping, environmental stewardship, and civic beautification.

We recognize the profound contributions of Indigenous Peoples to the cultural fabric and environmental sustainability of this land. By embracing our shared history and fostering partnerships with Indigenous communities, we aim to create inclusive and vibrant spaces that celebrate diversity and heritage.

Together with our residents, businesses, and community partners, we strive to build a city that embodies reconciliation, respects Indigenous knowledge, and values the past, present, and future contributions of all peoples to our community's growth and prosperity.

Table of Contents

Floral bed display and amphiteatre at Bell Park

Welcome to the City of Greater Sudbury

Greater Sudbury, located in Northern Ontario, offers a blend of natural beauty, vibrant culture, and rich history. As the region's largest city, it continues to grow, boasting a diverse population of 179,965 residents and a thriving community spirit. Surrounded by picturesque landscapes, there are over 300 freshwater lakes within its borders, including the two largest city contained lakes in the world. Greater Sudbury has a thriving urban centre and visitors are discovering that it is a special place to relax and enjoy major attractions, cultural celebrations, and the great outdoors.

The city's cultural scene presents an impressive array of festivals, galleries, museums, and theatres that celebrate our rich history and cultural diversity. Annual events including Up Here Festival and Northern Lights Festival Boréal showcase our vibrant arts community, while Science North, a premier tourist attraction, delights visitors of all ages with its interactive and hands-on exhibits. Greater Sudbury boasts some incredible and diverse restaurants to satisfy every taste, making it a go-to spot for shopping and dining in the region.

With its 140-year history and expertise in mining, Greater Sudbury has become a global mining hub, recognized internationally, for sustainable practices including our impressive efforts in regreening. The Big Nickel is a giant replica of a Canadian nickel and is an iconic landmark and symbol of our city's industrial legacy.

With its unique blend of urban amenities and natural wonders, Greater Sudbury is truly a wonderful place to live, work, and play.

Ramsey Lake

Message from the Mayor

On behalf of the City of Greater Sudbury, I am pleased to present our city's 2024 profile book as part of the Communities in Bloom competition.

This annual competition not only celebrates the beauty of our surroundings, but it also highlights our collective commitment to community pride, civic engagement and environmental stewardship. Our book showcases the incredible work of volunteers, local businesses, municipal staff and residents to create the beautiful and vibrant neighbourhoods we call home.

Whether it's our meticulously maintained parks, stunning floral displays, sustainability initiatives, or innovative urban centre, each element reflects our shared vision for a greener, more connected community. I want to extend a heartfelt thanks to everyone for their ongoing support and participation. Together, we are making a meaningful difference and setting a shining example of the kind of community we are proud to share with visitors.

I encourage everyone to keep up this momentum and continue to nurture our shared spaces and natural environment with passion and dedication. I look forward to sharing our achievements together.

Mayor Paul Lefebvre

Community Appearance

Welcome Sign

Bell Park

With more than 330 lakes, Greater Sudbury is proudly known as the City of Lakes. Our lakes are a year-round source of recreation and are home to a number of public beaches. Bell Park is one of our largest and most renowned parks in the City. Centrally located, it boasts a beautiful boardwalk spanning two kilometres on the edge of Ramsey Lake and a community amphitheatre. In summer, the park is filled with concerts, cultural events and festivals for all to enjoy. In winter, you'll find skaters on the ice enjoying the Ramsey Lake skating path, that has mimicked the water's edge of two kilometers for over 25 years.

With nearly 100 full time and seasonal staff, the Parks department maintains 1,400 hectares of parkland annually including 180km of non-motorized trails. Seasonally, Parks Services maintains approximately 200 waste receptacles throughout our parks, playgrounds, trails, and passive parks. All Horticultural Staff have a Certificate or Diploma in Horticulture or equivalent qualification. Over the last 10 years staff have been incorporating shrubs and perennials into the majority of the gardens. Additional training is provided annually for specific equipment, planting best practices and techniques, particularly in the spring when 60+ seasonal employees are hired to support spring/summer operations and maintenance.

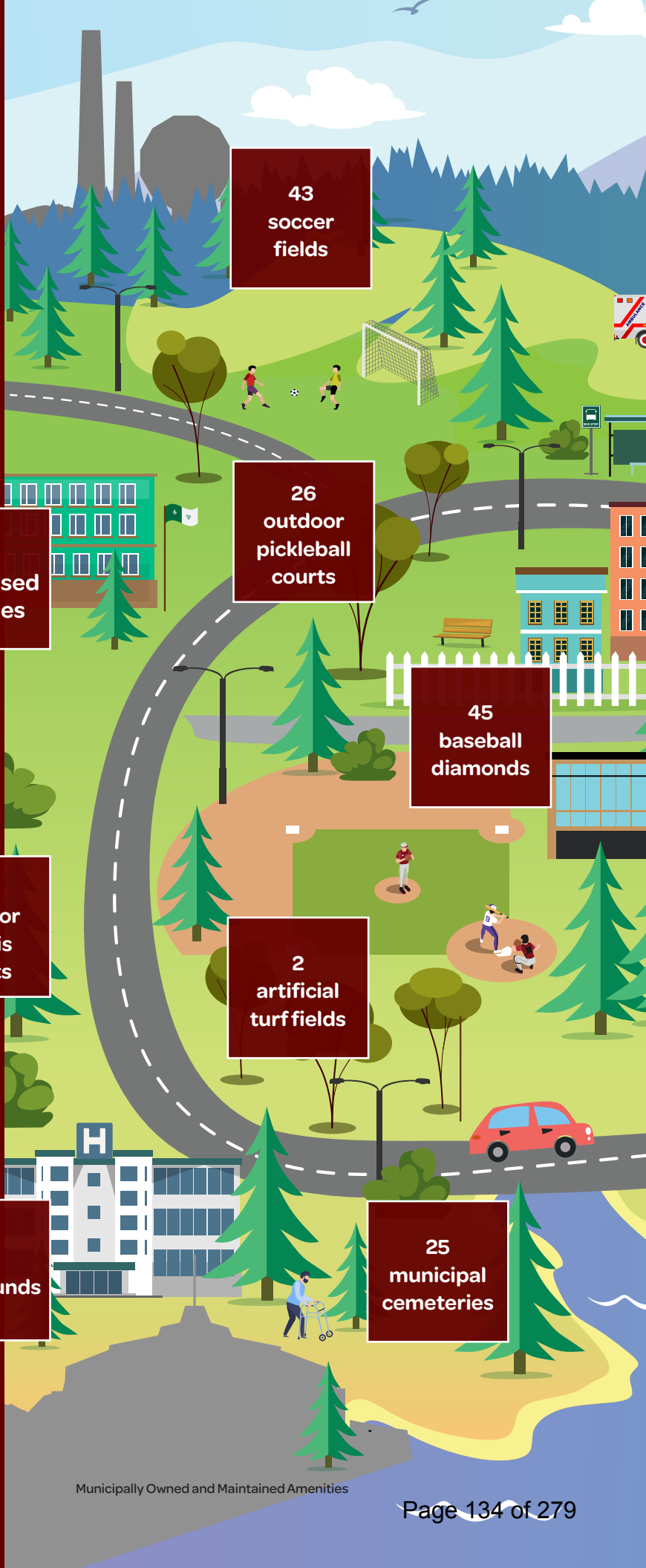
Blue Flag Beaches

In May 2024, Bell Park Main Beach and Moonlight Beach were awarded the prestigious Blue Flag Canada certification for the 7th year in a row. Blue Flag is an international award given to beaches and marinas that meet high environmental, safety, accessibility and cleanliness standards.

7 supervised beaches

43 outdoor tennis courts

181 playgrounds



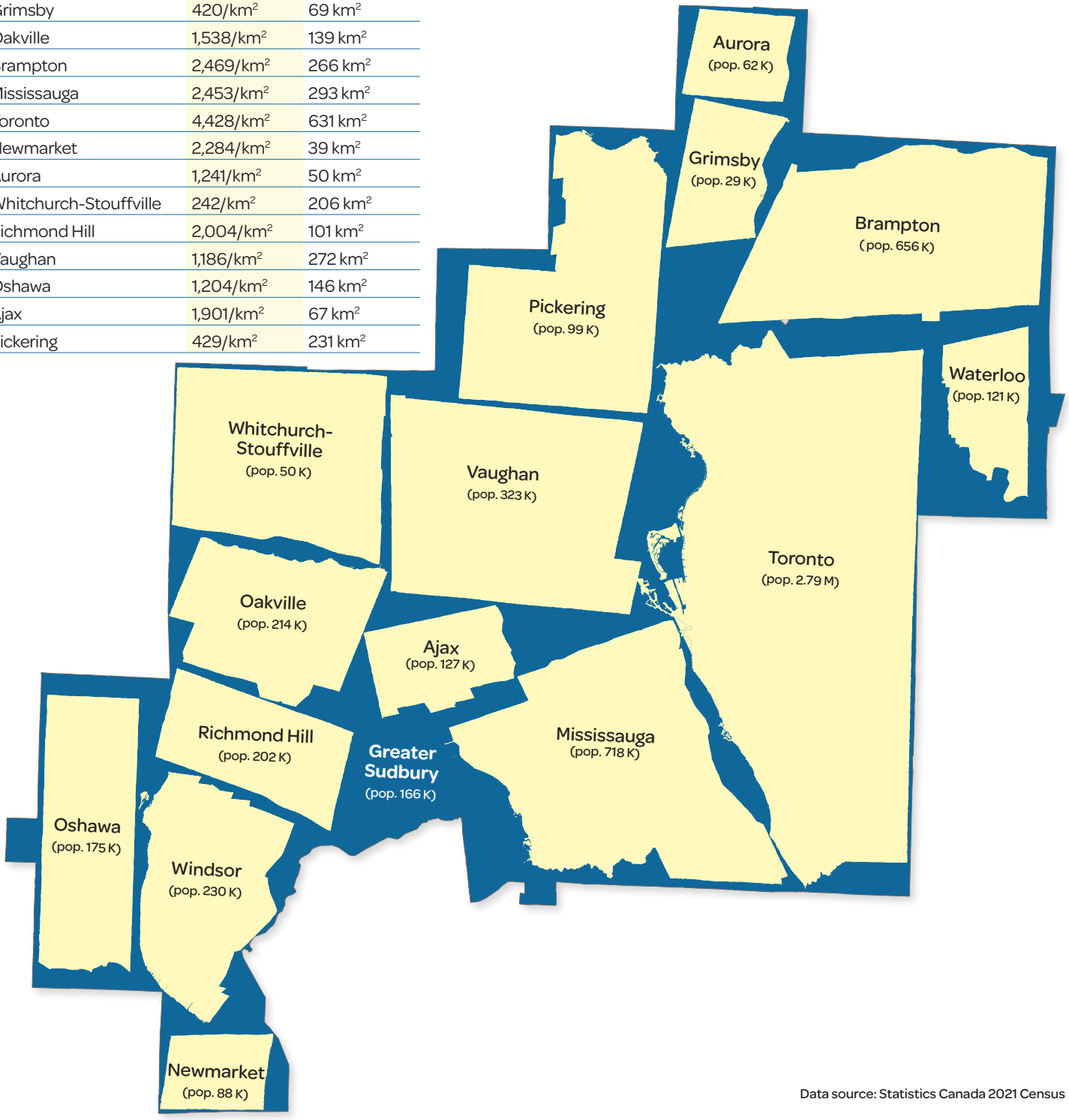
Municipally Owned and Maintained Amenities


2
ski hills
1,400 hectares of maintained parkland including 180km of non-motorized trails
179,965 population
57 outdoor rinks
5 pools
15 ice pads across 14 municipal arenas
11 skateboard parks
3 campgrounds and trailer parks
44 basketball courts
5 fitness centres
13 libraries
3 dog parks
2 skating paths
17 splash pads

Greater Sudbury vs Southern Ontario Cities

a look at distance and density

CITY	POP. DEN.	AREA
Greater Sudbury	**52/km²**	**3,186 km²**
Windsor	1,573/km²	146 km²
Waterloo	1,896/km²	64 km²
Grimsby	420/km²	69 km²
Oakville	1,538/km²	139 km²
Brampton	2,469/km²	266 km²
Mississauga	2,453/km²	293 km²
Toronto	4,428/km²	631 km²
Newmarket	2,284/km²	39 km²
Aurora	1,241/km²	50 km²
Whitchurch-Stouffville	242/km²	206 km²
Richmond Hill	2,004/km²	101 km²
Vaughan	1,186/km²	272 km²
Oshawa	1,204/km²	146 km²
Ajax	1,901/km²	67 km²
Pickering	429/km²	231 km²



Data source: Statistics Canada 2021 Census

Bridge of Nations

Bridge of Nations

The Bridge of Nations is a local landmark celebrating our city's ethnic diversity and commitment to peace and unity.

On Canada Day, 2007, members of the community gathered as the first flags were raised on the Bridge of Nations, forever changing the landscape of Greater Sudbury.

Today, the flags of 87 countries and nations fly over downtown, representing the cultural mosaic that call our great City home.

Heritage Conservation

Heritage Site – Church of the Epiphany
Photo by Huu Nghia N

Place des Arts

Cultural Assets

Science North – Canada's 2nd largest science centre and Northern Ontario's largest indoor attraction.

Dynamic Earth – Mining and earth science centre, and home of the iconic Big Nickel - celebrating 60 years in 2024.

The YES Refettorio – New open air theatre in downtown Sudbury.

Place des Arts – The first multidisciplinary arts centre of its kind in Northern Ontario, consisting of seven member organizations.

Indie Cinema – Greater Sudbury is one of the smaller communities among the list of cities with independent, not-for-profit, mission-driven arthouse cinemas such as Sudbury Indie Cinema. As a member of NICE (Network of Independent Canadian Exhibitors), we stay connected with colleagues from similar cinemas.

Up Here Festival murals

Community Murals

Over the past decade, We Live Up Here and Up Here Festival have been advocates for beautifying our city with public art and murals. As visitors and residents alike walk through Greater Sudbury's downtown core, they are greeted with sensational masterpieces that capture Northern Ontario experiences and a blend of international flare. The murals were created by local and visiting artists, and are expanding every year, with now nearly 50 works created since 2013.

Up Here also hosts guided walking mural tours and has a self-guided tour app for those looking to learn more about the artists, the works and the public art scene.

Additionally, the Community Action Networks have commissioned murals throughout the community, with some of these vibrant artworks being a collaborative effort that involved members of the community in the painting process.

Community Events

Greater Sudbury hosts a vibrant array of festivals throughout the year, offering something for everyone. Here are some event highlights:

Northern Lights Festival Boréal: This iconic festival, held in Bell Park, features a mix of music genres from folk to rock, celebrating Canadian and international artists over several days each July.

Up Here Festival: Known for transforming the city with art installations and live music, this urban art and music festival brings unique experiences to downtown Sudbury each August.

Cinéfest Sudbury International Film Festival: One of Canada's major film festivals, Cinéfest showcases over 135 films from around the world, attracting filmmakers and film enthusiasts every September.

Blueberry Festival: Celebrating the local blueberry season, this festival includes a variety of activities like pie-eating contests, blueberry-themed dishes, and family-friendly events spread across various locations in July.

Sudbury Jazz Festival: This event features live jazz performances from local, national, and international artists, providing a sophisticated musical experience every September.

These events are just a glimpse of Greater Sudbury's rich festival calendar, which also includes cultural celebrations, sports events, and more.

Other great events include:

Greek Festival, Japan Festival, Queer North Film Festival, Graphic-Con, Philippine Festival, Italian Festival, Gem and Mineral Show, Poutine Festival, Afrofest, Ribfest, Sudbury Multicultural and Folk Arts Association Canada Day festivities, Sudbury Summer Concert Series, Conquer the Crater, Pride Week Events, Onaping Falls Summerfest, Science North's Canada Day event, Indian Food Carnival, Copper Cliff's Famous Strawberry Social, The Great Benjamin Circus/Midway, Annual Downtown Sudbury Yard Sale, Wordstock Literary Festival, Valley East Days and so much more!

Wild Blueberries
Photo by Sindhura Y.

Heritage Assets/Sites

The City of Greater Sudbury takes pride in the conservation of heritage assets and sites, helping to improve and celebrate the history and culture of the city. The City of Greater Sudbury's Heritage Register includes properties that are either designated or listed heritage sites under the Ontario Heritage Act.

Designated Heritage Sites:

- Belanger Homestead (725 Notre Dame Ave., Azilda)
- Bell Mansion (468 Ramsey Rd., Sudbury)
- Canadian Pacific Rail Station (233 Elgin St., Sudbury)
- Church of the Epiphany (85 Larch St., Sudbury)
- Copper Cliff Fire Hall (7 Serpentine St., Copper Cliff)
- Flour Mill Museum (140 St. George St., Sudbury)
- Flour Mill Silos (Notre Dame Ave., Sudbury)
- Northern Ontario Railroad Museum and Heritage Centre (26 Bloor St., Capreol)
- Ste. Anne's Rectory (14 Beech St., Sudbury)
- St. Louis de Gonzague (162 Mackenzie St., Sudbury) – Current home of the Sudbury Indie Cinema

Listed Heritage Sites:

- Capreol Fire Station (59 Young St., Capreol)
- David Street Water Treatment Plant (355 David St., Sudbury)
- Fielding Memorial Chapel of St. Mark (935 Ramsey Lake Rd., Sudbury)
- Pine Street Elevated Water Tank (332 Pine St., Sudbury)
- Queen's Athletic Field (30 Cypress St., Sudbury)
- The Anderson Farm (550 Municipal Rd. 24, Lively)
- The Carrefour Senateur Rheal Belisle Cultural Centre (2777 Main St., Blezard Valley)

Heritage sign at St. Louis de Gonzague

Anderson Farm Museum

Museums

The City of Greater Sudbury Museums was created in 2001 upon the recommendation of the Task Force on Libraries, Culture and Museums. The City of Greater Sudbury Museums is made up of four museums which include:

Anderson Farm Museum

The Anderson Farm Museum is comprised of the century-old heritage buildings of a former dairy farm, once among the largest operating in Northern Ontario during the 1920s-1930s and a log cabin originally from the ghost town of Creighton.

Copper Cliff Museum

The log cabin museum, built in 1890, is located on the site of Copper Cliff's first dwelling. Inside visitors can learn all about the early days of Copper Cliff, the history of mining in the area, and the former town's part in the World Wars.

Flour Mill Museum

This clapboard house, built in 1903 by its owner, François Varieur, shares the history of the Flour Mill neighbourhood and stories of the area's early French-Canadian residents, as well as their role in the development of Greater Sudbury.

Rayside- Balfour Museum

The Rayside-Balfour Museum displays artifacts relating to the development and history of the communities which make up the former Town of Rayside-Balfour. It also highlights some of the people who played a key role in the community.

Northern Ontario Railroad Museum & Heritage Centre (NORMHC)

The NORMHC, located in Capreol, is a rail transport museum. The museum's primary focus is on preserving historical artifacts that represent the heritage of Northern Ontario and the history of the lumber, mining, and railroading industries. This museum offers a unique opportunity for visitors to delve into the rich history and heritage of Northern Ontario and gives you the opportunity to operate a locomotive simulator, explore life on the railroad through the box car house and school on wheels, climb inside a historic locomotive and a caboose, and experience their massive model train layout and interactive programs.

The former Capreol Municipal Building, once home to the Capreol Fire and Police departments, showcases exhibits reflecting on the region's social heritage and the town's early history. The NORMHC is independently owned and operated and receives municipal funding support.

Museum Revitalization Plan

In early 2023, a draft Museums Revitalization Plan was presented to Council, who approved;

- The appointment of a Museums and Heritage Advisory Panel that will provide advice and contribute to the creation of short and long-term plans, formulate the museums' statement of purpose, and recruitment of diverse panel members
- The addition of two full-time permanent staff to address the shortfall of skilled resources required to meet community expectations, industry standards and perceived service levels
- An increase in the operating budget to address increased costs in maintenance and provide financial support for the required external storage for a portion of the artifact collection
- Continued capital budget allocations towards maintenance of heritage buildings and other museum facilities
- Funds for the creation of a standalone website for museums
- Advice on municipal, provincial and federal policies and procedures pertaining to the museums' operations and activities

Natural Heritage Assets

Kivi Park

With over 480 acres of prominent landscape filled with lush Northern Forest, fresh waterways and distinguished rock of the Canadian Shield, Kivi Park is a breathtaking destination waiting to be explored.

Lake Laurentian Conservation Area

Experience 950 hectares of protected green space and the tranquility of a remote wilderness setting.

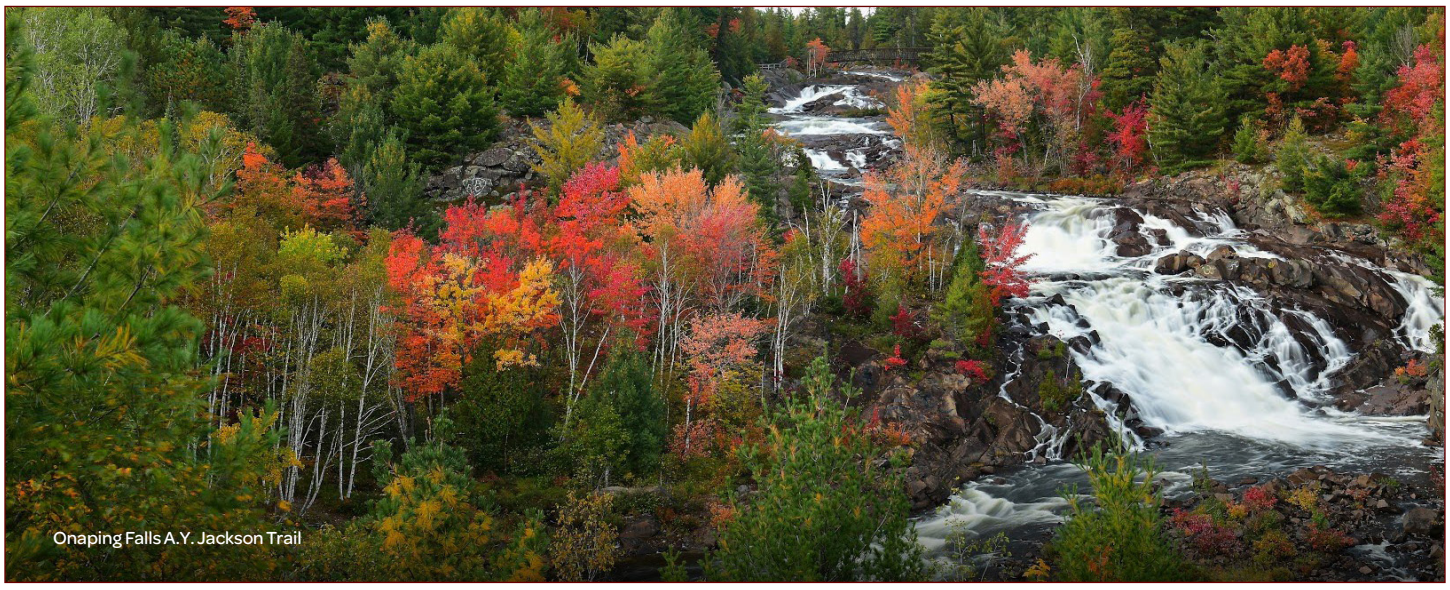
Onaping Falls A.Y. Jackson Trail

Provides picturesque views and trails leading to the falls.

Windy Lake Provincial Park

Offers trails with lovely lake views and forested paths.

Lake Laurentian Conservation Area



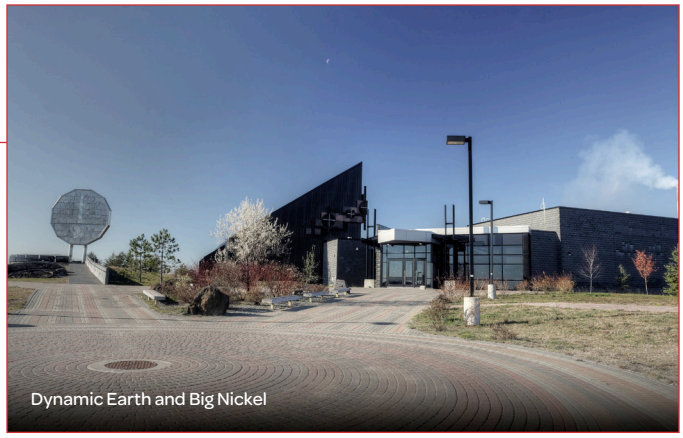
Onaping Falls A.Y. Jackson Trail

Crowley Lake- Kivi Park

Monuments

The Big Nickel

Sudbury's most iconic attraction, the Big Nickel, is located at Dynamic Earth, and is an exact replica of a 1951 Canadian nickel. It was built in 1964 and symbolizes the wealth that Sudbury has contributed to the Canadian economy through nickel production and mining. It is the largest coin in the world, and recently celebrated its 60-year anniversary in July of 2024.



Dynamic Earth and Big Nickel

National Mining Monument

Situated in Bell Park is an impressive monument towering over fifteen feet tall, celebrating the history of mining. This sculpture is a tribute to miners from the first prospectors with their picks and axes up to modern day miners. Hundreds of miners descend on both sides of the sculpture and their collective work merges into two giant hands extracting what lies beneath the Earth's surface.

National Mining Monument

Our Lady of Lourdes Grotto

The statues at Lourdes Grotto were erected in the 1950's. Situated on 5.1 acres, and overlooking scenic views of Lake Ramsey, the Grotto celebrates the world's religions. A full mile of walkways travel through Greek-style columns, a large fountain, flower gardens, benches, statues, and plaques ending at the foot of the magnificent grotto.

Fountain at the Grotto

Stompin' Tom Connors

A bronze sculpture honouring one of Canada's greatest folk/country artists, commissioned by the Stompin' Tom Connors Commemorative Committee, sits in front of the Sudbury Community Arena since 2015. Connors wrote "Sudbury Saturday Night", a song recognized from coast to coast in Canada.

Stompin' Tom Connors Sculpture

St. John's Cemetery

Cemeteries

The City of Greater Sudbury has over 25 cemeteries within the municipal boundary. The City of Greater Sudbury Cemetery Services is responsible for preserving the cemeteries in perpetuity on behalf of the community, and takes pride in sustaining the beauty and dignity of our cemeteries. We recognize the important contributions of individuals and families in the ongoing maintenance of cemetery grounds, and their dedication to adding to the floral and plant life on cemetery grounds.

Landscape

Ramsey Lake
Photo by Richard M.

Bell Park

Parks Donations and Memorial Gifts Program

Citizens can make a donation to select local parks through the Parks Services Donation and Memorial Program to commemorate a special person, or a momentous occasion, or as a philanthropic gesture to beautify our community. The program includes donations of benches, picnic tables, trees and shade structures.

Junction Creek Research

Junction Creek Stewardship Committee

In the bustling urban landscape of Greater Sudbury, the Junction Creek Stewardship Committee (JCSC) plays a key role in environmental stewardship and community engagement. Since its inception in 1999 and its establishment as a Canadian registered charity in 2019, the JCSC has been at the forefront of revitalizing the Junction Creek ecosystem. With a robust vision of a healthy and thriving watershed, the committee actively leads initiatives aimed at enhancing the ecological, economic, and recreational value of this significant natural asset.

Junction Creek Cleanup

Environmental Monitoring and Research to:

- fill data gaps, monitor, and assess stream health, biodiversity, and species at risk
- contribute to scientific databases and community science programs to inform watershed management and conservation
- work with local government, experts, stakeholders, and rightsholders, to influence positive environmental change

Water Quality Monitoring: monthly water sampling, site specific sampling

Bioindicators and Wildlife Surveys: fish community assessments, benthic macroinvertebrate surveys, brook trout, frogs, bats, birds, turtle studies, etc.

Habitat surveys: wetland evaluations (OWES), brook trout, sedimentation monitoring project, etc.

Environmental Restoration and Stewardship to:

- collaborate with local experts and community partners to restore degraded habitat
- mitigate pollutants from entering local waterways, and strengthen natural infrastructure,
- improve biodiversity, building resiliency to climate change, enhancing local green spaces, and improving the health of the watershed and community

Litter and Waste Management Initiatives: Campaigns and programs to reduce litter, promote recycling, and manage waste effectively within the community.

- Litter monitoring surveys
- Creek cleanups
- Stormwater project

Junction Creek Erosion Control

Habitat Restoration Projects

Implementation of projects aimed at restoring and enhancing habitats along Junction Creek to support native species and improve ecological balance. Projects include planting native trees, shrubs, and wildflowers, bioengineering techniques for shoreline erosion control, invasive species removal, annual trout release and arboretum.

Community Engagement and Education

Engage the community in environmental activities to promote sustainable practices and support environmental stewardship in Greater Sudbury.

Educational Programs: Offer educational programs and resources for schools, community groups, and the general public on topics such as water stewardship, wildlife protection, and sustainable practices.

- Nature Discovery Backpack Lending Program
- Junction Creek Youth Council
- Empowering Youth for Junction Creek
- Yellow Fish Road

Public Outreach: Host community events, provide outreach booths, and disseminate educational materials to engage residents in stewardship activities and raise awareness about environmental issues.

Volunteer Programs: Organize volunteer opportunities for local residents to participate in restoration efforts, fostering a sense of community ownership and responsibility. Provide guided walks and tours along the Junction Creek Waterway Park trail network to explore, discover, and connect with nature.

Rainbow Routes English Conversations on the Trails

Rainbow Routes Association (RRA)

Rainbow Routes was established in 1998 and is a non-profit organization committed to the promotion of all non-motorized trails in Greater Sudbury, fostering both physical health and mental well-being in the community through its regular programming. As a proud connector of the Trans Canada Trail, RRA supports the City of Greater Sudbury in maintaining the trails, including those managed by Conservation Sudbury, through the use of dedicated volunteers.

The RRA is dedicated to inspiring individuals to embrace the outdoors through a variety of engaging programs. Held on the first Saturday of each month, the Monthly Hike Club invites participants to explore the scenic paths of the Greater Sudbury network. English Conversations on the Trails is a program in collaboration with the Greater Sudbury Public Library—a welcoming program designed for those looking to improve their English skills in a relaxed, natural setting. The Nature Walk program, in partnership with the Coalition for a Liveable Sudbury, invites the community to discover the rich history and diverse ecosystems of the trails. The Inclusive Trail Trekkers program, developed with L'Arche Sudbury, ensures that everyone in the community can access and enjoy the Sudbury trails.

The Sudbury Camino, RRA's biggest event of the year, is an annual challenge that encourages the community to spend a day immersed in nature with a choice of venturing a 28 km, 21 km, 15 km, and 4 km guided hike through the Greater Sudbury's section of the Trans Canada Trail.

These programs reflect the RRA's commitment to helping Sudbury's diverse community reconnect with nature and find a rejuvenating break from everyday life. The RRA invites everyone to experience the joy and serenity of the outdoors, providing educational opportunities along the way.

Ugliest Schoolyard Contest winners - Chelmsford Valley District Composite School 2022

Ugliest Schoolyard Contest

The Canadian Biodiversity Institute and Earth Day Ottawa initiated the Ugliest Schoolyard Contest in 1998 in Ottawa. In May 2005, VETAC (City Council's Advisory Panel on Regreening) launched their own version of the Ugliest Schoolyard Competition. This initiative aimed to support schools across Greater Sudbury in revitalizing their outdoor spaces through regreening projects. Over the years, the program has received generous support from Sudbury Integrated Nickel Operations, a Glencore Company, as well as in-kind and financial contributions from local businesses and organizations. From 2005 to 2022, these efforts enabled 49 schools to transform their schoolyards into greener and healthier environments.

Looking forward, the program is progressing with the introduction of a new role: the Regreening Educator, which the City is currently hiring for. This position marks a transition from the contest format to engaging directly with schools. The Regreening Educator will deliver presentations and facilitate hands-on activities in schoolyards. Building on its successful trial run in 2018-2019, this initiative involves tasks such as upkeep of vegetation in former contest-winning areas or establishing new elements such as pollinator gardens or food forests. Beyond the physical transformations, this educational initiative aims to foster connections between children and Sudbury's ecological heritage while highlighting the community's environmental achievements.

Arena employee preparing ice at outdoor rink

Outdoor Rink Shovel Superheroes

Neighbourhood rinks would not be possible without the hundreds of volunteers who donate their time and energy each winter season. Volunteers help maintain and operate 57 outdoor rinks across the city.

Municipal Bylaws

Municipal bylaws are essential regulatory measures designed to uphold community appearance, standards, and environmental responsibility. These bylaws serve a dual purpose: first, to enhance the aesthetic appeal and overall cleanliness of neighbourhoods by establishing guidelines for property upkeep, signage, and public spaces; second, to promote environmental sustainability through measures such as anti-idling regulations aimed at reducing air pollution and conserving natural resources. By setting clear standards for landscape maintenance, waste management, and behaviours such as vehicle idling, municipal bylaws not only preserve the visual charm of communities, but also foster a healthier, more sustainable living environment for residents. This multifaceted approach allows us to effectively manage regulations in place, while safeguarding both the quality of life of residents and environment that define our community.

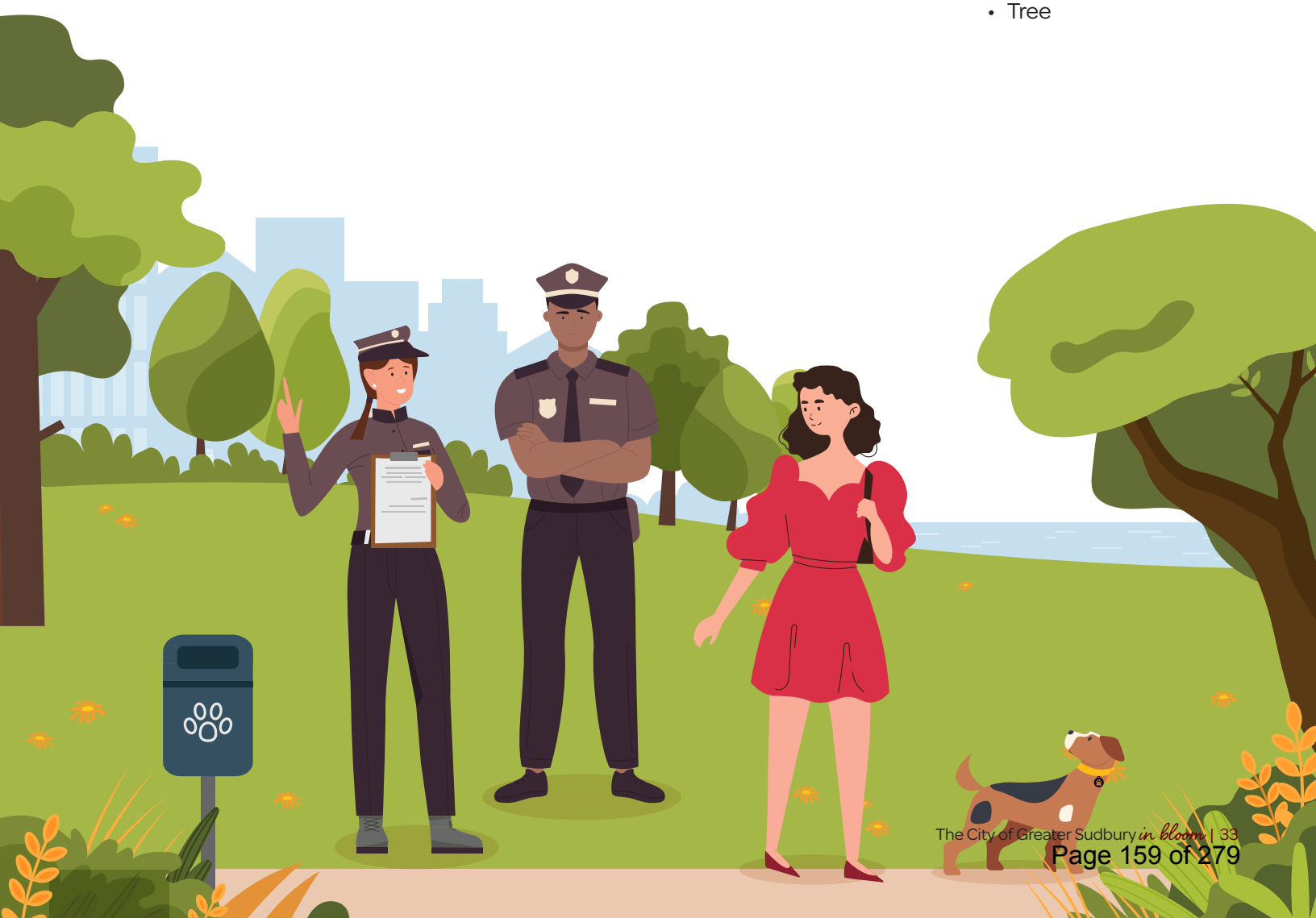
These regulations not only enhance the city's visual appeal but also contribute to a healthier community. They include the following:

Standards:

- Community appearance (effective bylaws, policies and compliance and enforcement)
- Vandalism clean up requirements

Bylaws:

- Property Standards
- Clearing of Yards
- Collection, Removal and Disposal of Waste
- Fouling of Roads
- Parks
- Sign
- Stoop and Scoop
- Zoning
- Anti-idling
- Tree

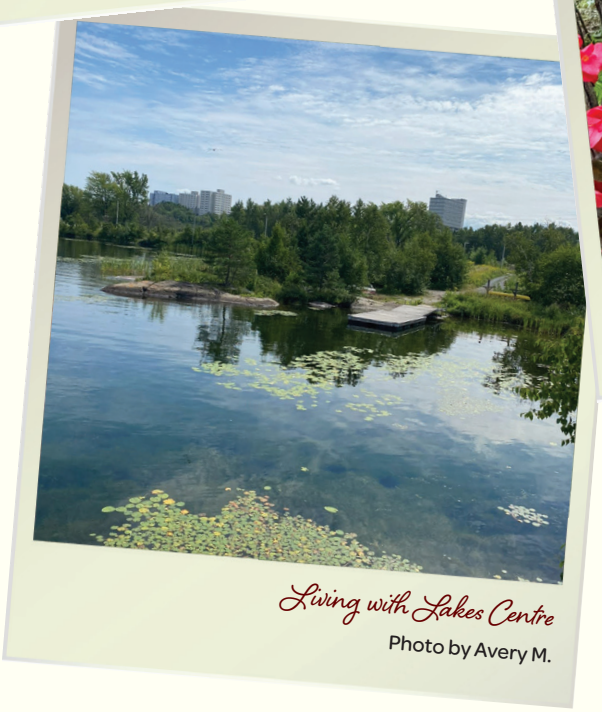


Plant and Floral Displays

Communities in Bloom floral design, Balsam Street entrance, Copper Cliff

Jim Gordon Boardwalk, Bell Park

Photo by Ted D.



Living with Lakes Centre

Photo by Avery M.

Over 90,000 plants and flowers are planted each year to beautify our city in over 700 flower gardens scattered throughout the city limits, consisting of a variety of planters, hanging baskets and gardens.

- Seasonal displays
- Residential
- Business/Institutional

Photo by Kishwor S.

Photo by Vanessa R.

Photo by Linda C.

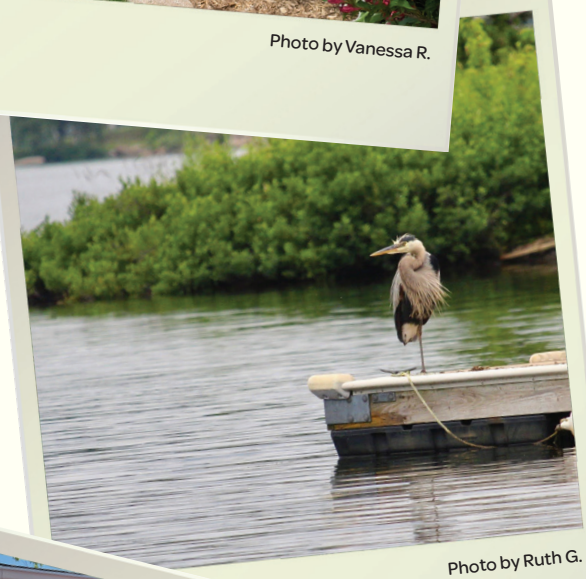


Photo by Ruth G.

Notre Dame Avenue flower beds

Photo by Doris R.

Photo by Kay and John K.

Photo by Asaduzzaman

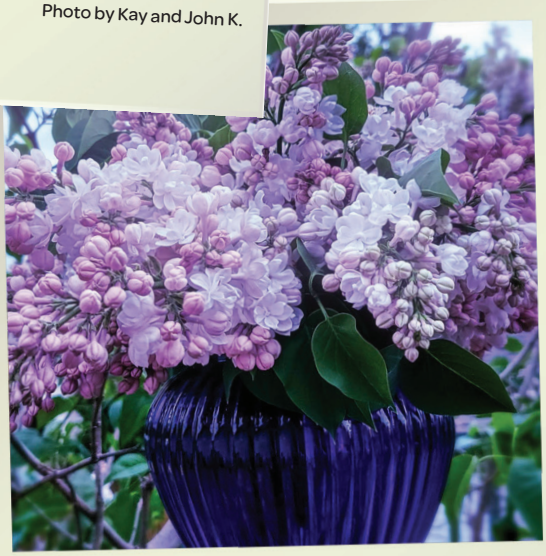


Photo by Jessica B.

Birch canopy at Fielding Memorial Park

Photo by Chris B.

Laurentian University Climate Science Parkette

Photo by Avery M.

Tree Management | Urban Forestry

Lake Laurentian Conservation Area boardwalk

Photo by Huu Nghia N.

Regreening program summer planting

Commemorative Trees - Sudbury Regional Tree Fund

Residents can have a commemorative tree planted in memory of a loved one or as an expression of thanks through the 'A Gift that Grows' program, lead by the Sudbury Regional Tree Fund. This program allows individuals to proudly take ownership of Greater Sudbury's improving natural environment.

Commemorative trees are planted in the Tom Davies Commemorative Forest, located within the scenic Lake Laurentian Conservation Area, only ten minutes from downtown Sudbury. Owned and operated by the Nickel District Conservation Authority, this Conservation Area encompasses 950 hectares (2,400 acres) of protected green space.

This tranquil wilderness setting combines natural and man-made features including: a man-made lake and pond, scenic lookouts, a self-guided nature trail, numerous wetland areas, hiking trails, bird watching spots, as well as snowshoe and cross-country trails in winter.

The Sudbury Regional Tree Fund contributes to the planting of approximately 1,000 native trees annually, such as white pine, red pine, jack pine, white cedar, and tamarack. These seedlings, planted each spring by the City's VETAC Regreening Program, collectively enhance the once-industrially damaged ecosystem of Greater Sudbury.

With every donation to the Sudbury Community Foundation's Sudbury Regional Tree Fund, a tree is planted in the Tom Davies Commemorative Forest. Contributions are pooled with others and invested to generate interest income. This income is then distributed as a grant to support the City of Greater Sudbury's Regreening Program, ensuring sustainable growth and continued improvement of local ecosystems.

Celebrating our Regreening Success Story

2023 marked the 50th anniversary of VETAC and 45 years since the Regreening Program began. Since 1978, more than 3,500 hectares of land have been limed and grassed and more than 10 million trees have been planted with positive results in the rehabilitation of Greater Sudbury's landscape and watersheds.

Our city was once barren and treeless as the result of mining and smelting practices. Today it is a thriving greenspace thanks to the efforts of the Regreening program. The Regreening Program works in partnership with local mining companies and residents. It also offers online videos and other resources to local schools about the Sudbury story.

In 2022, the 10 millionth tree was planted by Dr. Jane Goodall and the Right Honourable Justin Trudeau. During which time, scenes were filmed as part of Jane Goodall's Reasons for Hope IMAX film that was released in 2023. The film showcases three different conservation stories, one being our regreening story, that illustrate Jane's pillars of hope.

Regreening Program Results

Regreening Component	2023	To Date (since 1978)
Tree Seedlings Planted	113,075	10,222,422
Shrubs and Understory Tree Seedlings Planted	27,880	565,166
Area Limed	7.0 ha	3,504 ha
Area Fertilized	5.0 ha	3,271 ha
Area Seeded	5.0 ha	3,199 ha
Forest Floor Transplants	0.051 ha	2.24 ha
Program Cost	$1,038,182	$37,443,513
Temporary Employment Opportunities	27	4,895
Awards	---	15
Number of Schoolyards Regreened	--	50
Volunteer Tree Planters	90	13,311
Trees Planted by Volunteers	1,465*	390,076
Trees Provided for Residential Plantings	400*	432,199

**Values are included in the Tree, Shrubs and Understory Tree Seedlings Planted. The Regreening Process*

10 millionth tree monument, Bell Park

Urban Forestry

The City of Greater Sudbury places an emphasis on tree management and urban forestry through comprehensive policies and initiatives. Overseen by the Tree Warden and Superintendent of Horticulture, the city has established bylaws and regulations to protect its urban trees. These regulations encompass landscaping standards, approved planting lists, and guidelines for tree care and maintenance.

Central to Greater Sudbury's commitment is the Street Tree Policy. There are numerous benefits of urban trees including: improving air quality, managing stormwater, reducing heating and cooling costs, and enhancing neighborhood aesthetics. The Tree Warden oversees tree planting within city rights-of-way, implementing a comprehensive tree planting plan that includes species selection, nursery preparation, and post-planting monitoring. Annual maintenance of city-owned trees includes seasonal fertilization and watering, alongside inspections of trees in parks and playgrounds.

Currently, the city is developing an Urban Forest Master Plan, set to be presented to City Council in fall 2024. This plan includes strategies for replacing 1,200 Ash trees lost to Emerald Ash Borer infestation.

These efforts underscore the importance of trees in enhancing livability, sustainability, and resilience in urban environments.

Regreening program tree seedlings

10 millionth tree planting ceremony with Prime Minister of Canada the Right Honourable Justin Trudeau and Dr. Jane Goodall

50 Million Tree Program

Since 2016, Conservation Sudbury has been a Planting Delivery Agency (PDA) through Forest Ontario's 50 Million Tree Program. In collaboration with VETAC, Collège Boreal and local professional foresters, the program is offered to landowners living in the watersheds of the Vermilion, Wanapitei or Whitefish rivers, as well as areas west of, and including, Alban, Noelville, St. Charles and Markstay/Warren. To date, 338,000 trees have been successfully planted in Greater Sudbury and surrounding areas through this program, with an annual target of planting 50,000 trees each spring.

As a Planting Delivery Agency (PDA), Conservation Sudbury works directly with landowners to assess site eligibility, develop planting plans, allocate funding, and coordinate the planting process. The program is designed to significantly reduce the landowner costs that would normally be required to complete large-scale tree plantings and thereby increase the number of trees planted.

Environmental Action

Material Recycling Facility Tour

The City's Official Plan recognizes that a healthy and prosperous future depends on Greater Sudbury being a sustainable community. To that end, the Official Plan adopts a watershed-based approach to planning and provides land use policies that protect significant natural areas and features. The Official Plan also recognizes and includes policies that support climate change mitigation and adaptation.

In 2019, the City declared a climate emergency with a target of becoming a net-zero carbon emissions community by 2050. In response to the climate emergency declaration, a Community Energy and Emissions Plan (CEEP) was prepared and released in 2021, followed by a Community Climate Change Adaptation Plan (CCCAP) in 2023.

In 2009, the City of Greater Sudbury was one of the first Canadian municipalities to release a Biodiversity Action Plan as a natural next step to continue its award-winning regreening work begun in 1973.

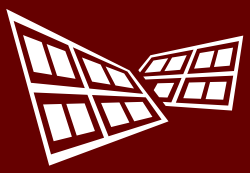
We are proud of our efforts to make our community greener, cleaner, healthier and more sustainable. With award-winning programs, such as the Regreening Program and EarthCare Sudbury, we strive to make a positive impact in our own activities while encouraging residents to respect, protect and enhance our natural environment.

The City of Greater Sudbury prepared its first Climate Action Annual Report for achievements made in 2021 - 2022. Highlights include:

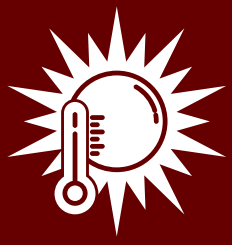
- switched all 11,000 + streetlights to LED bulbs, resulting in a 40% reduction in electricity use;
- upgraded several outdoor sports courts, including lighting, as part of the Outdoor Court Revitalization project;
- continued asset renewal projects including elevator modernizations and extensive roof replacements across a variety of locations; and,
- replaced several boilers in the Greater Sudbury Housing Corporation buildings.

Highlights

A "Greener Events" web page to help event planners find ways to reduce the ecological footprint of their events



Two large solar panel roofs: Gerry McCrory Countryside Sports Complex Arena and Pioneer Manor



Emergency plans for climate change events such as the Hot Weather Response Plan

A landfill gas collection system at the Sudbury Landfill and Waste Diversion Site that converts gases to electricity

Regreening program tree planting

EarthCare

The EarthCare Sudbury Program was established in 2001, and is a unique partnership between residents, the City of Greater Sudbury, and over 150 community, agencies, organizations and businesses. Guided by the Local Action Plan and the climate action plans, the program provides education, outreach and incentives to help the community take action to protect our environment, while improving our quality of life and building a strong local economy. The Plan offers objectives and actions under 10 themes:

- Air quality
- Energy
- Food
- Green Buildings
- Land Use Planning
- Natural Environment
- Solid Waste
- Transportation
- Water/Wastewater
- Youth and the Environment

Lake Water Quality Program

The Lake Water Quality Program was formed in 2001 with a mandate to:

- monitor various water and shoreline quality parameters of local lakes and work collaboratively with other City divisions, government agencies, lake stewardship groups, and individual residents to address problems as they arise;
- promote the creation of stewardship groups on individual lakes.

The Program helps nurture and works with 28 local lake stewardship groups whose aims are to:

- Advocate for local lakes and raise awareness of lake issues in the community;
- Develop a communications network for lake issues;
- Launch fund-raising events;
- Gather information, educational materials and collect data on a range of lake concerns;
- Gain a historical perspective from long-time residents;
- Network with other lake organizations.

Each year, the City provides $500 grants for up to 10 local groups through a competitive application process.

The Lake Water Quality Program also conducts aquatic vegetation surveys and mapping, water quality sampling and shoreline home visits to local lake-side residents.

Water Conservation

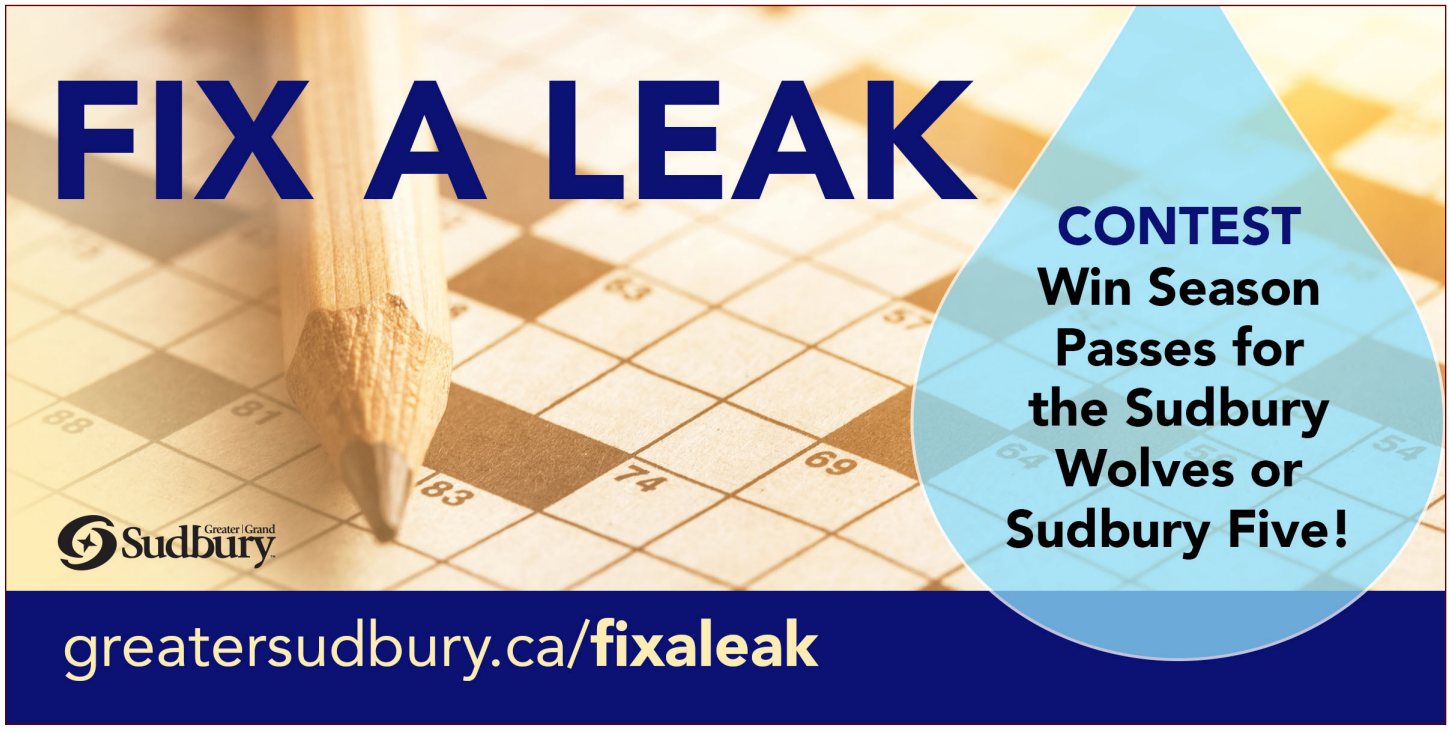
The Greater Sudbury Source Water Protection Plan was developed to protect our current and future sources of municipal drinking water. It identifies potential risks to our drinking water supply and contains policies to ensure that our drinking water remains safe. Policies within this plan are enforced by the City through its Legislative Compliance Support Section.

Every year, the City of Greater Sudbury participates in Fix a Leak Week (FALW), a campaign sponsored by the U.S. Environmental Protection Agency's WaterSense program, to raise awareness of the billions of gallons of water leaked annually nationwide. The campaign takes place during the third week of March and encourages municipalities to hunt down leaks and search for solutions to water loss.

The processing and distribution of municipal water is the most energy-intensive of any municipal operation. This means that any loss of treated water due to leaks also equates to a loss of energy. To remain in alignment with CEEP's commitment to achieve net-zero emissions by 2050, it is important to minimize water loss from leaks and encourage water conservation.

FALW helps develop positive habits that reduce water wastage and encourage the conservation and protection of Earth's most precious resources.

The City's 2023 FALW campaign comprised of a social media campaign, community posters, radio and billboard advertisements, all promoting water conservation and leak detection. Residents were encouraged to complete a water conservation crossword and submit their entry for a chance to win a grand prize. To complete the crossword, residents had to follow the City's social media posts and use the City's water/wastewater web content to find answers. This campaign was very successful with nearly 100 crossword submissions.



Greater Sudbury EV fleet

Greening the City's Fleet

Greening efforts are currently underway to replace end of life cycle light fleet vehicles with electric models.

To date, the Electric Vehicle (EV) fleet is made up of 12 light duty vehicles, two golf carts, one zamboni and nine Level 2 charging stations.

In 2021, Greater Sudbury became one of the first municipalities in Canada to add electric vehicles to its Paramedic Services fleet with the purchase of four EV's.

A feasibility study is also ongoing for the Fleet Electrification Plan.

Greater Sudbury Public Library Environmental Initiatives

Battery Collection program

Residents can stop by any library location across the city to drop off old batteries as part of their battery collection program.

Climate Justice Corner

The Climate Justice Corner (CJC) is a small area in the Main Library that is a 'go-to place' for you to find books, information, resources and items, whether you are looking to shrink your carbon footprint, get involved in community activities and efforts, or broaden your understanding.

Greater Sudbury Seed Library

The Greater Sudbury Seed Library is a free program whose goal is to strengthen our community of gardeners and local eaters by sharing biodiverse, locally adapted seeds.

Waste Collection and Diversion Programs

Residential

The City of Greater Sudbury collects a maximum of two approved garbage bags/bundles/containers of household waste per residential unit every other week. Unlimited amounts of leaf and yard trimmings are also collected from the roadside every other week. Unlimited amounts of Blue Box Recyclables and Green Cart Organics are collected weekly. Residents can request the delivery of a free Green Cart to their residence.

Bulky items such as furniture, appliances and electronics are collected at the roadside for eligible residences. Requests for collection of bulky items can be made through the City of Greater Sudbury's Waste Wise mobile app or online tool greatersudbury.ca/wastewise.

The City also provides several support programs including rebate programs for Cloth Diapers and Dog Waste Digesters, and garbage limit exemptions for diapers, medical or pet waste.

The municipality manages the Household Hazardous Waste Depot and a Toxic Taxi service to allow residents to properly dispose of their household hazardous waste (HHW). The depot is open 26 Saturdays per year and Toxic Taxi appointments can be made on the Waste Wise app, or by phone for collection at their home.

Battery collection bins are provided at any Greater Sudbury public library, the Environmental Services office at 1805 Frobisher St. and Tom Davies Square at 200 Brady St.

Non-Residential

Recycling and organics collection programs are available for a fee to non-residential units (e.g. hair salon, church, small store, etc.) located on a residential collection route. The Yellow Box Recycling Program provides non-residential units with weekly roadside collection of up to three Yellow Boxes or one Big Yellow recycling container. The Yellow Cart Organics Program provides weekly roadside organics collection of up to three Yellow Carts.

Waste Wise app

Material Processing Spotlights

The City, in collaboration with Greater Sudbury Utilities, recaptures landfill gases from the Sudbury Landfill to convert them to electricity for the grid, by using approximately 4,700 metres of collection trenches with perforated pipes buried within the waste. In 2023, the volume of landfill gas collected was 4,303,689 m3, generating 7,333,407 KWh of electricity. This is enough to power about 771.93 average households for a year. In addition to reducing the release of greenhouse gases into the atmosphere, this generated an average annual revenue of over $350,000.

The landfill site operators set aside reusable discarded items to place in the Reuse Stores of different landfill sites. These varied items are not only diverted from the landfill but can be purchased by residents for reasonable rates. Items include: children's toys, lawn furniture, sporting goods, luggage, lawn mowers, bicycles, counter tops, sinks, doors and more. In 2023, items diverted to site ReuseStores diverted 74 tonnes of waste from Greater Sudbury landfills.

Green Cart Organics are mixed with woodchips made from branches/leaf and yard trimmings brought to the landfill. These materials are placed in windrows to be periodically turned and go through an aerobic composting process (in the presence of oxygen). Mixed leaf and yard trimmings are processed in a similar way. The finished compost and woodchips are made available for purchase. The City gives away a total of 1 tonne of finished compost, packaged in small burlap bags to residents during an annual event held in May, in partnership with the Sudbury Horticultural Society and the Greater Sudbury Market.

The City's Material Recycling Facility (MRF) accepts recyclable materials from a variety of sources, including but not limited to: residential, industrial, commercial, and institutional sources, Public Spaces and depots. The City accepts Blue Box materials from within City boundaries, as well as other municipalities and First Nations outside the City's boundaries, with which the City has entered into an agreement for the receipt of Recyclable Materials.

Converting landfill gases into electricity for the grid at Sudbury Landfill

Laurentian University clean up group - 2024 Clean Up Blitz event

Litter Clean Up Programs

City Crew Roadside Litter Collection and Abatement

Roadside litter collection and abatement is completed seasonally along roadsides of major arterial roadways, secondary roads with heavy traffic flow, and in areas based on service requests received via 311 and identified during proactive field inspections. These activities are conducted both manually and with mobile equipment. From the beginning of May until the end of August, a crew of three summer students are typically hired to complement full-time resources.

Volunteer Litter Abatement Programs

These programs managed by Environmental Services include, One-Time Clean Up Events where residents can register a group to clean up an area once; the Clean Up Blitz, an annual two-hour event where groups register to clean up litter on various designated roadside areas throughout the City on the event day; and Adoption Programs, where groups can adopt a bin, a road or a spot, taking on the responsibility of periodically cleaning up litter in their adopted areas.

Long-term adoption programs promote clean-up initiatives, create litter awareness, and provide advertising opportunities for participants. The Clean up Blitz encourages participants to show community pride and is scheduled to take place at the approximate time of the year when the snow melt has left behind litter that has been trapped in the snowbanks throughout the winter. This program is very popular and attracts many volunteers each year.

Environmental Services Public Consultations

Environmental Services has been working on updating its Solid Waste Master Plan, with an external consultant. The overarching goal of the Solid Waste Master Plan update is to develop a sustainable waste management system that minimizes the quantity of waste requiring handling and disposal, and maximizes waste diversion opportunities. It will provide the basis for policy development, guide future decision making and provide direction on how to achieve Solid Waste goals over the next 10 years.

Waste Diversion

Success in 2023 by the Numbers

25
special events or festivals requests recycling/organics collection with an approximate attendance of 29,850

104
presentations, events attended, tours, Education Centre visits, etc.

7,588
new active reminder alerts were set for collection days

721,589
waste collection schedules viewed

4,450
addresses searched

640,815
materials searched

6,970
new Waste Wise app subscribers in 2023

45,639
Waste Wise app subscribers since 2016

2,816
inspections/home visits took place

54
schools and board offices have been approved on the organics program

61 tonnes
of household hazardous waste were disposed, 168 tonnes were recycled, and 96 tonnes were reused

18,000 + tonnes
received at the City's Material Recycling Facility to be processed and diverted from Greater Sudbury landfills

49
groups participated in the Clean Up Blitz

48
adoption and One Time Clean Ups

Azilda Community Garden – Photo by Tanya M.

Food Strategy

Food Forests

Delki Dozzi Park is home to Greater Sudbury's first and largest food forest, spanning about 8,000 square feet. The forest was established in two phases from 2017 to 2018, led by the Sudbury Shared Harvest. Since its inception, more than 300 people have volunteered their time here, with an estimated 400 volunteer person hours dedicated on an annual basis.

Since then, we have seen eight smaller community food forests come to life across the city. Six are located on City property, one is located at a school and the last is at Science North. The City works closely with the groups to maintain the forests.

Each forest mimics a natural forest ecosystem, so no manicuring is done and no fertilizers or pesticides are used to maintain them. Native flower species have also been added to enhance the biodiversity and create pollinator friendly spaces. Some of the species found in the food forests include: cold hardy apples, cherries, haskaps, currants, gooseberries, serviceberries, rhubarb, asparagus, cherry-plums and sea buckthorn.

Flour Mill Community Farm

In the heart of the Flour Mill is a small but mighty community farm that teaches volunteers, students and neighbours how to grow food and about the environment, while also offering a pay-what-you-can market. The farm seeks to help underserved communities and has recently expanded to include a quarter-acre food garden in Wanup.

Community Gardens

Spread across the city, you will find over 30 community gardens led by volunteer groups. Each one is unique in how it is organized and maintained. Some have buy-in plots, while others simply grow food with the goal of donating to local food banks. The Sudbury Community Garden Network works closely with the City of Greater Sudbury, Public Health Sudbury & Districts, the Foodshed Project, Coalition for a Liveable Sudbury, Sudbury Shared Harvest, Greater Sudbury Community Action Networks (CANs), and other local community groups to support the development and operation of community gardens in the region.

Active Transportation

2016 Transportation Master Plan (TMP)

The 2016 Transportation Master Plan (TMP) for Greater Sudbury was updated to align with the City's commitment to sustainability and multimodal transportation, as outlined in the Greater Together (2015) Corporate Strategic Plan and the City's Official Plan (2006). The TMP focuses on optimizing and enhancing the transportation network by incorporating cycling facilities and recommending policies to support pedestrian and cycling infrastructure. This approach aims to connect neighbourhoods, promote healthier and more equitable travel options, and contribute to a more environmentally sustainable community.

The TMP outlined a detailed network of cycling facilities to encourage active transportation, proposing 407 km of cycling infrastructure for implementation in the short, medium, and long-term.

Pedestrian and Cyclist Infrastructure

Since the adoption of the TMP in 2016, the City continues to take steps to improve road safety for pedestrians and cyclists through the construction of new infrastructure. This includes close to 8 km of new sidewalk and 119 km of cycling infrastructure, bringing the total to approximately 350 km of sidewalk network and 140 km of cycling infrastructure. As well, the City continues to take steps to improve the safety of pedestrians and cyclists as part of capital projects. The addition of a paved boulevard between the sidewalk and road which acts as a buffer zone, and the installation of tactile warning strips at sidewalk ends, and 1.0 m painted buffer between parking lane and bike lane are examples of active transportation safety enhancements that have been incorporated into capital projects.

GOVA transit

Transportation Demand Management Plan

The Transportation Demand Management (TDM) Plan for Greater Sudbury, finalized in 2018, was developed to address travel behaviour and promote sustainable transportation options. Initially introduced to the Operations Committee in May 2017, the plan aimed to reduce single-occupant vehicle use and encouraged walking, cycling, transit, and carpooling. The City of Greater Sudbury approved the plan in June 2018, incorporating it as a framework to complement infrastructure investments and foster more sustainable travel behaviours.

TDM Community Grant Program

In 2019, the City initiated the Transportation Demand Management Community Grant Program, aligning with the Council's commitment to optimizing transportation infrastructure investments. The aim of this grant program is to bolster a robust, non-profit sector program, offering eligible organizations funding assistance for community-based activities that positively impact the entire city and contribute to the implementation of the TDM Plan for Greater Sudbury.

Since the program's initiation in June 2019, the City has approved 35 applications and distributed $35,000 in funding to support various TDM-related programs, initiatives, and services.

Cycling Projects

Paris-Notre Dame Bikeway

- The Paris-Notre Dame Bikeway ('Bikeway') is planned to be a physically separated cycling facility on Paris Street and Notre Dame Avenue that will act as a spine to connect the City's cycling network from Regent Street in the south to Turner Avenue in the north.

Kingsway

- Silver Hills to Falconbridge Road
- Includes cycle tracks on both sides, intersection improvements, and a new sidewalk from Barry Downe to Falconbridge

Walford Road

- Regent to Paris Street
- Includes cycle tracks on both sides of the road

Larch Street

- Elgin and Lisgar Streets
- Two through lanes reduced to one and the introduction of an on-street cycle lane

Ride Share Program: Smart Commute (2023)

- Mobile application promoting sustainable transportation
- Offers eco-friendly alternatives to solo driving

Rack and Roll

- All GOVA Transit buses equipped with bike racks (can accommodate two bicycles)
- Free bike transport on buses
- Aims to reduce carbon footprint and commuting costs

Public Education Programs and Activities

- Cycling-related events such as Bike Month since 2018
- Recognized as a Bicycle Friendly Community (Bronze Level)

Complete Streets Policy

Adopted in June 2018, Greater Sudbury became the 6th municipality in Ontario to officially adopt a Complete Streets Policy. Complete Streets are designed to accommodate all users (pedestrians, cyclists, transit users, drivers). The design varies based on the street's character and context.

Complete Streets Design Guidelines (in progress)

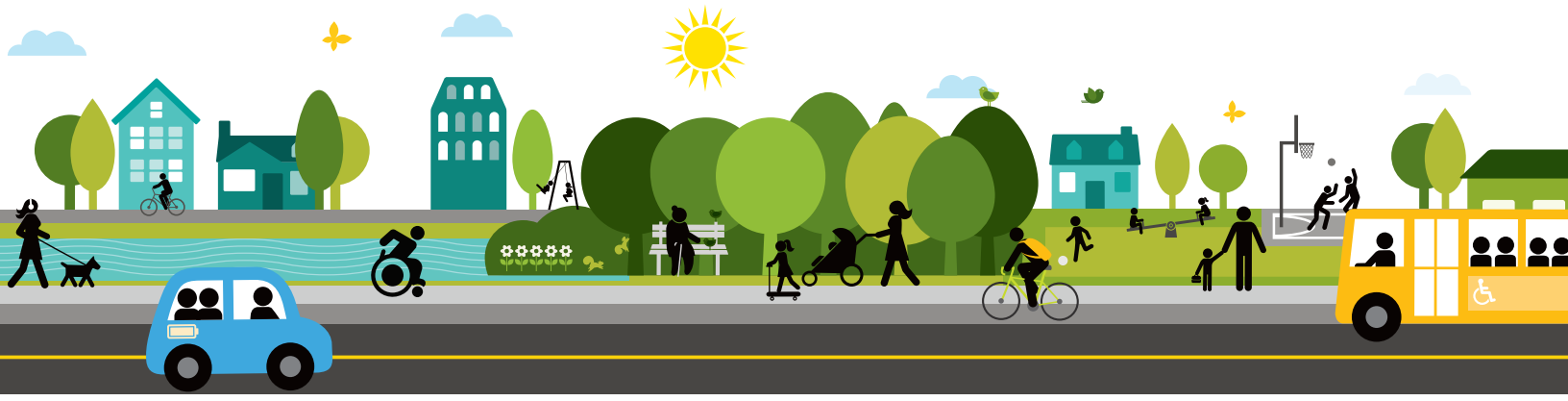
Greater Sudbury is developing consistent guidelines for the design, implementation, maintenance, and monitoring of Complete Streets across the city.

Sidewalk Priority Index

The Sidewalk Priority Index (SPI) is a strategic tool developed to prioritize sidewalk construction and enhancements in a city, focusing on the needs of pedestrians, especially the most vulnerable. It evaluates the road network to identify areas where pedestrian infrastructure is lacking, scoring road segments based on factors such as vehicle volumes, proximity to schools and transit, and pedestrian safety records. By ranking these segments, the SPI helps allocate resources effectively to ensure safe and accessible routes for pedestrians throughout the city. For the past five years, staff have been utilizing the SPI to select standalone sidewalk construction projects and to help rationalize the installation of new sidewalks as part of major rehabilitation or reconstruction projects.

Gateway Speed Limits

Gateway Speed Limits refer to a traffic management approach that allows municipalities to set a uniform lower speed limit for large areas by placing speed limit signs only at the entry and exit points of the designated area. This method simplifies the process of enforcing speed limits by reducing the number of signs needed, as the speed limit applies to all roadways within the designated area once the gateway signs are installed. This approach is designed to improve road safety and reduce costs associated with installing numerous individual speed limit signs on each street. The City initiated a pilot project in 2022 to test this approach in a specific neighbourhood and, based on its success, expanded the project in 2023 to include one location in each ward.



Business and Institutions

The Cambrian College Glencore Centre for Innovation

The Cambrian College Glencore Centre for Innovation houses Cambrian R&D, the Centre for Smart Mining (CSM), and the Cambrian Battery Electric Vehicle (BEV) lab. Cambrian R&D provides solutions that improve services, processes, and products for everything from agriculture and food production to mining. The CSM facilitates new technology adoption in the mining sector. The Centre's focus includes digital technologies, underground communications, alternative tailings treatment technologies, and battery-powered and connected mining vehicles. The BEV lab features equipment for BEV prototyping and testing powertrains and batteries, including battery emulation equipment, duty cycle testing equipment and dynamometers. It is the only public research facility in Canada to focus on mining and heavy-duty electric equipment, and has capacity to test vehicles' electric motors up to 600 kilowatts.

Cambrian College BEV lab

Mining Innovation, Rehabilitation, and Applied Research Corporation (MIRARCO)

MIRARCO's proposed Centre for Mine Waste Biotechnology in Sudbury aims to develop biotechnologies for use in real-world sites, to improve the environmental and economic sustainability of mining and related sectors. This facility will be equipped with tools and expertise to accelerate the commercialization of genomics-based bioremediation and bioleaching technologies. The Centre will provide a development and testing site where large samples of waste materials can be brought for pre-processing and treatment, and will respond to the urgent need for innovative solutions that transform mine waste from environmental hazard, to economic opportunity through economically sustainable mine waste strategies.

HighLight Solar Plant

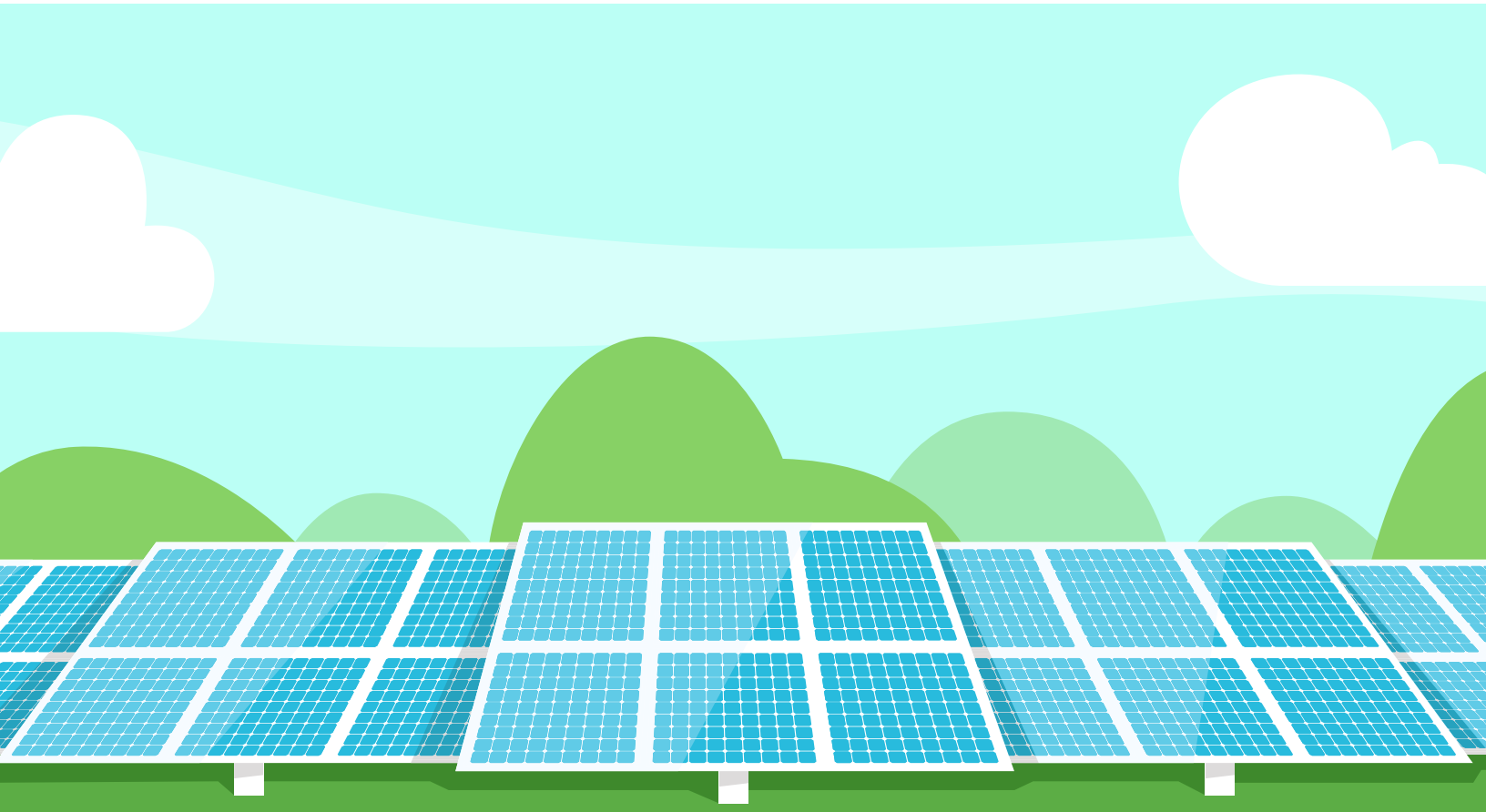
The HighLight Solar Plant (also known as the Capreol Solar Farm), located in Capreol, is a 10 MW solar plant featuring over 50,000 photovoltaic (PV) panels. This solar plant sits on 125 acres and generates between 15,000 to 22,000 MWh of electricity per year, enough to power over 1,500 households. The energy generated at the plant feeds into the grid managed by the Ontario Power Authority. The plant has been in operation since 2014, and plays a crucial role in promoting environmental sustainability, and providing a reliable source of green energy for the province.

The Climate Risk Institute (CRI)

CRI is a non-profit, academically affiliated organization focused on advancing practice and delivering services related to climate change risk assessment, adaptation planning, policy evaluation and resiliency. They run programs, develop and coordinate projects to mobilize knowledge, improve capacity, and deliver results for climate resiliency.

CRI works with all levels of government, partners in Canada and internationally, Indigenous communities, and private sector organizations to support the consideration of climate change in various planning and management processes, including enterprise risk management, hazard identification and risk assessment, corporate planning, infrastructure renewal and official plan development.

The Ontario Centre for Climate Impacts and Adaptation Resources (OCCIAR) transformed into the Climate Risk Institute in July 2019. The transition included the adoption of all past and current OCCIAR resources and tools. The OCCIAR developed and implemented resources and tools that communities, professionals and experts from all fields require in their decision-making processes.



Vale Living with the Lakes Centre

Vale Living with Lakes Centre

The Vale Living with Lakes Centre is a world class environmental research centre, where early career scientists and faculty address environmental issues such as climate change, aquatic biodiversity, habitat loss, and the need for effective restoration techniques. This globally awarded "green" building (LED platinum) is home to the Cooperative Freshwater Ecology Unit, a senate approved research centre established through a partnership with the Ontario government as a unique collaborative model, where students work directly with government, industry and university scientists to address both basic and applied research questions. Their monitoring and research findings contributed to the revisions of the NA Clean Air Act, affected a number of important forest, watershed and fisheries management policies, and climate adaptation planning for local municipalities and northern First Nations communities.
The Centre was recognized with the Bronze Award for North America in the global Holcim Awards for Sustainable Construction in 2008.

Lopes Limited

Lopes Limited is committed to giving back and supporting the Greater Sudbury community in meaningful ways. The company has a strong track record of investing in local initiatives, including the Bridge of Nations in the heart of Sudbury, and the Adélie Splash Pad and Community Gardens Greenhouse in Coniston. This greenhouse provides fresh produce that is delivered to three local seniors' residences every week.

In 2023, Lopes Limited donated a new greenhouse to the Twin Forks Community Garden. The garden is a collaborative effort between the Ward 8 Community Action Network and the Twin Forks Neighbourhood Association. All produce is shared with the community and organizations like the Food Bank. Lopes has also donated a greenhouse to the Sagamok First Nations that will be operational in the coming month.

Community Involvement
Public Participation

Clean Up Blitz volunteers 2024

In addition to the programs and events mentioned earlier in the book, the City of Greater Sudbury also has several associations that encourage community involvement.

Community Action Networks (CANs)

For over 15 years, CANs have brought together residents to build healthy communities that are strong and vibrant. They emerge from the collaborative efforts of citizens who care about where they live and want to make their neighbourhoods the best they can possibly be.

CANs receive support from the City through an annual community grant, staff assistance, and other resources. Their efforts focus on impactful projects and initiatives that enhance the overall quality of life in Greater Sudbury. There are currently 20 CANs throughout the Greater Sudbury region, covering all major communities.

The City is undertaking a comprehensive review of the Community Action Network (CAN) program, including CAN's organizational structure, mandate, status, and alignment with the City of Greater Sudbury's strategic priorities. The Review aligns with the 2019-2027 Strategic Plan and will help inform the development of a community engagement strategy.

Neighbourhood Associations (NAs)

NAs are volunteer organizations that work in co-operation with the City of Greater Sudbury to improve the quality of life in their community. Each NA organizes and promotes local leisure opportunities to meet the needs of area residents. They are involved with various programs, activities and special events, including community clean ups, winter carnivals, outdoor rinks and facilities. Many NAs sponsor facility improvements through fundraising initiatives.

In addition to providing and maintaining the NA facilities, the City of Greater Sudbury assists NAs by providing resource staff, assisting with volunteer recruitment, providing an annual grant, developing training opportunities for volunteers and promoting programs and activities.

Communities in Bloom Photo Contest

In anticipation for the Communities in Bloom competition, the City of Greater Sudbury launched a photo contest for residents to submit photos that celebrate Greater Sudbury's green spaces, landscapes, community engagement and neighbourhoods.

Three winners would be chosen to win a prize pack valued at $500, a celebratory lawn sign, and for their garden or home to be featured on the city-wide tour with the judges in August 2024. We received a total of 42 submissions over the course of two and a half weeks. Photos from the contest were also used throughout this Profile Book. The three winners' photos can be seen here:

Flower Close Up
Photo by Huu Nghia Nguyen

Rockview Community Garden
Photo by Mary Michasiw

Flowers at Waterfront
Photo by Lynn Gainer

Whitson River Trail

Community Improvement Plans

The City of Greater Sudbury uses Community Improvement Plans (CIPs) as a sustainable community planning tool to guide and promote development, and revitalize areas of our city through programs, grants and incentives.

For example, the City has undertaken two CIPs to enhance and strengthen the town centres of Capreol and Chelmsford. The planning process with these communities allowed the City and residents to identify issues and opportunities, and helped provide a clear strategy with defined goals and objectives on how a new vision for each community can be achieved. The recommended improvements provided a comprehensive list of projects that the City can prioritize for action over time. The Capreol waterfront was designed with the community over a two-year process and was built in time for the Town's 100th anniversary. A similar process was undertaken in Chelmsford, resulting in the opening of the Whitson River Trail.

greatersudbury.ca

Evaluation Form

2024

Greater Sudbury

2024 Evaluation Form

2024 Evaluation Form

Community: Greater Sudbury

Province: Ontario

Category: Click here to enter text.

The evaluation is based on 8 criteria, divided into the 6 following sections, assessing 4 sectors of the community:

Tidiness		109.00	/	**150.00**
Environmental Action		113.00	/	**150.00**
Heritage Conservation		104.00	/	**150.00**
Urban Forestry		115.00	/	**175.00**
Landscape		137.00	/	**200.00**
Floral Displays		131.00	/	**175.00**
	Total	709.00	/	**1000.00**

Percentage: 70.9

Bloom rating: 3 Blooms

Bloom rating: Up to 55%: 1 bloom. 56% to 63%: 2 blooms. 64% to 72%: 3 blooms 73% to 81%: 4 blooms. >82%: 5 blooms.

Mention: Environmental Action

Representative (s) of Community

Name:	Paul Lefebvre	Function :	Mayor.
Name:	Barb McDougall	Function :	Community Initiatives and Engagement Coordinator
Name:	Leah Stack	Function :	Business Development Officer

Judges

Name:	Paul Ronan	Name:	Bob Adams

Evaluation date: August 14th and 15th

2024 Evaluation Form

IMPORTANT NOTES:

* Evaluation is adjusted to the climate and environmental conditions of the community.
* Some aspects of the evaluation might not be applicable: scoring will be prorated.
* The score will vary from the previous year based on the facts that the evaluation form is subject to modifications each year and that the evaluation is based on the perception of the current judges.

SECTORS OF EVALUATION

Municipal:

- Municipal properties, parks and green spaces, streets, streetscapes
- Properties owned and run by municipality such as museums, historical sites

Business and Institutions:

Properties owned and managed by

- **Business:** commercial sector, shopping centres, commercial streets, industrial parks, manufacturing plants
- **Institutions:** schools, universities, churches, hospitals, service and community organization buildings (such as YMCA, Legion), private museums, government and crown corporations buildings (such as Canada Post)
- **Tourism bureaus and Chamber of Commerce offices**
- **Farms:** in rural communities, farms can be considered in this section

Residential:

- Citizens and citizen groups acting within their own properties
- Residential property owners, rate payer groups

Community Involvement:

The principle of community involvement is so fundamental to the program that it is considered in each segment of the evaluation.

- Individuals, community organizations and citizen groups – all contributing to various aspects of community improvement, including municipal spaces maintained through the efforts of volunteers and community
- Organized clubs such as horticultural societies, garden clubs, community associations
- Service clubs such as Rotary, Lions, and Optimist
- Participation (financial and/or in-kind or employee participation) by the municipality, businesses and institutions.

GENERAL COMMENTS AND SUGGESTIONS

The understated beauty of the area surprised me as I once thought of Sudbury as a barren remote destination that I did not want to spend time in. I was surprised at the actual beauty in and around the area, noting that they had in excess of 300 lakes in and around the area. The community has certainly spent numerous hours over the course of years to improve the once barren land. Reforestation, revitalization, community programs are all to recognized for their efforts.

The Greater Sudbury community was very welcoming and educational. People welcomed you with open arms and enthusiasm. They wanted you to experience their proud accomplishments since their last entry to the CIB program

Upon first arriving in Sudbury we passed the Toyota dealership which set the standard of what we might be judging in the area. The colourful vibrant planters along the boulevard clearly displayed pride of ownership and a sense of welcome.

A great time was had meeting numerous participants and officials while learning where the community had originated from.

The hospitality at the Sugar Shack was excellent, both educational and enjoyable. Great lunch experience, including a Black Bear sighting.

Suggestions:

Signage is required when entering the City stating the Greater Sudbury area is a “Community in Blooms” participant. Use of the CIB logo is recommended.

City needs to see an increase in the staffing budget to different departments (specifically forestry/maintenance) to complete the necessary work to ensure a safe and accessible community. Develop / create succession planning for key knowledgeable staff in all areas to ensure that qualified personnel are available to continue with the goals/ plans set out.

Community involvement signs – residential garden of the week signs to be provided to community participants who have demonstrated their support for the program.

2024 Evaluation Form

Signage throughout the town needs to be increased to further promote and create awareness of the program in the community. The signs can be provided to both commercial and residential gardens.

Increased signage for the education of best practises – compost for gardens, pruning methods, drought tolerant, native plant materials, etc.

2024 Evaluation Form

TIDINESS

Tidiness includes an overall tidiness effort by the municipality, businesses, institutions and the residents throughout the community. Elements for evaluation are parks and green spaces, medians, boulevards, sidewalks, streets; municipal, commercial, institutional and residential properties; ditches, road shoulders, vacant lots, signs and buildings; weed control, litter clean-up (including cigarette butts and gum), graffiti prevention/removal and vandalism deterrent programs.

	Max	Actual
Municipal		
Tidiness, order, cleanliness and first impressions	10	7
Community anti-litter awareness programs	10	7
Effective bylaws, programs and policies and enforcement; litter control, graffiti prevention and eradication, graffiti removal kits to residents	10	7
Cleanliness of public green infrastructure: parks, streetscapes (sidewalks, planters, urban signage and furniture such as benches, liter and recycling containers etc.)	15	11
Visual appeal, and condition of municipal buildings and properties (including City Hall grounds)	15	11
Business & Institutions		
Tidiness, order and cleanliness and first impressions	15	11
Condition of buildings (exterior maintenance), grounds, sidewalks and parking lots	15	10
Condition of urban furniture: benches, litter and recycling containers	5	4
Residential		
Tidiness, order and cleanliness	20	16
Condition of buildings, grounds and yards	15	11
Community Involvement		
Public participation in community, neighbourhood or individual street tidiness, clean-up programs, activities and annual maintenance (including promotion, organization, innovations involving youth and seniors, etc.)	10	7
Support – financial and/or in-kind or participation by the municipality, businesses and institutions for community clean-up programs	10	7
Tidiness Total	**150.00**	**109**

2024 Evaluation Form

TIDINESS

Observations:

Toyota- was a definite “WOW”. Greater Sudbury was very welcoming and beautiful. The residential properties visited and driven by were very impressive.

Curb appeal was clearly demonstrated by the care and attention given by the property owners. Walking thru the downtown we observed minimal amounts of litter.

The large murals were intriguing and well done.

There is obviously a positive connection between staff and business / residential to a certain degree, however expanding those relationships to become participants in C.I.B. would really help enhance overall City Beautification.

Recommendations:

Some businesses have 4’ weeds in their gardens, are there bylaws regarding property standards in place? A broader awareness of the program and its benefits might be shared with all businesses and residential owners to improve the overall standard.

Consider expanding your existing contests to encourage more competition in the Business and Residential sectors.

Consider offering CIB signage of recognition to those businesses and residents who are showing good examples of tidiness.

By using social media more extensively to promote clean up days would help get more people aware of what it takes to keep Greater Sudbury tidier than it already is

Really promote school involvement in these clean up initiatives and consider prizes or recognition for most litter collected.

By creating a Tidy Ambassador Volunteer, you could have them seek out and acknowledge tidy sites by offering the CIB signs to be displayed as recognition of their efforts.

2024 Evaluation Form

ENVIRONMENTAL ACTION

Environmental action pertains to the impact of human activities on the environment and the subsequent efforts and achievements of the community with respect to: policies, by-laws, programs and best practices for waste reduction and landfill diversion, composting sites, landfill sites, hazardous waste collections, water conservation, energy conservation, and environmental stewardship activities under the guiding principles of sustainable development pertaining to green spaces.

	Max	Actual
Municipal		
Sustainable development strategy: policies, programs, guidelines, long-term planning / vision; effective bylaws / policies and their enforcement; and public education programs and activities	20	15
Waste reduction to landfill and results (3-R : reduce, reuse and recycle), municipal composting programs, including activities such as composting sites, yard waste collections, mulching of wood debris (Christmas trees, hedge trimmings, etc.), reclamation of cut trees, and handling of hazardous waste including e-waste collection and reuse of compost material	20	15
Water conservation and use-reduction programs: efficient appliance incentives or promotions, efficient irrigation, use of non-potable water, water restriction policies and rainwater management	15	12
Energy conservation programs such as alternate forms of energy (ex. geothermal, biomass, wind, solar), and initiatives such as: efficient appliances initiatives, shielding for night skies issues, efficient street lighting	15	11
Environmental initiatives, innovations and actions such as: • Development and expansion of sustainable mobility and active transportation network such as bike lanes and multi-used pathways; • Horticultural practices such as green roofs, green walls, green lanes, living fences, buffer zones; re-use of sites; engineered wetlands, bio-swales, permeable surfaces and rain water management • Brownfield redevelopment, remediation, land reclamation • Air quality programs such as anti-idling, reduction of greenhouse gas emission (carbon reduction).	10	8
Business & Institutions		
Participation in the environmental effort: such as waste management (reduce, reuse and recycle), water conservation, energy conservation, brownfield management	10	7
Corporate environmental innovation / stewardship, initiatives, activities (ex. environmental clean-up activities)	10	7
Residential		
Participation in the 3-R (reduce, reuse and recycle) initiatives and composting	10	8
Adoption of water conservation practices & policies including rainwater collection	15	13
Community Involvement		
Public participation in public forums and policy development on environmental issues	5	3
Public participation in community, neighbourhood or individual street environmental activities and programs (including promotion, organization and evidence of taking ownership), etc.)	10	6
Support – financial and/or in-kind or participation by the municipality, businesses and institutions in public environmental activities and programs	10	8
Environmental Action Total	**150.00**	**113**

ENVIRONMENTAL ACTION;'

Observations:

Earth Care Minute is great and should / could be expanded on National level.
The cleanup and reforestation in the last several decades is very obvious.
Compost sharing is a fantastic program.
The supply of pet waste litter bags at the start of the walking trails is a great idea. The community gardens were well laid out and accessible.
There was a huge amount of support from the local residents.
The planters were raised up making the gardens wheelchair accessible. The use of solar electric vehicles throughout the city was obvious. Land reclamation in Greater Sudbury appears to be a huge success.
A good job has been done reducing the amount of sand entering the lake thru the culvert.
The promotion and recognition of your environmental programs is evident and ongoing. These leading best practices should continue to be aggressively promoted using all available media opportunities. TV, RADIO, NEWSPAPERS, SOCIAL MEDIA, SIGNAGE, AND BILLBOARDS.

Recommendations:

Remove invasive plant growth along lake edge – Minnow Lake Boardwalk.

Continuous learning and awareness of invasive plant material must be maintained as well as actioned to provide a sustainable environment.

Earth Care Minute – expansion is highly warranted and recommended.

Continue with the Seed program which collects seeds from the local areas, propagating, resulting with seedlings supplied and shared with numerous community groups inclusive of natives, to provide and create prosperous natural growth and reforestation for our generation and generations to come.

More education and awareness to new residents on where you were and where you have come would be helpful in promoting the many already in place initiatives and could assist in recruiting new volunteers and environmental initiative participants

HERITAGE CONSERVATION

Heritage conservation includes efforts to preserve natural and cultural heritage within the community. Preservation of natural heritage pertains to policies, plans and actions concerning all elements of biodiversity including flora and fauna ecosystems and associated geological structures and formations. Cultural conservation refers to the heritage that helps define the community including the legacy of tangible (built/hard assets) elements such as heritage buildings, monuments, memorials, cemeteries, artifacts, museums and intangible elements such as traditions, customs, festivals and celebrations. The participation of groups such as historical societies and conservation groups are considered.

	Max	Actual
Municipal		
Natural heritage policies, by-laws and their enforcement and effective programs	10	6
Natural heritage management plans and preservation initiatives: including eco systems, eco parks, protection of sensitive habitats, species at risk, support for at risk pollinators, grasslands, naturalization, wetlands, urban agriculture/farming, and wildlife	15	12
Management and promotion of natural heritage (through communications, information and support programs, economic development / tourism) including activities and programs (year-round) for education and use of natural heritage sites for and by the public	15	11
Cultural heritage polices, by-laws and plans and preservation initiatives for heritage buildings, cemeteries, artefacts, museums, monuments , heritage trees and gardens, including their integration with streetscapes and landscape	15	10
Cultural heritage initiatives throughout the year including festivals and celebrations along with preservation of traditions and customs	10	8
Business & Institutions		
Conservation, restoration and integration of natural heritage, including eco parks, conservation areas, heritage gardens, trees and landscapes.	15	11
Promotion of local heritage, including heritage gardens, native plants, and heritage trees	10	6
Residential		
Conservation / restoration and reuse of heritage buildings, artefacts on residential lands.	10	6
Community Involvement		
Public participation in community, neighbourhood or individual natural heritage programs including developing policies and plans, site improvements and management, conservation and education initiatives.	15	10
Support – financial and/or in-kind or participation by the municipality, businesses and institutions (including environmental groups) in community initiated natural heritage activities and programs.	15	10
Public participation in community, neighbourhood or individual cultural heritage programs including year-round heritage community events/activities, festivals and celebrations along with preservation of traditions and customs	10	7
Support – financial and/or in-kind or participation by the municipality, businesses and institutions (including historical societies) in community initiated cultural heritage activities and programs.	10	7
Heritage Conservation Total	**150.00**	**104**

HERITAGE CONSERVATION

Observations:

A strong sense of biodiversity and inclusion by all demonstrated a great respect for the lands and cultures. The visit to Capreol was too short, I could of stayed all day. Being able to walk thru the train cars was important and educational. It was very well laid out and was history well worth saving. The Peace Park was a good place to reflect on life. The Wood Stove planter at the Train Museum was a '10'.

The visit to Science North was an important reminder of what has come before us. The way the building has been constructed and merged with the earth is amazing.

At the Living with Lakes Centre, we were able to observe where the beavers live. This is an amazing piece of property. It is so important to educate both young and old that this type of habitat must be protected.

The absence of a focused Heritage Tree is a missed opportunity and one that could draw more tourists and residents especially given environmental challenges many of these trees have survived through.

Recommendations:

Heritage Tree recognition and protection may benefit from a committee of both city staff and residents to create more awareness and preservation.

Creating a data base of significant and or Heritage trees is strongly recommended

A more focused effort to identify existing heritage building, sites and history would be very helpful in capturing not only the mining history but the many buildings, houses and supports that were created to support the mining operations

A more prominent celebration and recognition of Indigenous history may also be considered.

Possible enrichment programs through the schools may provide a greater awareness for future generations, and generate enrolment in career paths to take conservation efforts to the next level.

2024 Evaluation Form

URBAN FORESTRY & TRAILS

Urban Forestry and Trails includes the efforts of the municipality, businesses, institutions and residents with regards to written policies, by-laws, standards for tree and trail management (selection, design, signage, planting, and maintenance), long and short-term management plans, tree replacement policies, pollinator friendly tree selection, tree inventory, and Integrated Pest Management (IPM), heritage, memorial and commemorative trees. Trail types, signage, risk management policies, accessibility, surfacing and promotion

	Max	Actual
Municipal		
Overall impact, benefit and first impression of the urban forest and trail	10	6
Policies, regulations and tree by-laws, tree protection and planting on public and private lands	15	10
Urban forestry and trail plan and design, including integration with overall green infrastructure landscape plan, and measures to preserve, protect, manage and expand overall tree inventory, including woodlots and trails	20	12
Plan of action: procurement, species diversity (including native trees), selection of hardy and pollinator habitat tree species, recommended tree list and tree planting standards. Trail linkages , land acquisition, landowner agreements, stakeholder engagement	10	6
Integrated Pest Management (IPM) / Plant HealthCare (PHC): plan of action for invasive pest detection and control, information on current infestations and diseases . Trail vegetative encroachment control and risk management	10	5
Public information programs: good planting techniques, best practices and maintenance programs including Trail promotion, signage, guides, trail use protocols	15	10
Maintenance best practices with proven results	10	5
Qualified personnel (including seasonal staff) and/or in place training programs	5	3
Business & Institutions		
Contribution to expanding overall trail and tree inventory, with consideration of design and diversity including native and hardy species of trees, on properties owned by business and institutions.	15	11
Maintenance programs, best practices with proven results: watering, pruning, IPM, surfacing, signage, trailhead markers, hazard removals, inspections	10	7
Residential		
Contribution to expanding overall trail and tree inventory, with consideration of design and diversity including native and hardy species of trees on residential properties	15	11
Maintenance best practices with proven results	10	7
Community Involvement		
Public participation in tree planting and conservation programs such as Green Streets Canada, Arbor Day, Maple Leaf Day, and other tree planting and maintenance programs and activities on public lands (including promotion, organization etc.) Trail adoption, clean up days, maintenance and public safety awareness for users, eg snowmobilers, hikers, ATV, horses, etc	20	15
Support – financial and/or in-kind or participation or promotion by the municipality, businesses and institutions for community trail maintenance and stewardship, tree planting and conservation programs on public lands	10	7
Urban Forestry Total	**175.00**	**115**

URBAN FORESTRY & TRAILS

Observations:

Nature Camps for children created a wide awareness of natural habitats and was in a perfect setting. Muddy rubber boots lined up outside the classroom guaranteed visitors that the children were immersed in their studies.

Downtown murals were unique and enjoyable as they displayed heritage, history, inclusion.

The visit to the Jane Goodall Reclamation Trail provided the opportunity to observe the program first hand. It was pointed out that long term regrowth can and does work with examples of before and after side by side.

The bilingual artwork placed along the trail certainly caught my eye. It contained a strong environmental message for everyone.

There was no doubt that staff are frustrated with the backlog related to dead tree removal and ongoing maintenance. That said, more resources will address this and staff are very hopeful that a grant which has been submitted will help tackle this issue.

Recommendations:

Remove or at least cut down the 1800 dead trees on boulevards throughout the city – danger, safety issue, unsightliness, to avoid potential claims from falling limbs / trees.

To create awareness and engage the public, services / washrooms need to be available as well as maintained throughout parks and trails.

Accessing and possible integration of educational programs through national organizations may provide a better understanding of issues / awareness of what we need to do to protect our natural environment.

Organizations such as Landscape Ontario, and Ontario Parks Association offer apprentice programs, educational seminars and assist with numerous fields within the Parks and Horticultural fields.

Reach out to Parks Canada, Landscape Ontario for further information tools.

Universities may offer specific courses to enhance city staff knowledge to improve and build on the possible future options to create sustainable habitats.

LANDSCAPE

Landscape includes planning, design, construction and maintenance of parks and green spaces suitable for the intended use and location on a year-round basis. Elements for evaluation include: native and introduced materials; balance of plants, materials and constructed elements; appropriate integration of hard surfaces and art elements, use of turf and groundcovers. Landscape design should harmonize the interests of all sectors of the community. Standards of execution and maintenance should demonstrate best practices, including quality of naturalization, use of groundcovers and wildflowers along with turf management.

	Max	Actual
Municipal		
First impressions of the community including gateway / entrance treatments	10	5
Sustainable designs (seasonally adjusted year round): energy efficient, use of green materials, naturalization, xeriscaping, suitable plant varieties (including pollinator friendly) , traffic calming, bank stabilisation	10	7
Urban and civic design standards for streetscape and public places: flags, banners, public art, fountains, site furnishings, signage, seasonal design and décor, walkways and paving materials	10	7
Landscape Plan: integrated and implemented throughout the municipality	10	5
Turf management programs, Integrated Pest Management (IPM), Plant Health Care (PHC), alternative solutions to diseases and infestations when appropriate, increased naturalization and adapted maintenance programs	10	7
Landscape maintenance policies, standards, best practices and programs	10	7
Landscape maintained to appropriate standards, specifications and best practices	5	3
Qualified personnel (including seasonal staff) and/or in place training programs	10	6
Demonstrated year-round opportunities and programs for education and use of parks and green spaces (urban agriculture, community gardens, parks and recreation programs)	10	7
Business & Institutions		
Sustainable designs (seasonally adjusted year round): energy efficient, use of green materials, naturalization, xeriscaping, alternate groundcovers, urban agriculture	10	6
Contribution to urban and civic design and public green spaces above requirements: such as public art, streetscape, site furniture, fountains & innovation in concept & design	15	11
Adequate ongoing life cycle management (ongoing maintenance, ground & asset management, rehabilitation & replacement) of all landscape elements	10	5
Residential		
Streetscape appeal of landscapes (year-round, seasonal, themed)	15	12
Maintenance of properties: lawn care and shrub maintenance (with proven results)	15	12
Selection of plant material (native, local, innovative, edible and pollinator friendly plants)	10	7
Community Involvement		
Public participation in community programs such as: urban agriculture, community gardens, "yard of the week", volunteer park maintenance, holiday illumination & decoration (promotion, organization, etc.)	20	15
Recognition (by municipality and/or by volunteer groups) of volunteer efforts in all aspects of the Communities in Bloom Program including activities in all evaluated criteria	20	15
Landscape Total	**200.00**	**137**

LANDSCAPE

Observations:

Hospice gardens another “WOW” yet peaceful and touching. Great space to reflect, I am thinking about that visit quiet frequently. Donor support was obvious. Replacing turf with perennial gardens near the bedroom windows was a great idea. Reducing noise while beautifying the patients view thru the windows.

Bell Park was another “WOW’ garden on a shoe string budget. Very nice! Bell Park was wheel chair accessible from the upper parking lot and continued thru the park offering opportunities to view the waterfront.

There were many examples of artwork that doubled as furniture. The aggregate placement in some of the landscapes was impressive.

The Community Gardens had a huge amount of support and were obviously successful.

The residential visits were appealing and well maintained.

There are many positive and successful examples of good practices in landscape in the residential and municipal categories. More effort on the business side to improve their landscapes will certainly be well noticed by tourists and residents alike.

Also the absence of noticeable Gateway, plantings at your 5 points of entry will have an immediate positive impression and impact to your community.

Recommendations:

Staff training is required to assist supervisors and managers in this area.

Joining Ontario Parks Association would provide access too many much needed training programs which can be brought to your community and save staff from travelling long distances

Landscape Ontario also offers apprenticeship programs in Landscape related activities as well.

Enhancing a full IPM program for your sport fields will help sustain the turf and help offset the wear and tear due to high use and demand of the fields

Also ensuring an investment in the training of staff on best practices for turf and landscape best practices is recommended.

FLORAL DISPLAYS

Floral displays evaluates efforts of the municipality, businesses, institutions and residents to design, plan, execute, and maintain floral displays of high quality standards. Evaluation includes the design and arrangements of flowers and plants (annuals, perennials, bulbs, ornamental grasses, edible plants, water efficient and pollinator friendly plants) in the context of originality, distribution, location, diversity and balance, colour, and harmony This pertains to flowerbeds, carpet bedding, containers, baskets and window boxes.

	Max	Actual
Municipal		
Integration into overall landscape plan and distribution through community. Concept and design including sustainable design	15	11
Diversity of displays: flowerbeds, raised beds, planters, hanging baskets, window boxes, carpet bedding, mosaics	20	16
Diversity of plants: annuals, perennials, bulbs, grasses, woody plants, natural flora, pollinator friendly plants	10	8
Quality, maintenance to appropriate specifications and standards, best practices: watering, weeding, edging, dead heading, etc.	20	15
Qualified personnel (including seasonal staff) and/or training	10	6
Business & Institutions		
Concept and design (including arrangement, diversity, colour of display and plants) on grounds	15	10
Contribution to, and integration with, overall community floral program	10	6
Quality of planting and maintenance: watering, weeding, edging, dead heading, etc.	10	6
Residential		
Concept and design (including arrangement, diversity, colour of display and plants) on residential properties Pollinator gardens and/or inclusion of pollinator plants in gardens	20	17
Quality of planting and maintenance with proven results	15	13
Community Involvement		
Public participation in community projects, volunteer initiatives, outreach programs in floral displays (including promotion, organization, etc.)	15	12
Support – financial and/or in-kind or participation by the municipality, businesses and institutions for community floral displays activities	15	11
Floral Displays Total	**175.00**	**131**

FLORAL DISPLAYS

Observations:

30th anniversary sign of Communities in Bloom was impressive.
Planters in the downtown core were an enjoyable sight with the use of different floral mediums.
Vibrant colorful displays were noted and caught our eye in several locations.
Bell Park is certainly a showpiece and credit to the Horticulture Staff who are really making great use of a very limited budget to provide a WOW garden.
Something we felt was missing were gateway plantings which could be used to welcome visitors, tourists and every day commuters to the various parts of the City.
It was very clear to us that there is terrific pride in keeping gardens and floral displays at a very high standard. This was evident in both the residential and municipal categories however more work on the business sector would really help raise the bar.
Much credit should be given to the municipal Horticulture staff who are delivering quality presentation on a shoestring budget.
Also much credit should go to the volunteers who are going above and beyond at the community gardens and could certainly use more funding and municipal support to augment their dedicated efforts.

Recommendations:

Community horticultural groups may hold meetings to promote a specific theme or color to be promoted throughout the year. This would increase the awareness of the program city wide. Possibly have a color scheme for different areas in the city. Create a healthy competition

A plan to create inviting Gateway plantings at your 5 main entry points would be strongly recommended. They do not need to all be done at once but certainly the one with the most traffic would be a good place to start.

Your Toyota Dealership is a shining example of how Floral displays can greatly enhance your City and promote business. Creating an acknowledgement of award program through Communities in Bloom to see other businesses step up is strongly recommended.

Creating a Garden Tour similar to Doors Open Toronto would encourage more involvement in sharing many of the exceptional residential gardens that you already have in the City. This could easily be promoted through your Culture and Tourism section as another option when visiting Greater Sudbury.

2024 Evaluation Form

2024 Evaluation Form

THANK YOU FOR YOUR INVOLVEMENT

"Within the context of climate change and environmental concerns, communities involved in the Communities in Bloom program can be proud of their efforts, which provide real and meaningful environmental solutions and benefit all of society."

COMMUNITIES IN BLOOM IS MADE POSSIBLE BY

The commitment of local, provincial and national volunteers.

The support of elected officials and of staff in municipalities.

The dedication of our judges, staff and organizations.

The contributions of our sponsors and partners.

Museum Services Revitalization Update

Presented To:	Community and Emergency Services Committee
Meeting Date:	March 17, 2025
Type:	Correspondence for Information Only
Prepared by:	Lara Fielding Economic Development
Recommended by:	Chief Administrative Officer

Report Summary

This report provides information regarding the Museums Revitalization Plan presented to Council on November 30th, 2022.

Relationship to the Strategic Plan, Health Impact Assessment and Climate Action Plans

The Greater Sudbury Museum Revitalization plan and its recommendations will address the following goals and objectives outlined in the Greater Sudbury Strategic Plan 2019-2027 (Revised): Economic Capacity and Investment Readiness and Create a Healthier and More Vibrant Community.

Financial Implications

There are no direct financial implication associates with this report.

Introduction

This report provides an update on the Greater Sudbury Museum Revitalization Plan (Revitalization Plan) and progress achieved. As previous reports have described, museum operations have remained largely unchanged in the 20 years since municipal amalgamation. Previously identified challenges regarding facility renewal and infrastructure needs, artifact conservation and program resources, continue to put pressure on staff's ability to advance the recommendations of the Revitalization Plan; however, Museum Services has made strides toward realizing the recommendations of the Revitalization Plan.

On November 30, 2022, staff presented the Revitalization Plan to Council highlighting three main recommendations.

- An increase in the Museums Services Operating Budget to provide for the addition of two full time permanent staff to address the shortfall of skilled resources required to meet community expectations, industry standards and perceived service levels.
- An increase in the operating budget to address increased costs in maintenance and provide financial support for the required external storage for a portion of the artifact collection.

- The appointment of an Advisory Panel to provide advice and input for the creation of short and long-term plans, including facility and programming opportunities.

Background

Museum Services operates as a “Community Museum” as defined under the Heritage Act (Ontario Heritage Act, R.S.O. 1990, c. O.18) and continues to receive a modest annual grant from the Province for this designation. In order to continue to comply with this designation a community museum must reflect the following characteristics and follow the Ontario Standards for Community Museums (Standards for community museums in Ontario | ontario.ca). A community museum must:

- Adhere to the requirements of the Heritage Act;
- Ensure staff resources that have sufficient, appropriate technical and administrative skills/experience to sustain the service’s administration needs and ensure programming and artifact management reflects industry standards; and
- Establish an advisory body that can demonstrate community support, provide guidance in prioritizing programs and activities, develop and validate strategic direction, and ensure representation for culturally significant communities.

Governance and Structure

As part of the Economic Development division within the Tourism & Culture team, Museum Services provides reports and updates to Council through the Community and Emergency Services Committee. The Economic Development division also coordinates the Museum and Municipal Heritage Advisory Panel, which provides advice and input on Museums planning, activities and programming opportunities.

As per provincial standards, Council’s specific responsibility is to act as the steward for the Museum’s collection in the public trust. Council is responsible for ensuring that the collections are properly managed and that adequate resources (financial and otherwise) are allocated for their care and management. Council is also responsible for approval of any museum policies and is also ultimately responsible for the Museum’s adherence to these policies.

As per resolution CC2022-291-A1:

> *…the City of Greater Sudbury approves the establishment of a combined Museums / Heritage Advisory Panel and directs staff to develop a draft Terms of Reference (TOR) for this new advisory panel, including consideration for heritage designation, museum programming and cultural heritage representation, and heritage tourism opportunities, and further, that the draft TOR be presented to Council for approval by the end of January 2023*.

The Terms of Reference for the Museums/Heritage Advisory Panel was subsequently approved by Council in 2023 through Resolution CC2023-22; based on this direction, the Advisory Panel provides advice and input on plans and activities for Museums as well as Heritage-related items.

The City of Greater Sudbury appointed Councillors Landry-Altmann, Vagnini (replaced by Councillor Benoit March 8, 2024), Labbée (stepped down from Advisory Panel) and Fortin to the Museum and Municipal Heritage Advisory Panel. Subsequently, during the Nominating Committee of May 23, 2023, with Resolution NC2023-16, Council appointed the following citizens to the Museums and Municipal Heritage Advisory Panel for the term ending November 14, 2026:

Karanbir Badhesha	Emelie Bourgeault-Tesse	Dieter Buse
Kate Gauvreau	Vicki Gilhula	Kathryn Huneault
Garry Michalak	Leslee Salo	Darlene Shawbonquit
Mark Simeoni		

This Advisory Panel had its inaugural meeting June 29, 2023, and has met several times since. The Panel will also be supporting the strategic planning process, which is a key recommendation of the Revitalization Plan, described in more detail below.

Human Resources

Museum Services includes Anderson Farm Museum, Copper Cliff Museum, Flour Mill Museum and Rayside Balfour Museum. As outlined in the recommendations of the Revitalization Plan, Museum Services now has a compliment of three full-time staff members: the Museum and Cultural Experience Officer, the Curator, and the Curatorial Assistant. During the summer months, Museum Services hires additional resources with summer students to primarily focus on education and programming with additional support focused on collection management.

Sites and Facilities

As reported in the Revitalization Plan, the City continues to invest in the maintenance of the museum facilities, having completed several improvements at Anderson Farm, including stair replacement in the log cabin, exterior fire escape stairs at the milkhouse/bar and interior stair replacement from the ground floor to the upper level of the barn.

The Plan also identified both the Milkhouse/Barn and Stable requiring loft floor reinforcement. Many of the Museum facilities are designated heritage structures and are therefore artifacts themselves. Accordingly, to preserve heritage characteristics and in some cases maintain heritage designations, heritage structures cannot be maintained the same way modern buildings are maintained. Each heritage building has distinct needs that must be research and carefully documented.

When repairs to the original elements of a heritage building are required, the following must be considered:

- Restoration and repairs must be based on historical documentation of the building and consistent with the original character of the building, with specific approaches used for repairs.
- An expert in heritage building conservation should be consulted to determine the best materials and methods for the job at hand.
    - If repairs are considerable and will require drawn plans, architects who are members of the Canadian Association of Heritage Professionals should be used.

<u>Anderson Farm Museum</u>

Anderson Farm Museum is a listed heritage site on the City of Greater Sudbury's Heritage Register under Section 27 of the Ontario Heritage Act. Before proceeding with repairs proposed for the Milkhouse/Barn loft floor reinforcement staff have engaged the services of LHC Heritage Planning & Archaeology Inc. to undertake two studies, a Cultural Heritage Evaluation Report (CHER) and a Heritage Conservation Plan (HCP). These studies inform how best to proceed with these improvements that are necessary for ensuring public safety.

The CHER comprehensively evaluates the cultural heritage value of a resource, site, or cultural heritage landscape. It provides historical documentation, identifies heritage features, and complies a Statement of Cultural Heritage Value or Interest. Essentially, CHER is a stand-alone version of the first part of the Heritage Impact Assessment (HIA), which is a necessary step toward achieving heritage designation.

Complementary with the CHER is the HCP. The purpose of a conservation plan is to identify the cultural and historic significance of a site and to set out a policy and strategy for the management and conservation of the heritage values, attributes, and integrity of that site. The conservation plan examines the long-term planning of a cultural resource and should determine how to retain its significance in any future use, alteration, repair, or development. Staff anticipate that work on the Anderson Farm reports will be completed by the end of Q1 2025.

When staff began to plan and investigate the work associated the barn loft floor reinforcements, it was discovered that the recommended approach would drastically limit how this space can be used; specifically,

the addition of six structural columns would limit the types of activities possible for the space. Subsequently, it was determined that this space could be better utilized as administration and program planning space for Museum Services.

Museum staff currently occupy the attic of the Milkhouse, which is not adequate for year-round occupancy. A shift in approach for the Stable will allow for appropriate staff space, more accessible space for visitors, continued community and citizen use resulting in revenue potential and future opportunities for enhancements to the visitor experience.

To execute the capital improvements described above related to the Anderson Farm Museum, the artifacts previously stored in both the loft of the Stable and of the Barn have been relocated to off-site storage to accommodate the capital work.

Flour Mill Museum

In accordance with the Revitalization Plan, the Flour Mill Museum heritage house and log cabin were relocated to the O'Connor Park site in 2019. In July 2022, in response to concerns of possible damage to the structures due to the move, consultant firm FCAPX was engaged to conduct a building assessment for both the heritage house and log cabin; this work subsequently determined that a structural engineer is required to complete a review of the structural integrity of the heritage house structure from water damage that has been identified. Staff have arranged for this work to be completed by A2S and the final report is anticipated shortly.

The detailed structural condition assessment further revealed several key findings. Museum occupancy loading and/or occupancy limits should be approved by the Chief Building Official (CBO)**,** and an architectural review of code compliance and heritage requirements is recommended to ensure alignment with applicable standards. To address excessive sagging of the upper floor joists, a new drop beam or joist reinforcement is needed, along with additional upper floor reinforcement if required to support museum occupancy loading. Modifications or reinforcement of the attic roof framing are essential to address excessive sagging and unintended load redistribution to the ceiling joists. Next steps will include a review with the Capital Projects team.

Website Development

An effective website is an important tool to help increase awareness of the facility, market to attract visitors and provide on-line programs for users. As recommended in the Revitalization Plan, Greater Sudbury Museums in collaboration with Communications launched a new website in September 2024. The new site improves the overall user experience, integrates current branding, meets AODA standards and replaces the current dated platform. While some database resources will take longer to migrate, a few redirects to the old site will remain during this transition. The new website is an essential step forward in meeting our revitalization service level goals and can be accessed at https://museums.greatersudbury.ca/.

Staff will continue to manage the website to ensure the information remains current and relevant, which keeps visitors coming back and contributes to elevating Museum Services credibility and reputation. As well, active website management contributes to Search Engine Optimization (SEO), which improves visibility and drives more organic traffic to the website. Additionally, regularly reviewing and tracking user behavior and website performance through analytics supports staff and Council's ability to making data-driven decisions.

Vision and Strategy for Future of Museum Services

Museums play an important role in making communities vibrant, welcoming, and desirable places to visit and to live. Strategic planning is an essential activity for all museums and cultural institutions to ensure that they meet community needs and funder requirements. Efforts towards realizing a vision and strategic plan for Museum Services are one of the Revitalization Plan recommendations.

A Strategic Plan Working Group has been established, consisting of staff from across the organization, key stakeholders, and community group and user representation. This working group will share updates with the Museum and Municipal Heritage Advisory Panel, and will follow a five phased approach:

- Phase 1: Preparation.
- Phase 2: Research and Consultation.
- Phase 3: Analysis and Recommendations.
- Phase 4: Strategic Planning; and
- Phase 5: Implementation and Reporting.

Building on the groundwork established during the development of the Revitalization Plan, the process will incorporate a community engagement strategy. This approach, coordinated with the Communications team, will provide multiple opportunities for public input and meaningful dialogue regarding the future of Museum Services in the City of Greater Sudbury.

Staff anticipate presenting the completed Strategic Plan by Q4 2025.

Conclusion

Museum Services continues to play a crucial role in advancing goals associated with both *Creating a Healthier and More Vibrant Community* and *Economic Capacity and Investment Readiness* by providing and supporting educational programs and resources that engage people of all ages, promoting learning about local history, art and traditions; fostering a sense of belonging and pride among residents by involving the community in curating exhibits and programs resulting in stronger local ties; attracting visiting and boosting our local economies; and celebrating shared heritage can promote understanding and dialogue among different groups, fostering social harmony and cohesion.

Next Steps

1. Complete Flour Mill Museum Heritage House structural review (Q1-2025)
2. Complete Anderson Farm Stable renovations (Q1-2025)
3. Complete Cultural Heritage Evaluation Report and Heritage Conservation Plan (Q1-2025)
4. Complete Anderson Farm Milkhouse/Barn loft floor reinforcements (Q3-2025)
5. Approval of Strategic Plan by Council (Q4-2025)

Resources Cited

Museum and Municipal Heritage Advisory Panel Appointments—Nominating Committee May 23, 2023
Nominating Committee Meeting - May 23, 2023 (escribemeetings.com)

Greater Sudbury Museums Revitalization Plan – City Council Special Meeting November 30, 2022
Special City Council Meeting - November 30, 2022 (escribemeetings.com)

Greater Sudbury Museums Review – City Council Meeting February 8, 2022
City Council Meeting - February 08, 2022 (escribemeetings.com)

Ontario Standards for Community Museums
Standards for community museums in Ontario | ontario.ca

Ontario Heritage Act
Ontario Heritage Act, R.S.O. 1990, c. O.18

GREATER SUDBURY MUSEUMS | MUSÉES DU GRAND SUDBURY

DRAFT MUSEUMS REVITALIZATION PLAN

October 26, 2022

Table of Contents

1. Introduction

1.1 Purpose of Report

Greater Sudbury Museums (GSM) welcome thousands of visitors to its four sites each year. The Museums Section of the City of Greater Sudbury is committed to conserving and promoting the heritage and history of Greater Sudbury as a means of sharing the community's cultural identity for residents and visitors by providing opportunities for education, interpretation and participation in heritage activities and programs.

In February 2022, City Council received a staff report which provided a status report on municipal museums and their associated challenges. As part of the February report, Council was provided with an option to permanently discontinue museum services and simply maintain the sites as passive park space. Instead, Council directed that staff produce a Museum Revitalization Plan and describe the investments and steps required to ensure that GSM can reliably deliver on its service level commitments and meet the recommended requirements for a community museum in Ontario.

The purpose of this report is to provide Council and the public with a draft plan for comment. It also provides the basis for the business case that Council could consider as part of the 2023 Municipal Budget. In order to achieve the goals for this plan, staff are bringing three main recommendations to Council:

- An increase in the Museums Section Operating Budget to provide for the addition of two full-time permanent staff to address the shortfall of skilled resources required to meet community expectations, industry standards and perceived service levels.
- An increase in the operating budget to address increased costs in maintenance and provide financial support for the required external storage for a portion of the artifact collection
- The appointment of an Advisory Panel will provide advice and contribute to the creation of short and long-term plans, formulate the museums' statement of purpose, assist with creating written policies specific to operating standards, and recommend programming to be delivered to the community.

These recommendations are outlined in the main Council report that accompanies this draft plan.

1.2 Overview of Current Museum Services and Challenges

Museums Services have been operating four museum sites across CGS since amalgamation without a consistent, coordinated strategy and with minimal investments in staff resources and budget. These factors have contributed to the challenges identified in this and previous reports regarding governance, facility renewal and infrastructure needs, artifact conservation and program resources.

With the current complement of one permanent full-time staff member, GSM has been unable to meet the its objectives of proper heritage conservation, public programming and meeting industry best practices for community museums.

The single Curator position is responsible for all duties with respect to operating the museum sites, with the majority of their time dedicated to administrative duties. This leaves minimal time to create high quality and engaging exhibits and programming that educate, inform and entertain visitors for all of the museum sites.

At present, the Greater Sudbury Public Library (GSPL) Board serves as a proxy advisory body for GSM. The absence of an advisory body that is dedicated solely to museum business also contributes to the challenges Museum Services have in providing relevant programming that includes the under-represented cultures and histories of the Francophone and Indigenous peoples. This challenge was noted by the CGS Auditor General during his review of GSPL Governance in 2019. The process to develop a renewed vision for the Museum Services with the shared efforts of an Advisory Panel, museum staff and public engagement will provide a clear vision for the role museums play within the community.

GSM has a significant number of artifacts that it is responsible for. Maintaining the standards regarding curation and conservation is not possible with the current staff complement. A clear collections policy is needed to guide staff in future collecting and deaccessioning efforts.

The challenge of properly documenting the collection is amplified by not having sufficient storage facilities and work space to complete the required task and to store the collection in an appropriate manner that is easy to access. The collection needs to be relocated into a more appropriate facility and continued work is required on cataloguing and sorting through the collection.

Many of the Museum facilities are heritage structures that require significant maintenance and asset renewal requirements. CGS have been investing into the maintenance of the heritage structures to ensure the safe use of the buildings and to continue to preserve the heritage structures.

In this phase of the plan, staff contacted the community partners that rely on the GSM to help host events and provide facilities for their success. We wanted to obtain a deeper understanding of the services the GSM offer these community groups and how we can improve to continue to support their needs. Their main recommendations including the need for additional resourcing an appointment of a Museums Advisory Panel Museums, the creation of a strategic plan and creating an awareness for the importance and value for heritage by working closely with Council to demonstrate the significance for preservation, promotion and animation of heritage services to the community.

The City recognizes the value museums bring to the community and believes that with the right supports in place, Museum Services will be better equipped to preserve our diverse heritage and offer meaningful services. This may be accomplished by reviewing the challenges Museum Services have been working with for the past several years and identifying the opportunities that may be achieved through short- and long-term goals.

1.3 Benefits Museums Bring to Communities

Community museums are created in the public interest. They inspire and educate visitors, foster deeper understanding of the community and promote the enjoyment and sharing of authentic cultural and natural heritage. Museums do this through the preservation and interpretation of heritage facilities and collections of artifacts.

According to the Ontario Museum Association, municipalities create value in their communities through the work of their museums. They do this by helping to create a sense of place,

preserving and promoting local stories, supplementing school curriculum, attracting cultural tourists, supporting healthy active seniors and promoting skill-building and learning.

A 2019 study working to quantify the benefits of Galleries, Libraries, Archives and Museums (GLAMs) determined that investing in museums is cost effective for the community; "for every dollar invested in non-profit GLAMs, society gets nearly four dollars in return. GLAMs perform very favorably when compared to other major social investments, such as transportation infrastructure."[1]

2 GSM Sites and Services

2.1 Summary of Museum Sites

Anderson Farm Museum is the largest and most visited museum in the GSM network. It consists of 4 historic structures and 1 multipurpose structure located on a 14-acre site with walking paths, a small playground and the Walden Community Garden. The exhibits reflect the history and heritage of the former town of Walden with emphasis on the agriculture life of Finnish immigrants "The Andersons". The site also interprets northern Ontario immigration and pioneer life more generally, as well as the mining culture of Creighton and other histories from the surrounding communities. GSM staff work closely with community partners to host special community events such as Rock the Farm, the Fall Fair and Christmas Tree Lighting, which attract many visitors to the site.

Copper Cliff Museum consists of a historic monument and a small 1½ story historic log cabin originally built in 1885 and later relocated to a small parcel of land on the site of Copper Cliff's first dwelling. The cabin is adjacent to Copper Cliff Memorial Park and across the street from the Copper Cliff Public Library which is often used for joint programming. The museum displays a collection of artifacts, some original to the house, which depict the interior setup of a miner's cottage, as well as other aspects of local history.

Flour Mill Museum consists of a 2-storey clapboard house built in the early 1900's and a replica log cabin that was built in 1983 for the Sudbury Centennial celebration. In 2019, these structures were relocated to from St. Charles Street to O'Connor Park to allow for the expansion and redevelopment of a sewage lift station. Prior to the move, a third building on the St. Charles Street site was condemned and not relocated. The potential replacement of this structure remains an outstanding item from the relocation project.

At present both buildings at the Flour Mill Museum are vacant and all artifacts are being stored off-site at a rental storage facility. Prior to the move, the museum exhibits and programming focused on the community's Working Class Francophone culture.

Rayside-Balfour Museum is located in the Azilda branch of the Greater Sudbury Public Library and is comprised of a one room exhibit which contains five display cases as well as a large display cabinet for artifacts and interpretative information. This location was established in the mid 2000's to accommodate artifacts that were previously displayed in an ad hoc space at the Lionel E Lalonde Centre. The intent of the site is to commemorate the shared histories of the communities of Azilda and Chelmsford.

[1] Ibid

2.2 Current Approach to Museum Services

Though not formalized in a strategy document, GSM staff have adopted the following principles in carrying out their mandate:

- Collect items from the later 19th century onward that reflect the community of Greater Sudbury and its history;
    - Demonstrate commitment to researching and collecting the history of the original communities and rural township areas which now lay within the current geographical and political boundaries of the City of Greater Sudbury;
- Create accessible opportunities for education in the history and culture of the Greater Sudbury area at physical museum sites and online through:
    - The exhibition and interpretation of museum artifacts and historical information;
    - Public programs and museum events
- Act as a repository for knowledge relating to heritage skills practiced in Greater Sudbury and work in partnership with local organizations to preserve, promote and teach those skills;
- In partnership with the Greater Sudbury Library, act as a resource for members of the general public with questions pertaining to local history;
- Protect and preserve, according to best practice, the assets entrusted to the Museum's' care for future generations;
- Ensure the effective operation of the museum sites; and
- Deliver services to the public in both official languages, in keeping with the City of Greater Sudbury's French Language Services Policy

GSM offers public programming with a goal to preserve and promote local heritage. Current programming themes encompass education and sustainable living. These programs are delivered with the help of community volunteer partners. There are four main strategies in program delivery:

- Keeping heritage skills alive, especially those with strong ties to our museum collections and the themes of focus of our museum sites. An example of the heritage skill that visitors are able to learn about and try is the 8-bit cross stitch.
- Practically demonstrate and promote practices of sustainable living, especially practices that were used in the past. These programs highlight and teach skills/practices such as food preservation, survival-related skills, gardening and making use of recycled materials.
- Create awareness of the Museums by offering programs which provide a window into what museums are for, how they work and what they do. They also host community programs and events at the museum sites to create awareness of and promote the use of the sites.
- Create accessible entry points to Greater Sudbury's history by delivering programs that teach local history tied to the physical museum locations as well as the history of the City of Greater Sudbury. These programs are delivered through school tours and asynchronous school programs and accompanying resources.

2.3 Services Offered to the Community

The Museums Section offers many services to the community each year. Most programs are delivered in the summer months between May and August when seasonal student employees are available. The current year-round staff complement of one employee does not allow for sufficient resources to deliver many programs in the September to April period. In addition to staffing, most GSM facilities are not equipped with heat and snow removal which also limits their use to warmer months.

Many museum programs are only possible with the help of the community volunteers and partnerships that Museums Services have acquired. The following paragraphs provide a summary of services and activities at GSM sites in a typical year prior to the Covid pandemic and the relocation of the Flour Mill Museum. Further information on each service may be viewed in Section 11.1.

Anderson Farm Museum is the largest and most utilized GSM site with many active partnerships supporting the Museums operations. The museum provides guided tours of the permanent exhibitions to visitors and hosts school visits. These visits may include demonstrations provided by the museum's partners. March Break and Summer programming are offered to the community in partnership with the Greater Sudbury Public Library and typically include a heritage craft to teach the importance of sustainable living. When additional staff resources and partnerships permit, the museum has also hosted large events such as the successful "Frightening Friday at the Farm"; a large outdoor haunted maze based on local history events.

GSM staff support the Anderson Farm Museum Heritage Society in planning, organizing and operating three annual large events, Rock the Farm, Fall Fair and Christmas Tree Lighting. These events are well received by the community and often attract thousands of visitors each year. Further to the museum use, Anderson Farm Museum also offers their site for recurring partner events at no cost such as the Walden Winter Carnival and Walden Lions Easter Egg Hunt. The Stable and grounds are offered to the public for booking and are often used for birthday parties, baby showers, weddings and reunions.

During the summer months, Copper Cliff Museum offers guided tours for visitors of the museum's permanent exhibition and provides a weekly Story Time program for young children at the Copper Cliff Library. The museum welcomes LU Architecture students each fall to learn about creating drawings based on an actual heritage structure. There are occasional onetime events held at the museum as well as the annual Christmas Tree Lighting event that is organized and operated by Copper Cliff CAN with support from Museum staff.

Flour Mill Museum offers guided tours of the museum's permanent exhibition and offers a Story time program for younger children with a different theme and accompanying craft each week of the summer months. Museum Staff host a free community blueberry pancake breakfast for the community to celebrate the annual Blueberry Festival.

Rayside Balfour Museum is located in the Azilda library and offers display cases for permanent exhibitions. This space hosted a long-term fully bilingual temporary exhibition with interactive elements in partnership with the Centre Franco-Ontarien de Folkore and installation of new temporary exhibition on Whitewater Lake is in progress. Programs are occasionally held in this space in partnership with the GSPL.

2.4 Greater Sudbury Museums Attendance Statistics: 2013-2021

	2013	2014	2015	2016	2017	2018	2019	2020	2021
Anderson Farm Museum	11,637	13,573	12,757	18,339	16,359	21,529	18,808	4,224*	1,614*
Copper Cliff Museum	191	253	338	334	463	452	519	Closed	Closed
Flour Mill Museum	189	181	248	242	Closed	Closed	Closed	Closed	Closed
Rayside-Balfour Museum	---	---	---	---	---	---	---	---	---
Outreach	---	---	2,236	1,174	626	1,730	979	100	None
School Groups	9	18	26	14	13	12	18	0	0
Students	2,070	1,759	937	1,438	1,278	1,440	1,190	0	0
Social Media Followers	122	191	273	492	1,145	2,113	2,433	3,065	3,484

Figure 1

Attendance numbers include regular visitation as well as program and event attendance.

--- : Numbers not available

***** Includes attendees of virtual programs and views of digital exhibitions

2.5 Limitations on Services to the Community

The complement of 1 full-time staff member and summer students is not adequate to provide a full range of programming at four museum sites. A focus on events and programming also means that attention can't be paid to updating exhibitions or curating artifacts. Many of the exhibitions are outdated and current resources limit the potential to complete new modern exhibitions and programming that reflect the vast culture of Greater Sudbury.

GSM sites and facilities also have limitations in terms of seasonal use, accessibility and capital deficiencies. The absence of a current strategic plan means it is it difficult to set appropriate service levels for the sites and provide a clear direction on what role the museums play in the community.

2.6 Opportunities to Enhance Services to the Community

The museums require additional staff to operate and effectively manage the sites, collections, exhibits, programs and events offered to the community.

With additional staff, new exhibits and programs can be developed that align with community expectations and new outreach educational programs can be developed. Furthermore, additional time can be spent with existing volunteers and community groups to help assist in the success of their events and better promote the museums sites.

As recommended by the CGS Auditor General. Greater Sudbury Museums require a Museums Advisory Panel to better connect with the community and provide strategic vision for the operations. A GSM Advisory Panel can assist with the development of a new strategic plan for recommendation to Council. This plan should recommend service levels which align with the community's needs and are supported by the City's ability to resource the service.

2.7 Renewal of Exhibition Development

The exhibitions at all the museum sites require renewal. Exhibitions should have innovative, well researched, and engaging displays and programs that balance the community's desire to see the collection with topics that appeal to broader and more diverse audiences. The topics of the exhibitions should represent the diverse heritage of CGS including the Indigenous peoples within our region and public education in relation to truth and reconciliation. The exhibits would benefit by utilizing current industry trends that are interactive and dynamic using a range of technology features. New related programming could be developed for each new exhibition. The use of social media and websites would extend and enhance access to programs and exhibits.

In order to achieve high-quality and engaging exhibits and programs that educate, inform and entertain visitors, many steps need to be considered and many hours of staff time will be required. Artifacts for the use of the exhibits need to be determined. This involves sorting, cataloguing and documenting the artifacts to determine what is in the collection to support the selected themes. Digitizing the collection also allows the exhibition to also be available in a digital format.

It takes a trained full-time staff person approximately six months to research, develop, fabricate and install a new permanent exhibition.

2.8 Renewal of Educational Materials

The existing Museum in a Suitcase program which was developed in 2002 is an outreach program facilitated in the classroom in partnership by GSM and GSPL for elementary school teachers. The program includes a number of modules with accompanying presentations and activities on topics of the history of Canada and Greater Sudbury including mining, farming, logging, railroads and money. The school curriculum has now changed enough that these modules no longer match up with the learning objectives for various elementary schools and the program requires to be updated.

An updated version of Museum in a Suitcase program may be developed that could be requested by elementary and secondary school teachers in both English and French that coincides with the school curriculum and would include all necessary tools for teachers to deliver the program in the classroom.

An investment into the renewal of the Museum in the Suitcase program would benefit the community. Many local teachers have contacted Museum Staff to inquire when a renewed program would be available indicating that the Museum in a Suitcase program helps fill an important gap in local education. The renewal of the program will also improve broader community awareness of the GS Museums and their services and could be shared with communities outside of Greater Sudbury.

2.9 Re-Opening Flour Mill Museum

The Flour Mill Museum was relocated from its Charles Street location to O'Connor Park to allow for the expansion and redevelopment of the sewage lift station at the Charles Street location. In 2017, the City retained R.V. Anderson Associates Limited to design the new St. Charles lift station including the relocation of the Flour Mill Museum. RVA conducted an inspection of the Flour Mill Museum buildings and it was determined that the office building was in disrepair and the City decided not to relocate the office building and instead reserve capital budget to construct a new office and storage building at O'Connor Park.

In 2018, a public meeting was held to advise the public of the plans to relocate the Flour Mill Museum. The meeting was well attended and there were discussions on the site layout as well the need for community space. In return, concept building plans were prepared for the proposed Office and Storage building providing two layouts that both are approximately 225 sq.m in area and equipped with office and storage spaces, washroom facilities and space for community use. These proposed building options are close to double the size of the original Office Building located at the St. Charles site. RVA also prepared a site plan for the site that includes the future Office and Storage building.

The heritage house and log cabin were relocated to the O'Connor Park site as detailed in the site plan drawings. There are concerns the heritage house may have been damaged due to the move. In July 2022, a consultant, Accent Building Sciences, conducted a building assessment for both the heritage house and log cabin. It was determined that a structural engineer is required to complete a review of the structural integrity of the heritage house structure from identified water damage. The City is currently arranging for this review to be completed to determine what repairs will be required to ensure a safe building for public and staff use. A permanent fence has been constructed on the site as shown on the site plan drawings.

An estimate was completed in 2022 for the proposed 225 sq.m Office and Storage building. It was determined that the cost of construction of the new build would be in the range of approximately $600,000 to $750,000. Additional costs for the site development in the amount of approximately $380,000 would also be required to complete the project as shown on the site plan drawings.

There currently is approximately $407,000 in capital funds allocated to complete the development of the Flour Mill Museum site. These funds are insufficient to have the site developed as per the original concept plans. To reduce the cost of development, options of constructing a new smaller office and storage building, possible module build or renovations to the existing community building may be considered.

In the short term, it is recommended that the City complete any repairs required to the heritage structure and log cabin to ensure public safety for the use of the buildings.

In the medium term, through the work of the Advisory Panel, further public engagement should take place to determine the needs of the community and the best use of the buildings and existing capital funds allocated for this project

2.10 Marketing and Website Development

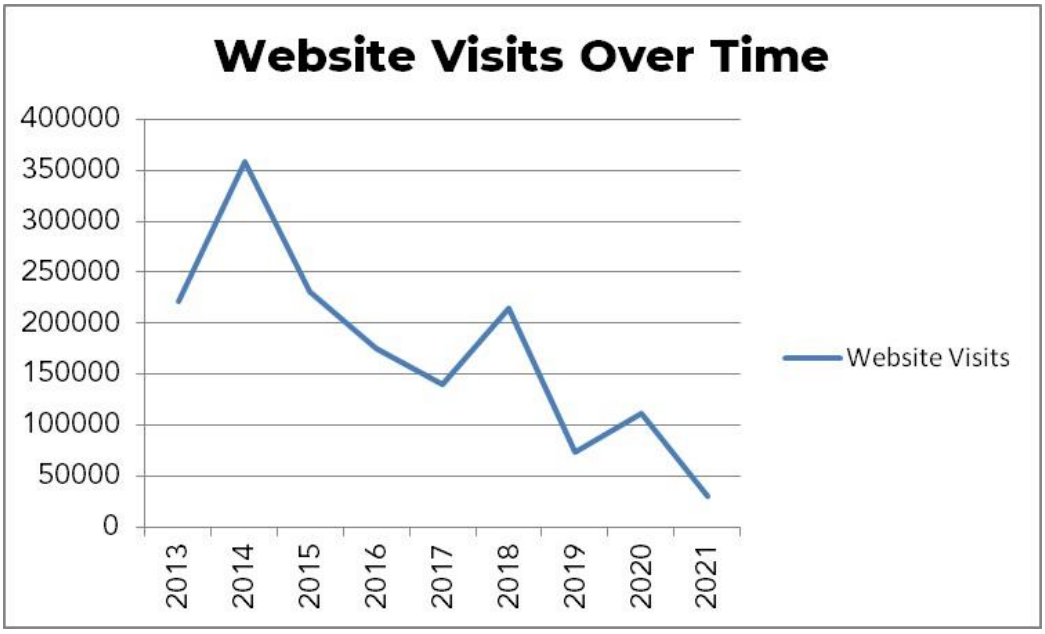
For a modern museum of any size, an effective website is an important tool to help increase awareness of the facility, market to attract visitors and provide online programs for users.

Studies indicate that tourists visiting museums is a popular activity for visitors to any community so it is vital that the GSM website clearly communicate what our museums have to offer through compelling images and graphics and engaging content.

Advances in technology have made museums more accessible than ever. For those who might struggle to attend an institution in person, museums are increasingly sharing their collection online. Virtual reality, digital guides, downloads, apps and digital trails are all becoming increasingly available and popular.

The GSM website contains a vast amount of detailed information, from previews of collections and exhibits, to visitor guides, event calendars, and research documentation. With the use of digital collections and exhibitions, visiting a museum can be done from home making it more accessible to more visitors.

The current CGS Museums website is outdated and requires a complete renewal to meet current regulations for accessibility and to encourage increased visitation. Over the past several years, user visits have declined as the site has aged and perhaps been seen as less functional.



During 2023, staff will work to develop a new, stand-alone website which will deliver increased value to users and meet all accessibility requirements. In the interim, the CGS IT Division will work with museum staff on the creation of a temporary website housed on the CGS website. It will contain only the core information and will be replaced by the new stand-alone website once it has been completed.

The investment required to build and maintain the new website is contained within the request for a modest increase in the GSM operational budget in the recommended business case.

3 Staff Resources

3.1 Current Staff Resourcing Model

As indicated previously, CGS museums have one full time Curator position that operates the museum sites. Multiple students are hired during the summer months to assist with program delivery at the museum sites and their work is overseen by the Curator. Recently it has been difficult to attract students for these positions.

3.2 Summary of Current Duties of the Curator

Since amalgamation, the one full time Curator position has taken on the duties for all museum operations with non-dedicated managerial support provided by the GSPL staff. The Curator has led Administrative, Planning and Organizational efforts required to operate the museums, while also coordinating Customer and Volunteer Services, and maintaining partnerships. The position is also responsible for exhibition and programming development, asset management for the heritage structures, sites and artifact collection, marketing and website maintenance.

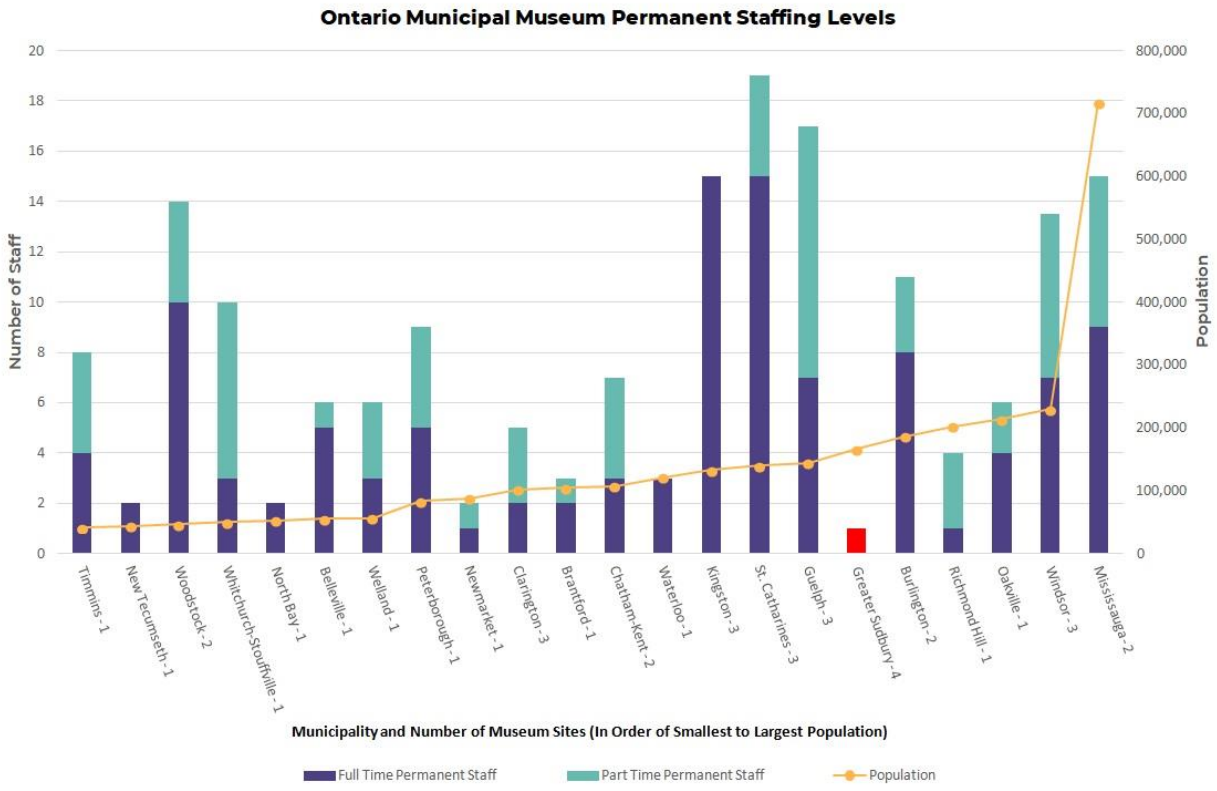
Most of the incumbent's time has been dedicated to Administrative/Planning and Organizational duties. It is estimated that 5% of her time is dedicated to tasks of collections, programming and exhibition development that specifically require curatorial expertise. This results in a mismatch between staff resources and service level expectations. These duties have been summarized in greater detail in Section 11.2

3.3 Comparisons with Other Ontario Municipality Community Museums

Museum staff conducted a survey to gain an understanding of the number of human resources that are provided by community museums in Ontario. The data gathered indicates that Greater Sudbury is an outlier when compared to other municipalities.

The average level of human resources commitment for municipal community museums in Ontario with a population over 40,000 was 5 full-time Permanent staff and 3 part-time Permanent staff. The average for communities with 2 or more municipally operated museums sites is 8 full-time permanent staff and 4.5 part-time permanent staff. As previously indicated, Greater Sudbury Museums have one full-time permanent position, approximately 0.2 FTE managerial commitment and 3,220 part-time hours which are generally used to employ summer students or to leverage government funding for temporary contract staff.

It is recommended that permanent staffing levels be brought more closely in line with other Ontario municipally operated museums.



3.4 Recommendation for Staff Resourcing

It is recommended that in addition to the Curator position, an Assistant Curator be added to the complement of museum human resources. This position would be filled with a candidate that has expertise in the field and can provide assistance to the Curator in duties related to exhibition development, collection management, program delivery and customer service.

It is also recommended that a Non-Union Coordinator position be added to the staff complement. This position would be responsible for the overall management of GSM operations with a focus on Facility Maintenance, Staff Supervision, Volunteer Management, Event Coordination and Marketing.

With the creation of the Assistant Curator and Coordinator positions, the number of summer students is recommended to be decreased from the average number of 7 students to 3 students each year. The students would continue to assist Museum Services with the delivery of programming to the community in the summer months and would focus on programs and events with demonstrated public demand.

3.5 Benefits of Additional Resources

Increased year-round staffing will stabilize GSM's operations and bring a number of important benefits, including:

- Adequate coverage for scheduled holidays and incidental sick time
- Additional time to focus on collection conservation, exhibition and program development
- Improved and modernized exhibits offering engaging hands-on experience and improved accessibility

- Increase of services offered to the community on a year-round basis
- Ability to take part in strategic planning for the section

4 Budget for Museum Services

4.1 Current Budget for Museum Services

The current operational budget for Museums Services includes the wages and benefits for one permanent full-time employee and 3,220 part-time student hours. It also includes a modest budget for operating expenses including advertising, displays, building repairs and ground maintenance, property taxes, energy costs, and minor capital projects and annual transfer grants.

Revenues		
Provincial Grants & Subsidies	($16,908)	See section 4.2 below
User Fess	($3,700)	
Expenses		
Salaries & Benefits	$183,268	
Materials – Operating Costs	$59,268	
Energy Costs	$20,463	
Grants – Transfer Payments	$112,500	See section 4.3 below
Total Expenses	$375,759	
Net Budget	$355,151	

4.2 Grants that Supplement Budget

The Community Museum Operating Grant is an annual, statutory grant program administered under Regulation 877 of the Ontario Heritage Act. Its objectives are to augment and encourage local support for eligible community museums and raise the level of professionalism in the Ontario Museum sector. In order to be successful in receiving this grant, museum staff are required to apply and illustrate how they are and/or working towards meeting the Community Standards for Museums.

4.3 Transfer Grants included in Museums Budget

The Museums Section Operating Budget includes two amounts which do not directly benefit the GSM operations. The following amounts are for grants to outside organizations:

- $110,000 annual grant to the Northern Ontario Railway Museum and Heritage Centre
- $2,500 annual grant to the Anderson Farm Museum Historical Society

Factoring in these amounts, the Net Budget for municipal museums is approximately $243,000.

4.4 Recommended Budget Increase

To address the mismatch of resources and service levels, staff recommend that two additional full-time positions are added so that Museum Services will operate with the following three full-time positions:

- A new Non-Union Coordinator who will take the lead in administration, supervising summer students, community partnerships, funding applications and liaison with City support services such as facilities maintenance.
- The current Curator position who will focus on public programming, exhibition development and artifact conservation.
- A new permanent Assistant Curator who will assist the Curator and make progress on recording and assessing the collection to ensure it is appropriately sized and focused for this community and Museum's mandate.

A decrease in summer student hours from 3,220 hours to 1,680 hours is also proposed. This will allow for three summer student positions a year to assist with artifact curation and program delivery. Additional students may also be secured through Provincial and Federal programs.

This change will address the shortfall of permanent skilled resources to meet community expectations, industry standards and perceived service levels.

The addition of a full-time Coordinator position and an Assistant Curator position will have a financial impact of $198,806 in wages and benefits, however the reduction of seasonal students will decrease the budget requirement by $30,227. Therefore, the total net financial impact of hiring two new skilled full-time employees is $168,579.

The change in the operating budget to address increased maintenance costs and provide financial support for the new costs of required external storage and website maintenance is $25,000.

The total required increase to the budget for these recommendations is $193,579.

4.5 Benefits to the Community with Increased Museum Funding

Additional resources will strengthen the ability of the Museums to offer engaging and relevant local history programs to a larger segment of the public on a year-round basis. Additional staff time will allow for the development of a volunteer program, which will further increase the Museums' capacity to engage with the public in meaningful ways. This is particularly important to support the special events undertaken at Anderson Farm, Copper Cliff and the Flour Mill Museums. These events attract most visitors each year but also take staff time away from the care and maintenance of the museums. A significant amount of time is required to liaise with and coordinate these large community events. Additional staff will allow both priorities to be addressed.

5 Governance and Structure

As previously described, there is a need for the City of Greater Sudbury to better define the service levels for Museum Services and to match these with an adequate level of resources. It is the role of City Council to determine service levels and allocate resources. This provides a clear, Council-supported vision for museums and the role they will play within the community. Establishing an Advisory Panel will better connect GSM with the community and bring an outside perspective to assist Museum Services staff.

5.1 Current Governance and Structure

Greater Sudbury Library Public Library (GSPL) has managed Museum Services for the past several years which included representing GSM through the GSPL Advisory Board. In 2019 the CGS Auditor General's governance review of the GSPL recommended that, following the next

municipal election, the CGS recruit and appoint members to a Museums Advisory Panel to meet the requirements of the Ontario Heritage Act and the recommended governance standards for Community Museums in Ontario.

5.2 Council's Role in Community Museums

As with all municipal services, City Council is the governing board for the museums. They are ultimately responsible for museum operations and determine how the service will be maintained and delivered. Council provides direction and authority to staff to operate Museum Services.

5.3 Ontario Community Museums Standards

Recommended standards for Ontario Community Museums have been developed. These include a recommended that museums be governed by a publicly accountable body and have established written documents which include descriptions of the authority for the museum and the museum's mission statement. The standards also suggest that community museums have short and long-term plans that are approved by the governing body which contain goals and objectives relevant to the museum's statement of purpose. The Governance Standard for community museums in Ontario may be viewed in Section 11.3.

5.4 Museum Advisory Panel Development – Terms of Reference

In-line with both the General Auditor's 2019 governance recommendation, and the Ontario Community Museum Standards, staff are recommending that Council approve the creation of a new Museums Advisory Panel for the coming term.

The nine-member Advisory Panel will provide advice and contribute to the creation of short and long-term plans which are approved by City Council with goals and objectives relevant to the purpose of the museum consistent with the vision of the City of Greater Sudbury

The Draft Terms of Reference for a Greater Sudbury Museums Advisory Panel are below in Section 11.6.

5.5 Partnerships with City Departments

The City of Greater Sudbury has many departments within the corporation that have expertise that can support Museums Services future growth and success. Staff recommend that these City resources be utilized for the future strategic planning and continued support for Museum Services day-to-day activities.

Economic Development and Tourism

Economic Development has created Greater Sudbury Cultural Plan 2015-2020. Museum Services should continue to be engaged with any updates to this plan.

Museum Services spends the majority of their advertising budget each year to be part of the Tourism Partnership Program. It is recommended that GSM work closely with the Tourism Department to develop a Museums Marketing Plan to promote the services and programs GMS offers to the public and also to attract more tourism to the City.

Leisure Services

Leisure Services maintains the grounds and landscaping at many of the museum sites. In the past, GSM has worked with Leisure Services to provide group tours for various summer camps offered by the Playgrounds and have also done occasional programming for children at the Walden Youth Centre. There is future potential for these departments to work together to develop a Museums Summer Camp program for youth in the summer months. There is also

room for improvement in the maintenance of the museums grounds to create more attractive and inviting museum sites.

Archives
The City's archives serve the entire population of Greater Sudbury by preserving and providing access to records that include both municipal government records and private records of organizations, businesses or individuals that have made a significant contribution of the development of the City of Greater Sudbury. The City's archives support the museums by offering their collection for research and development of exhibits and programming to Museum Services.

Communications and Citizen Services
The Communications Department currently offers assistance in writing and promoting Public Service Announcements for Museum Services. There is a potential to increase the promotion of museum events and programming through 311 Citizen Call Centre

Greater Sudbury Public Library
Greater Sudbury Libraries and Museums Services have worked closely on joint programming ventures. They also work together on the care of the photographic collections and shared maintenance of the digital collections database. They have a shared responsibility for research requests from the members of the public

Capital Projects – Assets and Fleet
Capital Projects has provided coordination of major capital repairs to the museums building assets. They could further support Museum Services by assisting in the development of a Building Maintenance and Capital Project Plan. This can be achieved by working with museum staff and outside experts to identify appropriate methods and materials for the repair of heritage structures.

Corporate Services - Security
Corporate Services provides security services to the museums by coordinating Crime Prevention through Environmental Design (CPTED) reviews for the sites that help determine ways to create a safe and secure environment. They also work with museums to implement security tools on the sites to mitigate vandalism to the museum buildings and sites.

Engineering Services
Engineering Services has provided Project Management for the Flour Mill Relocation Capital Project. There is also potential for Engineering to assist Museum Services with 3-D scanning of the heritage structures and aerial photographs.

6 Public Engagement

6.1 Strategy for Public Engagement for this Plan

In the development phase of the plan, staff contacted the community groups that regularly partner with GSM and rely on museum staff to help host events and provide facilities for their success. To obtain a deeper understanding of the services the GSM offers these community groups and how it might improve to continue to support their needs, twelve community and

volunteer organizations were asked for their input on what GSM is currently doing to support their success and what other initiatives could GSM undertake to help them achieve future success.

6.2 Summary of Responses from Stakeholder Engagement

Anderson Farm Museum Heritage Society (AFMHS)
AFMHS was formed in 2007 to develop action plans to ensure that Anderson Farm is preserved and protected with plans for future growth. GSM has worked with AFMHS on identifying strategic priorities and would like to continue this practice. AFMHS hosts three annual free public events at Anderson Farm which attract thousands of visitors and they have also partnered with the GSM, Business, Corporate and Community Sponsors to complete small capital projects to enhance the Anderson Farm Museum.

In order for continued success at Anderson Farm Museum, AFMHS recommend the following:

- Additional staff at the GSM be hired including a full time Curatorial Assistant and full time Maintenance employee
- Professional Cleaners that are trained in cleaning artifacts be hired to care for Greater Sudbury Museum assets
- GSM partner with Heritage Society to deliver additional summer programming for children at the Anderson Farm Museum
- AFMHS have a member that participates as a member on the Advisory Panel
- AFMHS work with GSM staff to continue developing 5 year Strategic Plan for Anderson Farm

Azilda Community Action Network (CAN)
Representatives of the Azilda CAN shared their thoughts about the GSM. They find that the museum located in the Azilda library is limited. They feel that museums should be an attraction for tourists that tell the diverse history of Sudbury and there should be additional effort to achieve this. They also feel that in addition to Dynamic Earth, GSM should focus on the history of mining in Greater Sudbury.

Copper Cliff Community Action Network (CAN)
The Copper Cliff CAN holds the annual Christmas tree lighting event at Copper Cliff Museum which is a favorite with the local community. They feel that more programming could be provided to the community in collaboration with the Greater Sudbury Public Library located across the street. They also feel that the museums have been underfunded which has led to improper maintenance of the heritage building.

Café Heritage de Rayside Balfour
Café Heritage organizes and runs festivals to celebrate the heritage of Greater Sudbury. In the past GSM has helped contribute to the success of their events by providing students to help manage their historical displays and also help set up and tear down the event sites. Gary J. Michalak, Executive Director of Café Heritage made several comments regarding the future success of GSM and Café Heritage include:

- Creating an awareness for the importance and value for heritage by working closely with Council to demonstrate the significance for preservation, promotion and animation of heritage services to the community

- A revised administrative plan that would include the creation of an Advisory Panel and committees that were in place prior to amalgamation
- Inclusion of the outlying areas of Greater Sudbury that play a significant role in the development of heritage programs and services
- Prepare a detailed inventory of the artifacts that were donated to the City
- The creation of a mobile museum collection that could be used at their annual festivals
- Continued development of the on-line Rayside Balfour Museum

Walden Community Garden
The Walden Community Garden organization maintains a community garden at Anderson Farm that is used to teach the public/students about agriculture. To continue providing this volunteer program to the public they would like to work in partnership with the City to have access to the buildings for a teaching space and washroom facilities, construct an ecologicial water/irrigation system for the garden to thrive and ensure that the garden is AODA compliant for all public to enjoy.

6.3 Next Steps for Public Engagement

Based on the direction of Council, staff will finalize the Revitalization Plan document and post on Over to You Website for review and comments. Staff will consolidate all comments and share with Council in time for the review of a final business case as part of the 2023 budget process.

6.4 Importance of Volunteers and Partnerships

Greater Sudbury has many active volunteer-based community groups that have an interest in preserving local history. These community groups host a variety of events across the city that benefit the community and help attract visitors to the museum sites.

A significant amount of time is spent liaising with community groups who run events at or pertaining to the Greater Sudbury Museums, and whose activities enhance Museum services.

Whenever staffing levels permit GSM have provided support for the large community events run by the following volunteer-based groups:

- Anderson Farm Museum Heritage Society (Rock the Farm, Fall Fair, Anderson Farm Museum Christmas Tree Lighting);
- Copper Cliff Community Action Network (Copper Cliff Christmas Tree Lighting);
- Rayside-Balfour Café Heritage (Rayside-Balfour Heritage Days).

The Museums provide support to the following volunteer-based groups, who in turn provide valuable services to the community:

- Walden Seniors and Pensioners Woodworkers (low-cost woodworking and repair services);
- Sudbury Spinners and Weavers Guild (free programs for members of the public);
- Walden Community Garden (significant donations of fresh produce to the Walden Food Bank)

In a normal year, the Anderson Farm Museum hosts the following additional large event organized and operated by another City department in which Museums staff provides general support and a booth with activities:

- Children's District Water Festival (EarthCare)

Devoted volunteers with many years of knowledge and experience in their areas of expertise provide demonstrations to members of the public at city museums, greatly enhancing the available programming. These include:

- Sudbury and District Spinners and Weavers crafts demonstrations
- Tours of the Farmhouse, Milk-house and Creighton Log Cabin by community seniors

In the past, AFMHS worked with GSM and community partners and Corporate Sponsors to complete 3 projects to enhance the uses at Anderson Farm:

2012 – A custom built kitchen was installed in the Stable for the use of GSM, AFMHS for meetings and annual events and the public who rent the space.

2013 – A 12'x23' deck was constructed along the south side of the stable and two 16'x16' decks/outdoor stages were constructed.

2013/2014 – The purchase and cladding of a metal shed was added to the Anderson Farm site to provide on-site storage for equipment for AFMHS and Walden Seniors Woodworkers. There was also a 4'x8' sign with a map of the site.

It is recommended that the Advisory Panel and museum staff develop a strategy to expand the number of volunteers and community partners. This may include a program to attract volunteers and partners with defined task descriptions and training opportunities that would benefit all parties.

6.5 Community Values Museums, Culture and Heritage

"The Greater Sudbury Cultural Plan (2015-2020) found that 87% of Greater Sudbury residents agree that the City of Greater Sudbury should support local arts, culture and heritage organizations"

In 2020 when Council was reviewing options for budget reductions in response to Covid-19, and was looking at removing funding for Museum Services, citizens submitted numerous letters in objection to closing the community museums. The common theme of the public response was that culture and heritage is important to the community and removing this service would be devastating for the community.

Continued community engagement will be a key asset for future strategic planning of Museum Services.

7 Vision and Strategy

Museum Services are committed to conserving and promoting the heritage and history of Greater Sudbury as a means of enhancing cultural awareness for its residents and visitors through opportunities for education, interpretation and participation in activities and programs.

Museum operations will be strengthened through the appointment of an active Museums Advisory Panel and an increase in staff resourcing.

The development of a strategic plan is vital in setting the direction of the museums by bringing Council, the Museums Advisory Panel, Museum staff and the community together with a shared vision for the future.

While the final determination of the Museum's vision and strategy are being developed, a survey of other community museums strategic plan's themes and goals have been reviewed and may provide insight into the strategic direction Greater Sudbury Museums may want to go. Staff have adapted the following statements from these plans as a potential starting point for the development of a future strategy:

The Museum will encourage community engagement and participation through the delivery and promotion of educational and cultural programming, activities and events as well as by fostering active volunteerism and partnerships;

The museum will be valued and supported as a vital asset in the community, through community partnerships and collaboration and a committed volunteer base. They will offer quality programs for residents of all ages as well as attract visitors by promoting itself as a destination site;

The museum will be innovative, generate excitement, and take advantage of new technologies and social media. They will foster participation and interest in the community's heritage and history and contribute to the overall cultural vitality of the residents of Greater Sudbury;

The museums exhibits will be innovative, critical, well researched exhibitions with connected programming that includes a broader representative of the vast culture and history of Greater Sudbury including the diverse cultures of the Indigenous and Francophone peoples;

The plan will consider options in addressing space, program and operational needs by determining the best use of current physical space and retrorfit potentials, exploring mutually beneficial community partnerships, joint initiatives and considering new ways of delivering programs and services through the use of technology;

The plan will investigate ways to strengthen the organizational, human resource and financial capacity of the Museum through increased resources for staffing, new funding opportunities, greater outreach to students, and by increasing volunteerism, donations, fundraising and community support. Organizational capacity will be strengthened through formal orientation, training and a clear understanding of the role of the Museum Advisory Panel;

The plan will identify ways to modernize, engage and increase interest, participation and support of residents, visitors and local organizations through branding and marketing

along with the use of new web-based technologies and social media to heighten awareness of the Museum's unique identity, ensuring a more visible, relevant role in the community.

Greater insight into perceptions around of the role of the museums, current environment, and circumstances, both internal and external need to be examined as part of the process of creating a strategic plan. This environmental scan should involve the Advisory Panel members, museum staff, volunteers and a cross section of individuals, community organizations and municipal staff in the areas of heritage, recreation, communications, education and tourism.

This engagement will assist the Advisory Panel and Museum Staff in developing a Vision for the future, a revitalized Mission Statement and the development of goals, objectives and program concepts to meet the need of the community.

Once the strategic plan is completed, master planning can take place to find the right balance of programs, operations, facilities, and funding. This stage will focus on exhibit and program plans, collections, educational program, service levels, space and site requirements and capital budget allocations.

8 Care and Management of Museum Assets – Sites and Facilities

8.1 Overview of Sites and Facilities

The four GSM sites are in heritage structures that have significant maintenance and asset renewal requirements. Some GSM artifacts are housed in facilities that are inadequate for the long-term preservation of the items. being stored in substandard facilities, a storage building in Lively, onsite at Anderson Farm Museum, Copper Cliff Museum and Rayside Balfour Museum and in the garage at Main Sudbury Public Library Branch on MacKenzie St.

CGS has been investing into the maintenance of the heritage structures and museum facilities to ensure the safe use of the buildings with the intent to preserve the heritage structures. In the last 10 years, the CGS has invested approximately $2 million towards facility capital renewal, including the budget for the Flour Mill Museum relocation project.

CGS continues to invest in the maintenance of the museum facilities. There are multiple projects that are scheduled to be completed in 2022 at Anderson Farm including a new concrete floor in the granary building, stair replacement in the log cabin, exterior fire escape stairs at the milkhouse/barn and interior stair replacement from the ground floor to the upper level of the barn.

An additional investment or $467,000 is included in the 2023 capital budget prioritization list to reinforce the barn loft floor and the adjoining milkhouse, as well as the upstairs floor in the stable building.

City Staff are currently working towards identifying any maintenance, accessibility, security, and health and safety issues at all the sites. The sites would also benefit by being more welcoming to visitors with the addition of wayfinding signage, additional seating and increased beautification to the sites.

8.2 Building Assessments 5/10 year Capital Needs for Maintenance

The CGS Facilities Section retained Accent Building Sciences to perform a Building Condition Assessment for the GSM heritage buildings and other facilities

These reports are based on the condition of the building, identifying the physical adequacy of construction, material, and equipment, and outlining the life cycle of all building components. It is a planning tool intended to facilitate the provision of adequate funds and required to address routine capital replacements.

Their report is based on visual inspections of the building envelope, exterior site elements, interior building components, mechanical systems, electrical systems, drainage, and other services.

As detailed in the table below, the estimated capital maintenance requirement for all sites and facilities over the next five years is approximately $2.5 million. While relatively accurate, this figure may change as priorities are set and detailed projects developed for Council's consideration.

Location	5 Year Capital Maintenance	10 Year Capital Maintenance
Anderson Farm – Barn, Milkhouse and Office	$1,169,610	$469,328
Anderson Farm – Farm House	$450,634	$262,762
Anderson Farm – Log Cabin	$196,901	$536,121
Anderson Farm – Shed, Site	$159,594	$306,322
Anderson Farm – Stable	$277,664	$187,957
Anderson Farm – Wood Shop	$65,486	$218,071
Copper Cliff Museum	$66,336	$103,931
Flour Mill – Clapboard Heritage House	$114,517	$126,287
Flour Mill – Log Cabin	$1,200	$91,200

8.3 Special Considerations in Maintaining Heritage Buildings

In order to preserve heritage characteristics and, in some cases, maintain heritage designations, heritage structures should not be maintained the same way modern buildings are maintained. Each heritage building has distinct needs that must be researched and carefully documented. It is important, therefore, to have a detailed multiyear plan for maintenance activities and repairs for each of the Museums' heritage buildings.

Repairs to heritage buildings can be very costly. Regular inspection for damage or deterioration and quick attention to new issues can obviate the need for expensive conservation projects. Frequent, careful maintenance will also help decrease the number of large repairs required.

When repairs to the original elements of a heritage building are required, the following must be taken into account:

- Restoration and repairs based on historical documentation of the building and consistent with the original character of the building.
    - Interventions should be as minimal as possible.
    - Wherever possible, repairs should be done with like materials and methods.
    - Wherever appropriate, repairs should be reversible.
    - Replacement of original features and/or materials should be done only as a last resort. It should be done only after original materials have been thoroughly documented and only after an expert in heritage building conservation confirms there is no viable alternative.
- An expert in heritage building conservation should be consulted to determine the best materials and methods for the job at hand.
    - If repairs are considerable and will require drawn plans, architects who are members of the Canadian Association of Heritage Professionals should be used.

8.4 Accessibility for Ontarians with Disabilities Act (AODA)

Elements of the Accessibility for Ontarians with Disabilities Act pertains to the GSM sites and buildings. The Museums' heritage buildings that are municipally listed are exempt from portions of the requirements under AODA that "would erode the heritage attributes, as defined under the Ontario Heritage Act, of a property".

Many of the Museums' resources and physical spaces require alterations to adhere to AODA requirements and recommendations specific to museums. Fortunately, there are solutions to many of the Museums' accessibility issues that would not erode the heritage attributes of museum buildings.

It is recommended that an accessibility assessment of the GSM buildings and grounds should be performed, and appropriate controls implemented to meet AODA standards**.**

9 Care and Management of Museum Assets - Artifact Conservation and Storage

9.1 Overview of Current Storage Facilities and Artifact Collection Challenges

CGS currently has an estimate of over 10,000 artifacts in their collection that reflect the local community's population and industry. There are an additional estimated 12,500 photographs, and an unknown number of inventoried slides and negatives that form a part of the Greater Sudbury Heritage Image collections, jointly managed by CGS Museums and GSPL.

These collections are stored in multiple sites across the City. Many of these storage spaces are substandard for artifact storage and may cause a threat to the collection. Threats to the collections include damage from pests, water infiltration, mold, uncontrolled climate (RH and temperature), security and damage from human interaction. Damaged artifacts can result in significant costs for conservation and restoration.

There has been no formal strategic planning around the storage of the collection and instead, storage locations have been addressed by responding to the immediate need of space at the time without detailed consideration of industry requirements and best practices.

Artifacts have been collected for many years without a clear intent of their significance to the CGS collection. Museum Staff have been dedicating time to catalogue the collections however more time and resources are needed to complete this task. A freeze on acquisitions was implemented in 2021 and will remain in place until a collection strategy is in place

It is recommended in the short term, that additional staff resource be utilized to continue the process of cataloguing and documenting all objects in the collection to obtain accurate and up-to-date records. This will assist in determining what artifacts are in the collection that may be used in selecting themes for future exhibitions and programming.

In the longer term, a Collections Development Plan to help guide future collecting and deaccessioning efforts should be developed. Plans and policies regarding the collections can be determined by the Advisory Panel, museum staff and through public consultation.

In regard to the challenge of inadequate storage facilities, GSM should make continued efforts to identify alternative storage locations with increased security, climate control and accessibility to safely store the collection until a long term storage solution is developed.

9.2 Standards for Conservation

According to accepted provincial, national and international museum standards every artifact in the collection must have:

- **Legal documentation**
    - Deed of Gift: legally passing ownership of the artifact from the donor to the City of Greater Sudbury Museums;
    - Copyright: An artifact under copyright cannot be displayed without permission. It must be determined for each artifact whether or not the GSM has the right to display it under the Canadian Copyright Act. If not, permission to display the artifact must be sought from the copyright holder.
    - Municipal Freedom of Information and Privacy Protection Act: A photograph of a person is protected under MFIPPA. For each photograph in the GSM collections it must be determined whether or not MFIPPA applies. For photographs where MFIPPA applies, permission to display photographs of individuals must be sought.
- **A unique identifying number:** Each artifact must also be labeled with that unique identifying number. This is crucial for ensuring that the information about an artifact can always be associated with that artifact.
- **A completed catalogue record form:** A catalogue record form describes the artifact in detail and collates such important information as where an artifact was made, what it was used for, what is its significance but also information crucial to other processes such as whether or not we have permission to display the artifact under the Canadian Copyright Act and how large the artifact is.
- **A condition report:** Each artifact needs a detailed description of its condition at the time it is donated to the museum. Condition reports must periodically updated to see whether and how artifacts may be deteriorating in order catch problems before they become serious. Condition reports must also be taken any time an artifact is moved a significant distance, as this is a high risk activity and damage is more likely to result.

- **Photographs:** Photographs assist staff in identifying artifacts and also make it possible to share the GSM collection of artifacts online. Photographs are a key component of tracking the condition of artifacts over time.

It is estimated that 5% of the artifacts in the GSM collections have all required documentation and approximately 50% of the artifacts have some of the documentation they require. GSM staff do not have an estimate for the time it would take to rectify all issues with the documentation of all artifacts, as this would require a full inventory of all artifact storage spaces to have been completed. Some artifacts are very straightforward, whereas others have many parts or complex needs for storage and handling which must be taken into account. As a result, the estimated average amount of time to process one artifact is 105 minutes (1 hour and 45 minutes).

CGS Museums staff surveyed municipal museums to determine what proportion of their collections were fully documented. In this case, a fully documented artifact was defined as having a completed catalogue record form, a signed deed of gift, and at least one photograph.

Of the 21 municipalities who responded:

- 3 had less than 25% fully documented
- 5 between 25-50% fully documented
- 3 had between 50-75% fully documented
- 10 had between 75-100% fully documented

During the survey process, Museum staff received many comments from municipal museum staff across Ontario. Two comments were made with high frequency:

- Much more time goes into cataloguing than most people understand; and
- Generally, not enough resources are allocated to properly document museum collections

9.3 Storage Facility Requirements to Preserve Artifact Collection

To meet industry standards for caring for the collection, Museum Services should have one or more exclusive spaces for the storage of the collection. These areas should be large enough to store existing artifacts without crowding, have appropriate environmental and access controls, and be equipped with proper shelving and operating areas.

Staff have determined that a minimum of 5,250 ft^2 of storage space with appropriate environmental conditions is required to accommodate artifacts that are currently in overcrowded storage spaces that may have conditions not suitable for this type of storage. A complete list of requirements for artifact storage areas may be viewed in Section 11.4.

Roughly 1,500 ft^2 of additional space is required for essential collections management/care support functions.

A space for collections management and care support should include:

- General workspace for Collections Manager;
- A room for quarantine of recently arrived donations;
- A space to photograph artifacts;

- Workspaces for use of and storage for tools, equipment and materials; and
- A lab safety zone including appropriate furniture for chemical storage, a fume hood, an eyewash station and a safety shower.

An estimate was completed in 2022 for the cost of constructing a 6500 square foot storage facility. It was determined that the cost of construction of a new build would be in the range of approximately $1,625,000 to $2,112,500.

The City is currently renting 2000 square feet of external storage space to store a portion of the collection. This space has proper environmental conditions however, there are some concerns about the security of the collection. The cost of the storage facility rental is $20,000 per year and is currently required until a long-term strategy can be identified.

GSM artifact storage spaces were assessed using Re-Org, a system for museum artifact storage evaluation, planning and reorganization developed by the International Centre for the Study of the Preservation and Restoration of Cultural Property. Its use is endorsed by the Canadian Conservation Institute (CCI), an agency of the federal department of Canadian Heritage. You will find a summary of GSM artifact storage deficits as determined through a Re-Org based assessment, attached as Appendix B.

10 Conclusion

The City of Greater Museums have the potential to provide an effective level of services that provides significant community value despite their current challenges. In the short term, an increased investment of human resources and the appointment of a Museums Advisory Panel would enable the museums to develop a renewed vision with clear goals, objectives and program concepts to meet the needs of the community. A continued commitment for investments in the maintenance of our sites and facilities will ensure staff and public safety and the vitality of our heritage structures.

11 Additional Support Documentation

11.1 Details of Services Offered to Community

Anderson Farm

Pre-COVID-19 Hours:

- September-April: Monday-Friday, 10:00AM-4:00PM - open for individual or small group tours by appointment only;
- May-June: Monday-Friday, 10:00AM-4:00PM - open by appointment for school and larger group tours;
- July-August, Monday-Sunday, 10:00AM-4:00PM - open for walk-in tours
- Grounds are open year round Monday-Sunday, 6:00AM-11:00PM (as per Parks by-law)

Services Available in typical year Pre-Covid:

- Guided museum tours for individuals or small groups of permanent exhibitions in the Farmhouse and Log Cabin (weather determines if unheated Barn/Milkhouse are included) provided on a by-appointment basis during the off season;

- School visits (tailored by group size, student needs and grade level) offered May and June while extra staff available (7 summer student Museum Tour Guides). Visits can include: tours of permanent exhibitions in Farmhouse, Barn/Milkhouse; spinning/weaving demonstrations (in partnership with Sudbury and District Spinners and Weavers); weaving craft; old-fashioned games; Maple the Cow workshop (offered in partnership with Northern Ontario Agrifood Education and Marketing); meet baby animals (offered in partnership with Northern Ontario Agrifood Education and Marketing and local farmers).
- Museum Programs:
    - March Break programming (offered in partnership with staff from the Greater Sudbury Public Library – GSPL).
        - 2-3 programs developed to fit with the GSPL March Break programming theme.
    - A minimum of one program is held per month during the off-season. Developed and delivered in partnership with the GSPL. Off-season programs typically feature a heritage craft with a modern twist or a craft using recycled materials (in keeping with both the pioneer ethos of making use of what you have and the modern understanding of the importance of sustainable living);
    - Summer Programs (July-August):
        - Every Wednesday from 10:00AM-2:00PM the Sudbury and District Spinners and Weavers provide hands-on demonstrations to members of the public in the Farmhouse
        - Once a week the Museums run a Story Time program for younger children with a different theme and accompanying craft each week.
        - Once a week the Museums run a program which is part of a larger series for older children/young adults featuring a different heritage craft of craft featuring recycled materials
- Larger Museum Events
    - May be offered in any given year depending on availability of GSPL staff or presence of temporary Curatorial Assistant intern.
    - Can be one-time (planned to coincide with an anniversary or specific event):
        - 2017 Eclipse Viewing Party (learn to make a pinhole camera, view an exhibition about the history of solar eclipses in Greater Sudbury)
        - 2019 Mystery Walk (guided walk at Meatbird Lake and telling of actual 100-year old story of local doctor who died under suspicious circumstances in that vicinity)
    - Or recurring:
        - Ie. 2013-2016 Frightening Friday at the Farm (large outdoor haunted maze based on real local history) – in partnership with volunteers from Lively High, various volunteer members of the public and GSPL staff;
- Anderson Farm Museum Heritage Society Events (planned, organized and operated by AFMHS with support from Museum staff:
    - Rock the Farm: July/August weekly farmer's market with free live concerts by local museums from 4:00-8:00PM. Museum staff help set up and tear down for each event and operate the Museum table with crafts, books for sale, and provide free tours of the Farmhouse.

    - Fall Fair: Held in September, this event features well over 100 arts/crafts, hot food and produce vendors, community partners providing demonstrations and free activities for children, and live music over the course of the day. Tours of the Farmhouse, Milkhouse/Lower Barn, and Creighton Log Cabin are provided by staff with the assistance of many community volunteers (trained by Museum staff).
    - Christmas Tree Lighting: Held every year in early December, this event features choral performances from local schools, model trains in the Woodshop, cookies and milk with Maple the Cow, hot chocolate, horse-drawn wagon rides and a visit from Santa and Mrs. Claus. Museum staff provide support for this event, and when time allows assemble a small temporary exhibition inside the Stable on a topic relating to Christmas (ie. antique toys).
- Recurring partner events:
    - Walden Winter Carnival: Museum not involved in operation, site is rented to group at no cost;
    - Walden Lions Easter Egg Hunt: Museum not involved in operation, site is rented to group at no cost;
    - Sudbury Children's Water Festival: Organized and operated by EarthCare, this event provides a variety of hands-on activities educating 100s of local school children about topics relating to water and conservation. Museum staff run one of the many activity booths with support from GSPL staff. Use of the site for the event is provided at no cost;
    - Creighton Reunion: Museum staff are on site to provide tours of the Creighton Log Cabin. Rental of Stable and Grounds provided at no cost.
- Stable and Grounds Rentals:
    - Members of the public may book the Stable and/or Grounds for their community events. Non-profit groups may have one rental at no cost per year.
    - Events such as showers and birthday parties are often held in the Stable.
    - Wedding ceremonies, reunions, etc. are often held on the Grounds.

Copper Cliff Museum

Pre-COVID-19 Hours**:** July, August: Wednesday-Sunday, 10:00AM-4:00PM; September-June: Monday-Friday, by appointment only

Services Available in typical year Pre-Covid:

- During the off-season, guided museum tours for individuals or small groups on a by-appointment basis of Log Cabin permanent exhibitions (weather-dependent – building is not heated, and snow is not cleared throughout the winter).
    - Once yearly in the fall Museum staff provide access to the Log Cabin interior for LU Architecture students to learn about creating drawings based on an actual historic structure.
- July/August: Walk-in guided tours of the museum's permanent exhibition.
- Weekly, during July/August: Museum staff run a Story Time program at the Copper Cliff Library for younger children with a different theme and accompanying craft each week.
- Occasional One-Time Events:
    - Ie. Historical walking tour of Copper Cliff Poké-Stops

- Partner events:
    - Copper Cliff Tree Lighting (organized and operated by Copper Cliff CAN with support from Museum staff). Choral performances, games, hot chocolate, horse-drawn wagon rides and a visit from Santa make up this community event.

Flour Mill Museum
Pre-COVID-19 /Pre-Move Hours: July, August: Wednesday-Sunday, 10:00AM-4:00PM; September-June: Monday-Friday, by appointment only
Services Available in typical year Pre-Relocation and Pre-Covid:

- During the off-season, guided museum tours for individuals or small groups on a by-appointment basis of Log Cabin permanent exhibitions (weather-dependent – building is not heated, and snow is not cleared throughout the winter).
- July/August: Walk-in guided tours of the museum's permanent exhibition.
- Weekly, during July/August: Museum staff run a Story Time program for younger children with a different theme and accompanying craft each week.
- Larger Museum Events:
    - Every year, during the Blueberry Festival, museum staff host a free community blueberry pancake breakfast for members of the public.

Rayside-Balfour Museum
Pre-COVID-19 Hours: Library Hours, vary by season
Services Available in typical year Pre-Covid:

- Display space within library building with back-of-house storage and workroom areas;
- Space hosted a long-term fully-bilingual temporary exhibition with interactive elements in partnership with the Centre Franco-Ontarien de Folklore.
- Installation is in progress for a temporary exhibition about Whitewater Lake.
- Programs are occasionally held in this space in partnership with GSPL.

11.2 Summarized Duties of Museum Services

- Admin./Planning/Organization:
    - Staff direction, paperwork relating to grants supporting the hiring of summer students, HR paperwork relating to summer students, delivering training for summer student employees;
    - Applying for and fulfilling reporting responsibilities for grants
    - Statistics tracking, collection of public feedback and analysis (visitation, public programming, etc.);
    - Various financial: obtaining and comparing quotes/pricing for required tools/materials/etc., purchasing card reconciliation

- Public/Volunteers:
    - Responding to public inquiries:
        - About site rentals (weddings, and requests for permission to do specific things with the site during larger rental events;

        - About the Museums; and
        - About local history and about specific local history/genealogy subjects. Directing members of the public to appropriate resources, connecting them with local history experts as required.
    - Maintaining relationships with various partners and stakeholders:
        - addressing member concerns, providing regular updates, attending meetings; coordinating and providing support for events, connecting members with other City department etc.
    - Volunteer management, including: scheduling and supervising volunteer work, developing training materials for and training volunteers.

- Exhibition:
    - Museum staff typically develop and display at least one small temporary exhibition per year;
    - Exhibition development includes: research and planning; costing of display; writing/editing of text; selection of images/artifacts from the permanent collection; preparation of artifacts for safe display; design of text panels; design/creation of interactive elements; installation of exhibition.

- Asset Management
    - Buildings/Maintenance/Security:
        - Cleaning of museum buildings as required (except Anderson Farm Museum Stable and Office);
        - Building and site inspection, documenting and reporting issues to supervisors/maintenance/security for resolution as required;
        - Coordinating/providing access to buildings for contractors for repairs/improvements as required;
        - Researching which materials and methods are appropriate for repairs/improvements to Museums' heritage structures, summarizing and communicating this information to supervisors, contractors, etc.
        - Checking site/building after public rentals, documenting and reporting resulting damage.

- Marketing/Web/Digital:
    - Developing advertising materials for Museum programs and general awareness of Museum services and resources;
        - Sharing digitally or distributing physically, whichever is most appropriate given the intended audience;
    - Developing and sharing local history/museum-related content through social media;
    - Writing copy for the Museums' website;

- Programming:
    - Fielding requests for school tours and developing an individual plan/schedule for each visit based on grade level, number of children and required accommodations for students with learning challenges/disabilities (in a typical

year, the end of May and most of June is occupied organizing and delivering school tours);
    - Setting annual programming goals in keeping with the Museums' broad programming objectives and developing/delivering programs to support those goals;
    - Purchasing materials for programs, preparing materials as required, training summer student employees on how to perform necessary skills to deliver programs.
    - Developing and delivering small outreach programs (ie. presentations at Parkside Centre, programs at local library branches, etc.)
    - Developing/delivering large outreach displays/programs for large community events to connect with new audiences.

- Training/Professional Development:
    - Receiving internal training
    - Keeping abreast of current best practice in museums through:
        - Periodic review of related published materials;
        - Attending webinars/online training sessions;
        - Attending the annual Ontario Museums Association conference when possible.
        -

11.3 Governance Standard for Community Museums in Ontario

As a community museum, you must be governed according to the standards and be open and accountable

1. A community museum must be:
    a. governed by a publicly accountable body.
    b. established by a written document(s) which include(s) descriptions of:
        - authority for the museum
        - museum's mission statement that
            - defines the museum's purpose
            - makes a commitment to the museum's role in the public trust
            - identifies who the museum serves
            - identifies what the museum will collect
            - identifies the impact it will have in its community
    c. how the museum will dissolve its assets and liabilities should it cease to operate
2. The museum's governing body must:
    a. be established by a written document which outlines:
        - its composition and structure – including selection of members and terms of office
        - its obligation to ethical behavior and the avoidance of conflict of interest – as a body and as individuals
        - its obligation to meet municipal, provincial and federal legislative requirements that have an impact on its decisions or activities
        - its responsibilities and duties, including:
            - recruiting, supervising and evaluating the museum's curator or director (that is, the museum's chief manager)

- formulating the museum's statement of purpose
- formulating written policy governing operations and defining programs
- securing funding necessary to carry out the museum's programs
- preparing or approving an annual budget and monitoring it to ensure public accountability
- ensuring that the purposes for which the museum exists are being fulfilled
- ensuring that the collection is being cared for under proper conditions

b. meet regularly and as often as necessary to conduct its business effectively
   - meetings must follow a written agenda and a written record must be kept of all discussions and decisions

3. The museum's operation and administration must:
   a. meet municipal, provincial and federal legislative requirements that have a bearing on its operations and activities
4. The museum and its staff must:
   a. demonstrate a commitment to ethical behavior as an institution and as individuals.
5. The museum's operations and activities must be:
   a. directed by short and long-term written plans (for example, business plan, strategic plan, visioning plan or master plan) that are:
   b. approved by the governing body contain goals and objectives relevant to the museum's statement of purpose

11.4 Draft Terms of Reference – Greater Sudbury Museums Advisory Panel

Mandate:
To provide advice and contribute to the creation of short and long-term plans which are approved by City Council with goals and objectives relevant to the purpose of the museum consistent with the vision of the City of Greater Sudbury. Provide advice to Museums staff in meeting municipal, provincial and federal policies and procedures pertaining to museum operations and activities.

Role of the Museum Advisory Panel:
As an Advisory Panel, the Greater Sudbury Museums Advisory Panel will provide advice on:

- formulating the museums' statement of purpose
- creating written policy specific to museums operating standards and recommended programs;
- securing funding, assisting with grant applications and soliciting donations;
- fulfilling the mission of the museums;
- ensuring proper care and maintenance of the collections, museums and heritage programs
- developing working relationships with relevant groups

Organization of the Advisory Panel:
The Advisory Panel will be composed of people residing within the City of Greater Sudbury who demonstrate a strong commitment to the terms of reference. A diverse cross section of people

should be chosen in order to bring the Panel relevant technical and professional expertise as well as strong advocacy, communication and organizational skills.

- Nine members comprised of a broad representation of the culture and heritage sector, ideally including representation from:
    - The Francophone community
    - The Indigenous community
    - People that demonstrate interest in local history and culture
    - Private, not-for-profit, education and public sectors
    - Youth Member (18 years-30 years)
    - One Member of Council
- Appointment opportunity will be advertised on the CGS website and through social media
- Advisory Panel members will be appointed by Council through the Nomination Committee process
- Additional members may be appointed throughout the term to fill any vacancy that occurs on the Panel
- The term of the Advisory Board will coincide with the term of Council
- The public members of the Panel shall hold office for a term of four years and may be re-appointed to one more consecutive term. Following this, the member must retire for at least one term to be eligible for re-appointment to the Panel
- One member will be appointed by vote of Advisory Panel at the first meeting of each term to serve as chair for the upcoming term. The Panel will also, at this time, select a vice-chair and secretary for the same duration
- CGS staff shall provide support to the Panel

Meetings:
The Panel will meet on a regular basis and as necessary to conduct its business effectively:

- The Panel will hold a minimum of four (4) meetings a year
- The date and time of the regular meetings will be established at the first meeting of each term
- Meetings will have a formal agenda
- Agendas and information packages, that will include the minutes from the previous meeting, will be sent (via mail or email) to the Panel Members prior to each meeting
- A majority of Council appointed Members will constitute quorum for the transaction of business
- The members may meet occasionally informally to discuss issues as required

Role of the Chair:
The Chair is responsible for ensuring the smooth and effective operation of the Panel and its roles. This will include the responsibility for:

- Calling the meeting to order
- Creating an informal atmosphere to encourage the exchange of ideas such as, using a roundtable format
- Creating an agenda in consultation with the Secretary
- Chairing the meetings
- Acting as the spokesperson when required
- Representing the Panel on other panel/committees when necessary
- The Chair shall conduct meetings in accordance with the City's procedures
- In the absence of the Chair, these responsibilities will be undertaken by the Vice-Chair

Role of the Secretary:
The Secretary is responsible for ensuring a complete up to date record for the Panel:

- In liaison with Chair, arrange date, time and venue for meetings
- In liaison with Chair, set agendas and circulate to members two business days prior to the meeting
- Circulate meeting minutes to the members
- Keep a complete up to date written record of all discussions and decisions
- At the discretion of the Advisory Panel, a City staff person may serve as Secretary

Role of Members:
Membership on the Panel is a position of responsibility and requires strong commitment to the Terms of Reference. Panel members are to:

- Attend all regular scheduled meetings. Members are required to notify the Chair, Secretary or the designated municipal staff liaison if they are unable to attend a meeting
- Review all information supplied to them
- Prepare information for the use in the development of materials for the Panel
- Promote the role of the Panel
- Offer input to the Municipal Staff reports to Council
- Attend training as required to effectively perform their role as a panel member
- Panel members are subject to the Municipal Conflict of Interest Act R.S.O, 1990, c.M50 and must disclose any direct or indirect pecuniary interest. The disclosure must be recorded in the minutes to the meeting

Role of Municipal Staff:
The Panel will provide advice to municipal staff on the operations of the museums. Municipal staff are responsible for reporting to Council for their direction. Municipal staff will also:

- Act in liaison with other municipal departments, be an information resource for the Panel
- Provide orientation of Advisory Panel members at the first meeting after Council appointment
- Provide Council with an annual report at the beginning of the year outlining the Panel's accomplishments in the previous twelve months

11.5 Requirements for Artifact Storage Areas

Recommended storage requirements exist to protect artifacts from agents of deterioration. These threats include mechanical damage (physical forces); fire; water; incorrect relative humidity; incorrect temperature; pests; disassociation; theft and vandalism; light; and pollutants. To see a break-down of these agents and how they affect collections you can visit Agents of deterioration - Canada.ca for more information.

Minimum Environmental Parameters for Storage

- Relative Humidity (RH): 45% RH ± 5%
- Temperature: 20°C ± 1°C
- Visible Light:
    - Storage: 0 Lux
    - Exhibit: 50 Lux at 7 hours/day, 5 days/week
- UV Light:

- Storage: 0 µW/lumen
- Exhibit: 0-75 µW/lumen

A storage space needs to be a stable and monitored environment for artifacts to protect them from deterioration. Large and rapid fluctuations in RH, temperature, and light can create stresses on artifacts which inevitably lead to deterioration and damage.

Minimum Requirements for Storage Materials, Units and Systems

- NO artifacts may be stored on the floor.
- All storage furniture must be raised a minimum of 10 cm (4 inches) off the floor. The lowest shelf should also be 10 cm off the ground.
    - Oversized or very heavy objects that cannot be placed on a storage unit must be stored on a pallet or a dolly with wheels. Under no circumstances should the artifact be placed on the floor
- Objects should not be packed closely together on shelves
- Objects should not come in direct contact with shelves or drawers
- All materials used to house artifacts should be chemically stable and pH neutral (i.e. metal powder-coated shelving; plastic sheeting and housings, etc.)
- There should be at least 10 cm of space between each storage unit and the outer walls. This will help avoid any mold or condensation problems.

General Requirements

The minimum requirements for appropriate artifact storage are as follows:

- In/out logbook should be placed within the storage area;
- Storage area should be a darkened environment where traffic is restricted to protect from pests, pollutants, theft, vandalism and light damage;
    - Artifact storage rooms must be secure and only accessible to Museum staff;
    - Contractors or non-museum staff must be supervised for the duration of their visit;
    - Visiting researchers must be supervised;
- Artifact storage rooms must not contain objects other than artifacts, storage equipment, and conservation tools and equipment;
- Storage rooms should not be located in attics or basements as these areas are at increased risk of flooding and roof leaks. These spaces are harder to environmentally control and therefore not ideal for the long-term preservation and housing of artifacts;
- Both the size of the current collection and future growth of the collection must be considered when selecting an appropriate size for a storage area;
- Storage rooms should be equipped with insulation and vapor barriers. Must be large enough to accommodate storage furniture and permit easy access to artifacts;
- Aisles should be wide enough to accommodate trolleys and other equipment used to move artifacts
- There should be a designated work area within the storage room for object examination and care. This work area should consist of a table that is always clear and only used to examine or care for objects.
    - NOTE: mount making, and other storage preparation should be done in a separate room to reduce clutter
- Artifacts containing/made of hazardous substances must be labelled and stored accordingly.
- All artifacts, enclosures, and shelving units must be labelled so that their locations can be recorded in the database.

- There needs to be a designated quarantine area to prevent pest and mold from entering the artifact storage space. Quarantine is a temporary space for new artifacts that enter the museum or to quarantine artifacts affected by mold or pests until they can be treated. The quarantine space should be a separate room from the general artifact storage. A quarantine area should include:
    - Multiple freezers to quarantine and store artifacts affected by mold or pests until they can be treated by a conservation professional.
    - Storage furniture to store newly acquired artifacts for a period of 2 weeks before they are fully accepted into the museum collection.
    - A table that serves as a workspace to properly examine and care for the artifacts.

Housekeeping Requirements

- Artifact storage areas must be part of an Integrated Pest Management Plan, which includes regular monthly monitoring of sticky traps and good housekeeping practices.
- Regular cleaning of storage area by someone trained
- Cover objects in storage with polyethylene sheets or dust covers
- No food/drink is allowed where artifacts are stored
- Light-colored storage shelves that easily show debris makes housekeeping and pest/pollutant detection easier.

11.6 Recent Trends in Museums

In the past 10 years, there has been continuous discussions about the role of museums and the best practices to remain relevant. The following topics are facets of that drive to remain relevant to the public.

<u>Visitor Participation/Destabilizing Old Models</u>

Many museums operate on an outdated model where people come to the museum to hear about the topics the museums choose with no opportunities for participation or feedback. It has been a model of the expert delivering information to the public in a one-directional flow.

There are many museum professionals advocating for a more equal relationship between museums and the public, and for museums to move away from their traditional role of static broadcaster of unimpeachable knowledge to:

- Open and collaborative institutions
- Holders of space
- Signal boosters for the community
- Recognition of the value of different types of knowledge (ie. stemming from lived experiences)

The push for more participatory models is being driven by the younger museum professionals, and will be considered the standard to meet moving forward.

<u>Interactivity/Hands-on Learning</u>

The integration of hands-on learning and interactive elements in display is one of the older trends that have become the industry gold standard that smaller/less funded institutions have struggled to meet.

An example of successful hands-on learning is Science North. They were an early proponent of hands-on, staff facilitated learning which many other science centres have since tried to replicate.

Interactive doesn't have to mean hands-on, companies are now developing new technologies that allow people to navigate through a digital experience via motion controls tracked by cameras, for example. There are also many ways to develop online experiences with interactive components.

Digitization/Digital Experiences

Museums are recognizing the importance of digitizing their collections. There has been a push from the industry for the government to provide more funding specifically for digitization. Beyond straightforward databases and virtual exhibitions seeking to replicate physical exhibitions, the industry has been pushing for complete digital experiences that take full advantage of the digital medium. More museums are looking to find ways to integrate VR and AR experiences. Younger generations have grown up with technology. This means that for up and coming museum goers, digital offerings will only become more and more crucial. And, virtual museums provide further benefits like and enhanced experience, the ability to share unseen collections, and global accessibility.

Appendix "A" - Results from Key Stakeholder Survey

Anderson Farm Museum and Heritage Society

1. **What services do CGS Museum Services currently offer that help you/your organization to succeed?**

Note: Unfortunately, since 2020, COVID-19, scheduled [2020-2022] repairs to the Creighton Log Cabin, Farm House, Stable, Milk House/Barn and an Archeological Assessment at the Anderson Farm Museum, have resulted in the CGS Museum being unable to provide the annual Museum Services, which have been part of the Anderson Farm Museum Heritage Society's long-term Partnership with the CGS, GSM & Ward 2 Councilor, since 2007.

Background Information:

In October 2006, the Walden-Community Action Network's [Walden-CAN] Heritage Committee presented a 16 Page Final Report & Recommendations to Walden-CAN - which formed a Heritage Task Force to work with the City of Greater Sudbury & the Greater Sudbury Museums to:

• Implement the Recommendations of the Heritage Task Force

• Create an AFM Site Committee

• And Develop Action Plans to ensure that the Anderson Farm Museum was preserved & protected; expanded & developed – as a vital CGS heritage site for future generations

In 2007, the Site Committee became officially incorporated as the Anderson Farm Museum Heritage Society.

At that time, the Heritage Society decided to reintroduce the three Free annual events which had been hosted at the museum, when it was owned by the Town of Walden: a summer concert series, Fall Fair & Christmas Tree-Lighting Celebration- as a perfect way to attract people from Walden & CGS- to come to the museum; enjoy our free events; tour the historic buildings (barn, Milk House, Farm House & Creighton Log Cabin) and learn to appreciate & value the Anderson Farm Museum. Our 3 Free Annual events continue to grow & expand attracting thousands to the AFM.

Since 2007, because of our special Long-Term Partnership with GSM, the AFMHS has had access to:

• Free use, annually of the Stable at the AFM for: AFMHS Board/Committee Meetings, AGM, Media Conferences & other special on-site meetings-as required [if the Stable is not already booked by the Curator or community groups/public]

• Free use of the 14-acre site to host our three Free annual events [including days for set-up/take-down of the site] - which we book a year ahead of time at Lively Citizen Service Centre

Each year, we request some extra CGS equipment for our Fall Fair:

• CGS Special Event Request Form re: 6' folding tables, chairs, barricades, picnic tables & lime Line-makers + bags of lime- to mark booths & on-site parking areas for Vendors, Community Groups, Partners/Sponsors & Volunteers

• GS Waste Management Request Form re: garbage bins & recycling units

- a custodian on site to help clean the washrooms as needed at the Fall Fair

Every year, thousands of people of all ages- from CGS, West Nipissing & NE & Southern Ontario attend our annual 'Rock The Farm' FREE Concert & Farmers' Market summer series, on Wed [July, Aug] and our FREE Fall Fair [second Sat. in September] and hundreds attend our FREE Christmas Tree-Lighting Celebration at the AFM.

Since 2007, the Heritage Society has worked in partnership with GS Museums to develop short & long-term action plans to ensure that the Anderson Farm Museum is preserved & protected; expanded & developed.

• AFM Strategic Plan [2008-2013] - attached to email

• AFM Strategic Plan [2014-2019] - attached to email

NOTE: Unfortunately, the AFMHS was not a partner in developing

any AFM Strategic Plans for [2020-2025].

Over the years, the AFMHS has partnered with CGS [HCI Funds], GSM + Business, Corporate & Community Sponsors re: three small Capital Projects at the AFM:

2012 Special Project Partnership:

• A Custom-built kitchen in the Stable: used by Curator [museum programs], AFMHS [meetings/annual events] & the public who rent the space

• AFMHS + GSM + Ward 2 Councilor/HCI Funds + Grant from Retired teachers of Ontario

2013 Special Project Partnership:

• [12'x36'] Deck along the south side of the Stable

• Two [16'x16'] decks/outdoor Stages: one beside the Milk House and one at the south end of the Barn

• AFMHS + GSM + Ward 2 Councilor/HCI Funds + Business/Corporate Sponsors [cash/in-kind] + Walden Srs & Pensioners Woodworkers – who built the deck & 2 Stages

2013 & 2014 Special Project Partnership:

• Purchase of and cladding of Sea Can: on-site storage of equipment for AFMHS & Walden Srs Woodworkers + location of new [4'x8'] AFM Site-MAP

• AFMHS + GSM + Ward 2 Councilor/HCI Funds + Business/Corporate Sponsors [cash/in-kind] + Walden Srs Woodworkers- who clad the Sea Can

Scheduled AFM/AFMHS Information-Sharing Meetings were held with Mgr. Libraries & Museums, Curator GSM and President, Vice-President, Treasurer, CIO & 1 Director [Treasurer Walden Srs Woodworkers to update the board & discuss topics including:

For example, in 2016:

• Audit of the heritage buildings at AFM

• GSM Budget allocation for AFM

• Repairs to: Milk House, Barn, Farm House & Creighton Log Cabin & Windmill

• Renovations to upstairs of Stable: new storage space for AFMHS & Curator

• New [4'x8'] Site-MAP of AFM + bilingual signage for buildings

• New Exhibit in the Loft of the Barn

• Landscaping/roads/paths upgrades throughout 14acres

• Ways AFMHS & Woodworkers can assist/sponsor small projects at AFM

• 2017 HCI Grant Application re: possible capital projects at AFM - in partnership with AFMHS, Business, Corporate, Community Sponsors & Walden Srs Woodworkers

• Issues/problems being addressed at other GS museum sites

In 2022:

- We met with Ian Wood, Samantha Morel and Mette Kruger to discuss the future of museums and the possibility of hosting events in 2022.

NOTE: Unfortunately, since 2016 there have been no permanent Exhibits, on display for the Public to see, in the Loft of the Barn and since 2019, there have been no scheduled AFM/AFMHS Information-Sharing Meetings held.

2. **What additional support would you find beneficial for Museum Services to have in place to help you/your organization continue to succeed?**

a. Improve communication with their long term Partner i.e. reinstate regular information-sharing meetings
b. A written monthly Curator's Report and presence at a few of the Board meetings or written report if not able to attend in person.
c. Improve support for annual events i.e. students, advertising for rock the farm (in the past summer students have handed out flyers at the Northern Lights Festival and assisted with the setup for Rock the Farm)

d. Continue to partner with the Board on Capital Projects at AFM which help improve services for the use of AFM by Curator, AFMHS & Public who rent the facilities i.e. kitchen, deck behind Stable, 2 stages plus proposed Timber-Framed Pavilion
e. Train interested Board members to help with tours during the summer season and with artifact preservation

3. Are there any aspects of Museum Services that you feel hamper you/your organization?

a. AFMHS used to be part of 5 Year Strategic Planning process for the Anderson Farm Museum, we want this to continue
b. We used to have a Board member on the Library & Museum Advisory Board ...should have one on the new Museum Advisory Board
c. The big issue in 2022 is the closure of the museum buildings and the archaeological study that made it impossible to host our 3 fund-raising community events. (Rock the Farm, Fall Fair & Christmas Tree Lighting)
d. The excess storage of artifacts in the Stable and loft of the Barn have a negative impact on our ability to host events or meetings.

Other

We feel that funding for a full-time Curatorial Assistant plus a full-time maintenance person at the AFM, who is capable of small repairs and professional cleaning scheduled for artifacts would be extremely beneficial for the success of preserving and protecting Greater Sudbury Museums for the future.

The professional cleaners - trained to clean artifacts & walls, floors, shelving units etc - (Like heritage sites & museums hired throughout the world) could be rotated through other museums , on a schedule determined by the Curator.

We would also like to see summer programming for kids on site at the Anderson Farm Museum and could partner with Museums to operate these programs (agriculture related).

In the big picture- we would like to see the Curator focus more on preserving the site, school tours, hosting community events, applying for grants and not so much on digitizing artifacts.

Azilda CAN

Hi Linda

here is some input from our executive members for the Museums, from the Azilda CAN, let us know if there is anything else

All I have to say is when I travel across the country here and in the US museums are tourism focal points. As a child I remember getting a tour of the Anderson Farm Museum and it was quite interesting, but that was pre amalgamation. As for the Rayside Balfour Musuem in the library, it is somewhat limited. I have no knowledge of the Flour Mill Museum and the Copper Cliff Museum. I don't find our museums are tourism focal points. I still don't understand why we don't have a mining Museum because Dynamic Earth is more of an exhibit than a museum. Eric Lachance

Agree - a mining museum - why it isn't something at dynamic earth? the other local museums are ok but mainly for local kids though Railway museum in Capreol is kind of neat Anyone travelling thru Sudbury would need a REASON to stop at any of the small sites like looking for a family item. That said

I've been in a number of small towns - Fort Frances comes to mind and happened to walk in the museum and was shocked to see how great it was. (locals had done it to attract people to an empty building) Cora

I think that having focal points for Museums should be an attraction and need a little more effort, especially in the mining industry, that is what has built Greater Sudbury to what it is today, had we not had all the immigrations from Europe, in the early 1920's we would have never built the City to where we are today, Cathy

thank you

AZILDA CAN

Copper Cliff CAN

Thank you for considering the Copper Cliff CAN on these questions.

Here is my response to your questions:

1. What services do CGS Museum Services currently offer that help you/your organization to succeed?

The museum has allowed Copper Cliff CAN to hold an annual tree lighting at the exterior of the museum. Local residents have told us it is their favourite community event. Despite COVID, the fir tree In Front of the log cabin still was lit up during Christmas in 2020 and 21.

2. What additional support would you find beneficial for Museum Services to have in place to help you/your organization continue to succeed?

The CAN hosts and markets the entire event. It would be beneficial if a Christmas display could be held inside the museum, by museum staff or couple with the library for the old time Christmas theme. Liaising with Samantha Morel has been an asset in ensuring approval and electrical ports.

3. Are there any aspects of Museum Services that you feel hamper you/your organization.

If I may, I would also make the comment that the museum in town and perhaps others, have been woefully underfunded. This then has led to improper maintenance of the building

We also notice that larger museums have more programming than our little museum. The old log cabin represents the living conditions of when mining first started in the Sudbury area. More could be done in collaboration with the local library which is across the street

Thanks for allowing us input

Margaret

Gary Michalak – Café Heritage

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July 6, 2022
Museums Revitalization Plan

To: Linda Harnish, Special Projects Coordinator

Hello Linda
Please note that these are personal comments and may or may not reflect the opinions of the President and Board of Directors of Productions Café Heritage.

BACKGROUND

Council has directed staff to develop a Museums Revitalization Plan for their review. The focus of the Plan will be to provide vision and recommendations to Council on a sustainable structure for our current heritage assets and provide an approach to developing a longer-term vision for the future of Museum Services.

Greater Sudbury Museum Services operates 4 museum sites with a level of resources which has remained almost unchanged since amalgamation in 2001. These limited resources result in many challenges in delivering relevant programming to the community in a safe and accessible manner while meeting the provincial standards for community museums.

In developing the Plan, staff will examine 6 main areas of concern, as outlined in previous reports that will aid in the future strategic planning of Museum Services:

- Current Operation Challenges and Opportunities
- Vision and Strategy
- Sites and Facilities
- Artifact conservation and Storage
- Governance and Structure
- Staff Resources

The City recognizes the value that museums bring to the community and believe that with the right supports in place, Museum Services will continue to enhance our community with the many meaningful services they offer.

Productions Café Heritage recognizes, appreciates and welcomes the opportunity to be part of the Museums Revitalization Plan.

We value our community partners and would appreciate your feedback as one part of this process. Your answers to this short survey about Museum Services will help us to understand how this service affects you and your organization.

What services do CGS Museum Services currently offer that help you/your organization to succeed?

- *Museum collection at the Gilles Pelland Library*
- *Recognition of historical properties*
- *Consultation and advice*
- *In the past has*
  - *Provided student help in managing historical displays at our festival*
  - *Provided student help in setting up and tearing down festival sites*

What additional support would you find beneficial for Museum Services to have in place to help you/your organization continue to succeed?

It is highly recommended that study considers creating an awareness for the importance and value for heritage. We must work very closely with Mayor and Council in the need to demonstrate the significance for the preservation, promotion and animation (bringing to life) of heritage services which includes Museums.
With the amalgamation of the area municipalities of the former area municipalities in 2020, the new administration did away with all of the area boards and committees and adopted a centralized staff driven development model that did not, and still does not recognize the contribution being made by community volunteers.
Members of Council and staff have to re-think and re-purpose Heritage Attractions including museums to be not only of social importance, but to adopt experiential tourism heritage opportunities that may bring substantial economic development to our welcoming City.
Serious consideration to the formation of the City of Greater Sudbury Network. The Network should include those in the outlying areas that play a significant role in the development of Heritage programs and services. Being proactive in providing secretarial and consulting on future development
To prepare a detailed inventory of the artifacts that were donated to the City. Many citizens feel that their donation has gone into a black hole.
To complete an audit of what is happening in the outlying areas. List and promote to recognize the contribution.
To prepare and staff mobile museum collections that would be used at our annual heritage festivals and events.

To work with Café Heritage in the development of its on-line Rayside Balfour Museum.

Are there any aspects of Museum Services that you feel hamper you/your organization?

As mentioned, there has to be a paradigm shift in the manner in which City administration works with all neighbourhoods in the development of its social and economic capital. The need to develop and adopt a "community engagement strategy" is paramount to support the ongoing effort to create a healthy community.

Please feel free to provide further comments or recommendations that you feel are important to be reviewed as part of the Museums Revitalization Plan.

Thank you for the opportunity to share my thoughts on your important mission. As a student and a strong advocate for community development in the creation of healthy communities, we are hopeful that that the results of this study will position heritage (museum services) as a needed and welcomed service by Council and staff.

Sincere best wishes

Take care

Gary

Walden Community Garden

Please see my comments in response to the questionnaire below

Thank you for including our group of community members on this.

Leigh Anne Cecchetto

1. What services do CGS Museum Services currently offer that help you/your organization to succeed?

They offer a space for our community garden. Pre covid, our garden team was also able to access the stable at Anderson Farm for washrooms and if classes came to help, a teaching space (if weather was not agreeable). We also use Municiple water to water the garden, however we hope to have upgrades to this that 1. It is more accessible and 2. We can harness rain water

2. What additional support would you find beneficial for Museum Services to have in place to help you/your organization continue to succeed?

We would like access to the indoor washrooms at the stable and teaching area.
We would like to see the city/museum agree to and act on our ecological water/irrigation system for the garden, and would like the City engineer or plumber to help us hook it up (we do have funds to contribute to make this happen!)

3. Are there any aspects of Museum Services that you feel hamper you/your organization?

Yes, the garden is not accessible to wheelchairs and we would love to have an engineered walking loop through the gardens for all of the public to participate and enjoy.

We would love to have an easier watering system too as right now seniors or anyone with mobility issues cannot help with this.

Appendix "B" – Re-Org Score Summary Results for All CGS Museum Storage Spaces

Location	Management	Building/Space	Collection	Furniture/ Equipment	Total
Copper Cliff Museum: Storage Spaces	14	10	4	4	32
St. Stanislaus Cemetery Storage Building	11	15	4	3	33
Anderson Farm Museum: Log Cabin	12	15.5	4	8	39.5
Anderson Farm Museum: Creighton Basement	12	16	4	8	40
Anderson Farm Museum: Milk house and Barn	14	15	7	15	51
Anderson Farm Museum: Farmhouse	20	21	7	15	63
Main Library	20	16	13	17	66
Anderson Farm Museum: Stable	17	19	17	20	73
Anderson Farm Museum: Office	18	30	15	23	86
Rayside-Balfour Museum: Display Area and Closet	21	30	12	23	86

Legend
All OK!
Only small improvements are needed
You need a re-org project
You need to start a re-org project now!

Request for Transit Service at Villa St. Gabriel Villa

Presented To:	Community and Emergency Services Committee
Meeting Date:	March 17, 2025
Type:	Correspondence for Information Only
Prepared by:	Laura Gilbert Transit
Recommended by:	General Manager of Community Development

Report Summary

This report provides information reagrding options and estimated costs to provide transit services to Villa St. Gabriel Villa to support staff, residents, and visitors attending the facility.

Relationship to the Strategic Plan, Health Impact Assessment and Climate Action Plans

This report describes work related to the Transit Action Plan and continued efforts to expand ridership through innovative and responsive system improvements, in alignment with the Asset Management and Service Excellence objective, and goal 1.5 “Demonstrate Innovation and Cost-Effective Service Delivery”.

Within the Low-Carbon Transportation Strategy Sector of the Community Energy & Emissions Plan, this report aligns with Goal 7, to enhance transit services to enhance transit mode share to 25% by 2050.

Financial Implications

There are no financial implications associated with this report.

Background

During the September 9, 2024, Community Services Committee meeting, through Resolution CES2024-31-A1, Staff were directed to prepare a report that includes estimated costs and constraints, and any studies or trials which have been done in the past regarding transit services travelling to Villa St. Gabriel Villa (VSGV) for Council’s consideration. Specific analysis and costing for the following options was requested:

i) an increase or adjustment to the GOVA Zone service which aligns with the needs of VSGV,
ii) the addition of winter maintenance on the lit, paved path from Place Bonaventure Mall to VSGV to provide year-round pedestrian access, and
iii) the addition of winter maintenance on the paved path from the end of Pinellas/Keith Avenue to VSGV to provide year-round pedestrian access.

On March 05, 2015, through Resolution FA2015-13, staff were directed to provide a one (1) year trial of transit service to VSGV. Via the Azilda-Chelmsford transit route (at that time), transit service was provided to the VSGV three times a day, seven days a week. This one-year trial was approved by Council and funded by the Provincial Gas Tax.

The results of the trial concluded that service to Villa St. Gabriel Villa did not generate significant ridership and the recovery ratio was consistently below 1% each month. As GOVA Zone TransCab service was available along Municipal Road 15 as a cost effective and efficient way of providing transit service to low density areas within City limits, on-site transit service to VSGV was discontinued as of September 2, 2016.

Transit Planning

The GOVA Transit system is built on a “pulse”, where all route departures are scheduled to depart at the same time, and all route arrivals are scheduled to arrive at the same time. These route connections are integral to ensuring customers’ ability to travel throughout the transit system conveniently and seamlessly. Any minor deviation to a route pattern requires additional route running time and layover/recovery time to ensure route connectivity within the system network pulse. When increasing a route running time, the additional time must be added to every trip per service day. Any deviations to route running time must align with work rules in the Collective Bargaining Agreement (CBA) and service level budget while ensuring transit system reliability, transit best practices, and passenger satisfaction.

As outlined within the Transit Action Plan, the overarching best practice within the transit industry is to best match service to ridership demand through the provision of a family of services.

Existing Transit Service to Villa St. Gabriel Villa

GOVA Conventional Service

GOVA Transit operates 40-foot buses on fixed route schedules in higher population areas throughout the Greater Sudbury area. Route 104 Azilda-Chelmsford runs every 45 minutes during peak periods from the Downtown Transit Hub to the Chelmsford Mobility Hub, at Place Bonaventure Mall. The walking distance from the Chelmsford Mobility Hub, via Municipal Road 15, to VSGV is approximately 550 meters (7-10 minutes).

The Transit Action Plan confirms that individuals who are within 450 metres of a bus stop are within the transit service area. VSGV is situated approximately 100 metres outside of the conventional transit service area, but within the GOVA Zone C TransCab service area.

In 2024, Route 104 had 194,605 riders, averaging 22 rides per revenue hour. The total route cost was approximately $1.37 million, with a cost/recovery rate of 25%. Route 104 is on the higher end of cost/recovery when compared to the average GOVA commuter route cost/recovery rate of 22%, and the overall network cost/recovery rate of 38%.

GOVA Zone (TransCab Service)

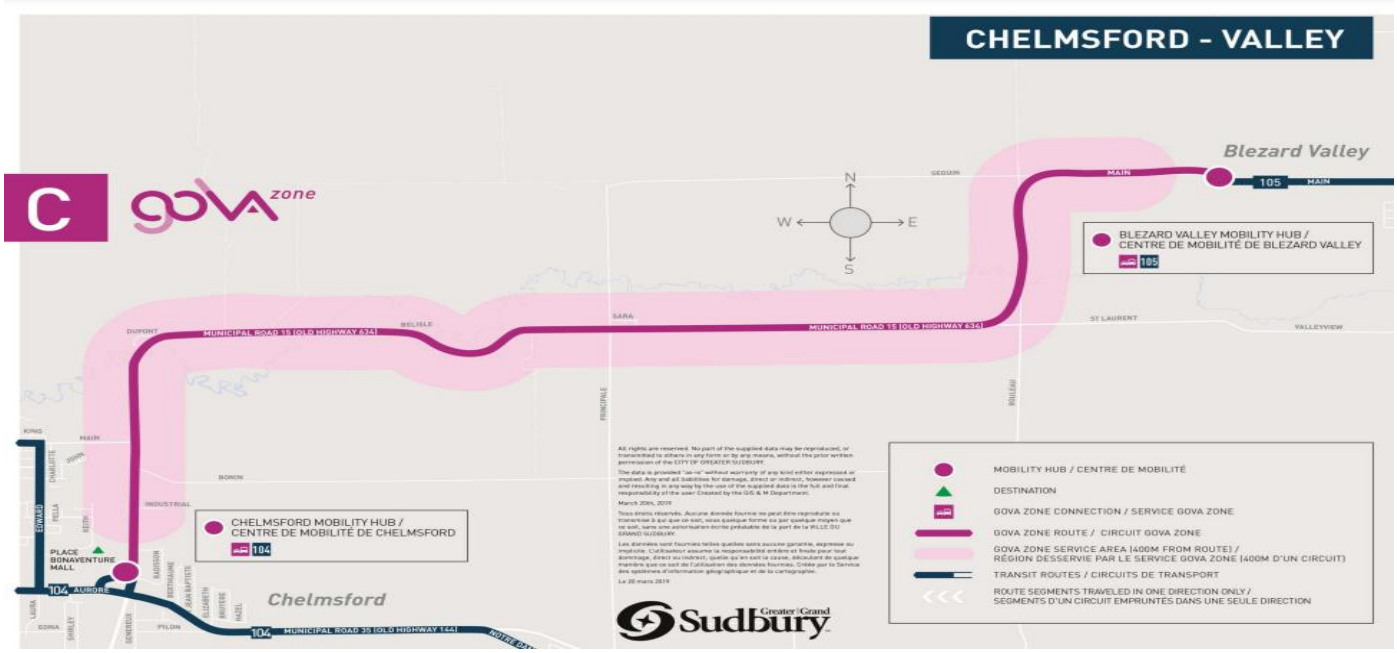
GOVA Zone (TransCab) supplements Conventional Transit Service by providing door-to-door, shared service, in nine lower population density, and outlying communities. Typically, services are within areas of the city that are not easily accessible by GOVA Transit conventional buses and offer connection to fixed conventional transit routes at key points.

GOVA Zone C (Chelmsford-Valley) services via Municipal Road 15, from Place Bonaventure Chelmsford Mobility Hub to the Blezard Valley Community Hub, within a 400-metre distance from the road, identified as the service area. GOVA Zone C provides regular service to VSGV, through Route 104 Azilda-Chelmsford connection times; 11 times per weekday, and 7 times per weekend, aligning with ridership demand and other

GOVA Zone areas.

The 2024 total cost of GOVA Zone C TransCab service was $14,965, which was 92% of budget, with the average kilometres travelled per trip being 9.21 kilometres. The contracted rate per kilometre is $3.90.

Between 2016 and May 11, 2024, there was no GOVA Zone ridership logged to/from VSGV. Between May 11, 2024, and January 17, 2025, GOVA Zone C TransCab service has been utilized for a total of 39 trips for 43 passengers; averaging 0.18 riders a day.



Route 104 Pattern Change Analysis

Route 104 Transit Service via Pinellas/Keith- Added Winter Maintenance

To service closer to VSGV with use of a walking path and adjusted transit service through Route 104 via Keith/Pinellas, Route 104 would be rerouted from Edward Avenue to Pinellas Road and Keith Avenue. This change would remove service from the Chelmsford Community Centre and Arena. Further, two bus stops, including a bus shelter, would be relocated to Pinellas and Keith, affecting an average of 12 riders per day. The running time for Route 104 would increase by 15 minutes during off-peak times increasing its overall route running time to 1 hour and 30 minutes. The approximate cost of this service increase is $144,944.00.

The paved path from the end of Pinellas Road/Keith Avenue is a City of Greater Sudbury unopened road allowance which abuts a parcel of land owned by Union Gas, running north/south, between Place Bonaventure Mall at Highway 144 and the train tracks near Main Street. The Union Gas owned property is an unmaintained gravel path through green space, with an agreement allowing the City of Greater Sudbury to use it as a pedestrian trail from May to October. In winter, the area is used and maintained for snowmobiling by the Sudbury Trail Plan Association. To add winter maintenance to this path to facilitate pedestrian access would negatively impact the snowmobile route which connects winter travel/tourism within the community. Further review and analysis would be required to allow year-round pedestrian use of this pathway.

Due to the removal of service to Chelmsford Community Centre and Arena and absent of feasible year-round access to the pathway to VSGV, including considerations for accessibility, this service change is not recommended.

Route 104 Transit Service direct to Villa St. Gabriel Villa

Where the implementation of the Transit Action Plan resulted in route realignment and on-site/private property transit services being removed in areas such as at Pioneer Manor and Meadowbrook Retirement Community. With consideration for proximity of transit and the age friendly population health strategy, on-site/private property service was maintained at Finlandia Village. This acknowledges the balance between delivering efficient fixed route services and supporting accessible transportation options.

To evaluate the feasibility of on-site service, Transit Training and Operations Staff met with Villa St. Gabriel Villa staff on November 13th, 2024. It was determined that, with sufficient access/egress from the roadway and on-site space to maneuver/turn around, using a GOVA conventional transit bus, service could safely be added on-site.

During the November 13th meeting, VSGV staff provided the following input:

- VSGV staffing ratios have significantly increased since 2016 with the addition of new positions like Behavioural Support workers.
- Conventional transit would support student and volunteer programs.
- Villa St. Gabriel Villa is one of three French Catholic long-term care homes in Ontario.
- GOVA Zone requires 90-minute advance notice for scheduled bus connections, which is unreliable for on-call staff.
- GOVA Zone connection times support three out of five shift times on weekdays and two out of five shift times on weekends. Outside these times, VSGV staff and residents walk to/from the Place Bonaventure Chelmsford Mobility Hub via Municipal Road 15, raising concerns about pedestrian safety, especially during winter months.
- VSGV staff would prefer on-site service through Route 104 as opposed to service via Keith/Pinellas or an increase in GOVA Zone service.

A staff survey conducted between June 10th and June 20th, 2024, revealed:

- 46 team members take the bus five or more times weekly.
- An additional 16 use transit three to four times a week.
- 85% of all surveyed (96 respondents) would take the bus if VSGV had an on-site stop.

To support service to VSGV via Route 104 using Municipal Road 15, the existing fixed route would require rerouting from Municipal Road 35 to Municipal Road 15, on outbound trips. The running time for Route 104 would increase by 15 minutes during off-peak times, increasing its overall route running time to 1 hour 30 minutes. The approximate annual cost of this service level change would be $144,944.00.

Financial Implications

Route 104 Transit Service direct to Villa St. Gabriel Villa

The cost to provide this service on site to Villa St-Gabriel Villa based on the current Route 104 schedule would be $144,944. This option requires bus stop infrastructure and the addition of one full time employee.

Weekday + Weekend + Stat:	**Cost per Year ($)**	**Annual Hours**
To add 3 trips	$ 42,042	273
To add 6 trips	$ 84,084	546
To add all trips	$ 144,944	941

Increase GOVA Zone C (TransCab Service)

The annual cost increase to provide this service, based on 2024 GOVA Zone C ridership and future ridership growth projections, would be approximately $6,800. The cost of increasing GOVA Zone trips can fluctuate lower/higher depending on the amount of kilometres travelled and amount of passenger trips, as this increase would benefit the entire GOVA Zone C service area. Based on historical costs and under-utilized areas across GOVA Zone locations throughout the system, this could be accommodated within the existing service model.

This option has no additional cost related to infrastructure or employee salary and benefits. Through CDD21-49, service level increases are permitted upon written notice to the Service Provider in accordance with the rates or costs as outlined within the contract.

Weekday + Weekend + Stat:	**Cost per Year ($)**
To add 1 trip	$ 850
To add 2 trips	$ 1,700
To add 3 trips	$ 2,550
To add 4 trips	$ 3,400
To add 8 trips (4 weekday/4 weekend)	$ 6,800

Summary

There are options to proceed whether by increasing GOVA conventional fixed route service level increase to provide on-site service, or GOVA Zone services with an estimated cost of $6,800, subject to ridership. Where an increase in GOVA Zone could be done within existing budget, it is noted, through consultation that VSGV did not prefer this option. Should Council elect to direct staff to add VSGV to a fixed Route 104, a business can be brought forward for 2026-2027 Budget.

Resources Cited

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Go Snowmobiling Ontario, Interactive Trail Guide, https://ofsc.evtrails.com/#

Potential Program for Free Access to Transit Services for Students

Presented To:	Community and Emergency Services Committee
Meeting Date:	March 17, 2025
Type:	Correspondence for Information Only
Prepared by:	Danielle Derochie Transit
Recommended by:	General Manager of Community Development

Report Summary

This report provides information on the feasibility and financial implications of providing free transit access to high school students by analyzing similar programs in other municipalities.

Relationship to the Strategic Plan, Health Impact Assessment and Climate Action Plans

This report describes work related to the Transit Action Plan and continued efforts to expand ridership through innovative and responsive system improvements, in alignment with the Asset Management and Service Excellence objective, and goal 1.5 “Demonstrate Innovation and Cost-Effective Service Delivery”.

Financial Implications

There are no financial implications associated with this report.

Background

During the August 12, 2024, Community and Emergency Services meeting, through resolution CESC2024-25, Staff were directed to consult with the municipality of Kingston and other municipalities with similar free secondary student transit programs. Staff were directed to analyze service models and partnerships with local school boards for delivering free transit services to high school students. This report provides the requested information regarding the experiences of other transit services.

Free Transit for High School Student Programs

Consultations with other municipalities revealed varied outcomes for youth transit ridership programs. Common issues include increased service costs, capacity problems, increased on-board incidents adversely affecting regular transit users; apart from service level costs, programs have reportedly been linked to higher absenteeism rates due to students using transit to leave school during the day.

Kingston Transit, High School Pass Program

Established in 2014, Kingston's High School Pass Program provides free transit to about 10,000 high school students, including homeschooled students. The program aims to offer mobility for activities like co-op placements, jobs, and extracurriculars. Students use smart cards to access transit, with a $3.00 fee for lost or stolen cards. The program is mainly funded by the City of Kingston, with two (2) out of four (4) school boards collectively contributing a total of $60,000 annually, since 2014. Despite fare increases, school board contributions have not increased. The program has successfully increased youth ridership, accounting for 5.4% of overall ridership in 2024. Kingston Transit has confirmed that a full cost accounting of the program has not been undertaken.

Kingston also has a Field Trip Program, offering unlimited passes for school field trips during school hours. In 2023-2024, 220 passes were issued, with two school boards contributing $7,500. The funding model has since changed to a $40 annual fee per participating school. Schools must coordinate trips with Kingston Transit, limiting trips to 30 students to manage capacity.

London Transit Commission, Secondary School Student Transit Pass Pilot Program

In Spring 2024, London City Council directed a two-year pilot project with the Thames Valley District School Board (TVDSB) to provide annual transit passes to 450 students at Clarke Road Secondary School, in grades 9 and 10, starting in September of 2024.

LTC staff raised concerns about the high cost ($900,000), lack of funding beyond the pilot, undefined success measures, and the negative impacts on existing riders related to increased ridership on crowded routes.

The cost for the two-year pilot program is estimated to be approximately $900,000. This is based on the City of London's reimbursement to the LTC, the cost of monthly student passes for each of the 450 participants and costs associated with the administration of the program. Included in the overall cost for the pilot is a programming cost of $27,487. This will be required to make the necessary adjustments to fare tables within the LTC's existing smart card software to allow for distinct tracking of ridership associated with the pilot program. The City of London will be responsible for the full cost of the pilot program as there is no subsidy funding being contributed by other levels of government or the TVDSC to support the costs of the program.

TVDSC requested provincial funding, but it has not been approved. The pilot is unlikely to increase ridership enough to secure additional funding allocation from the Provincial Gas Tax Program. Revenue losses may occur if current paying customers cannot rely on transit during peak times.

LTC reviewed routes near Clarke Road Secondary School, finding them already over capacity (150 per cent to 200 per cent) during peak times. The pilot may add pressure on weekends as well. Overcrowding issues cannot be addressed until the following year, based on previous year's data. LTC is focusing on current ridership and capacity issues by increasing routes, frequency and reliability. Concerns about behaviour and fare compliance have also been noted, similar to issues with free transit for children under 12.

Ongoing discussions aim to clarify roles and address issues. A report to the LTC Board is expected in February to decide if the pilot will proceed in September 2025.

Barrie Transit, Barrie Transit and Simcoe County District School Board High School Pilot Program

In Fall 2024, Barrie Transit, in partnership with the Simcoe County District School Board, launched a pilot project providing free transit passes to 80 students in a specified area via the City's Mobile Transit App. The small pilot area was chosen to minimize financial impacts and capacity issues, using existing service capacity. The City of Barrie will cover the full cost, with no subsidies from higher government levels or the Simcoe Country District School Board.

The program aims to foster independence and mobility for jobs and extracurricular activities, and to encourage public transit use, instead of school board transportation. Long-term, it hopes school boards will consider purchasing student transit passes. City and school board staff provided educational materials and travel training sessions in fall 2024.

A staff report to City Council in Spring 2025 will update on the pilot program using data from the Mobile Transit App. A second report will follow, after the 2024-2025 school year.

Guelph Transit, Transit for High School Students Pilot Program

Starting February 1, 2025, Guelph Transit offers free transit to youths aged 13-17 every weekday after 5:00 p.m. and on weekends and holidays until December 31, 2025. This avoids conflicts with school bus service. The programs annual cost is $134,000, including $92,000 in revenue loss and $42,000 in staffing costs. It is funded by the Tax Operating Contingency Reserve, with no subsidies from higher government levels or school boards. Staff will monitor the program and seek sponsorships to offset costs.

Concerns include increased ridership on already crowded buses, potentially requiring additional buses. A recommendation on making the program permanent will be presented before Guelph's 2026 budget process.

GOVA Transit Supporting Youth Ridership

Expanding and encouraging ridership among youth has been shown to foster continued use of public transit and improve rider retention. In addition to the reduced fees for fares and passes for students and youth riding on the conventional transit system, GOVA Transit currently has programs and initiatives in place to support and encourage student ridership on the conventional system.

Discount Passes

GOVA Transit offers discounted 6 Ride and 31 Day Passes for students and youth to increase ridership. Students and youth pay $15.00 for 6 Ride Cards (29% discount) compared to $20.00 for adults. Monthly passes for students are $85.75 (13% discount), and youth $56.00 (57% discount) compared to the $100.50 for adults. Students must present a valid student card and proof of enrollment to obtain a Student Transit Photo ID, which is valid for four years. The Youth Transit Photo IDs are available for children aged 5-12. Both IDs can be purchased at the Downtown Transit Hub Kiosk.

Travel Training

In 2024, the City of Greater Sudbury in collaboration with the Sudbury Catholic District School Board's Student Senate, launched a GOVA Awareness Campaign to promote public transportation and educate students on navigating the GOVA Transit System. GOVA Transit ambassadors visited St. Benedict Catholic Secondary School, Marymount Academy and Bishop Alexander Carter Catholic Secondary School with a GOVA Transit conventional bus to provide travel training to students in grades 7 and 8. The training covered routes and schedules, fares, and passes, bike rack usage, accessibility, safety and security and bus etiquette. Each student received a 1 Ride card through the Free Access to Transit Program, with a total of 225 ride cards distributed. The programs costs were covered by a designated Community Event Programs budget, which hosts $45,424 in 2025. Due to the program's success, more training sessions are planned for Spring 2025 in collaboration with the Sudbury Catholic District School Board's Student Senate.

Free Access to Transit Services Program

The GOVA Free Access to Transit Services Program offers free travel on the conventional system for community and school board groups of up to 35 people. Funded by the Provincial Gas Tax, this program allows schools to use transit for field trips, experiential learning opportunities and school related activities. Information and applications are available on the GOVA Transit's website. Approved applicants receive a letter for free group transportation. In 2024, 2,433 students benefited from this program, with 1,708 receiving

free rides, and 725 getting ride cards at a cost of $9,732. Operating off-peak times, the program helps students learn to use the transit system in a less crowded, relaxed environment.

GOVA Service and Additional Considerations

Before implementing free transit access for students, several factors must be considered, including service level cost, staff resources, impact on existing routes and ridership, potential reduction in yellow school bus services, and success metrics.

In 2024, GOVA Transit saw a ridership increase to 6.2 million, an 18.6% increase from 2023, leading to 11,000 additional service hours at a net cost of $722,139. Ridership for 31-day Student Pass was 2,272,191 in 2024; an increase of 19% year over year. Should Council direct staff to implement a free access to transit program for high school students, concerns exist that the overcrowdings and strain on the system will negatively affect paying riders and require more service hours.

Predicting the program's full impact is challenging due to unknown factors such as student participation and travel patterns. Routes 104 (Azilda/Chelmsford), 105 (Valley), and 11 (Donovan) may be most affected by increased student use.

Additionally, fare evasion (inappropriate use of student passes) and negative on-board behaviors could rise. Tracking program success is difficult without distinguishing high school from post-secondary student ridership, necessitating fare structure updates.

Financial Considerations

Implementing a free transit program for high school students involves significant service level costs and administrative responsibilities. Continued discussions with local school boards are needed to determine their potential support. Without reducing yellow school bus services, the municipality risks duplicating transportation costs currently funded by the province.

Most municipalities offering similar programs have increased their budget for transit services or funded a trial from reserve or other one-time funding sources. They receive minimal school board or government contributions.

An enhanced service level would require a budget increase or additional outside funding. A pilot project would allow staff to gather key data related to high school student transit usage to be able to determine the full financial impact of such program. Assuming 15% of eligible high school students made use of a free monthly transit pass, the estimated net cost would be $1,120,581.

Summary

Should Council wish to further explore a free transit program for high school students, staff will return with a report describing the steps required for a pilot project to determine the viability and impact of a free transit program for high school students.

Resources Cited

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Guelph Council Memo – Response to Mayoral Direction 2024-B2; Transit for High School Students: https://pub-guelph.escribemeetings.com/filestream.ashx?DocumentId=53477&utm_source=guelphtoday.com&utm_campaign=guelphtoday.com%3A%20outbound&utm_medium=referral

GOVA Transit Free Access to Transit Services: https://www.greatersudbury.ca/live/transit/fares-and-passes/

GOVA Awareness Campaign: https://www.sudburycatholicschools.ca/blog/2024/06/14/scdsb-student-senate-promotes-public-transit-with-gova-awareness-campaign/