Statement

26 June 2025

Project	City of Courtenay - Zero-Emission Vehicles Fleet Transition Plan	**From**	Rippan Bhattacharjee
Subject	Confirmation of BC Hydro EV Ready Plan	**Tel**	604 348 7653
Date/Time	26 June 2025	**Project no.**	12639105

Yes, I understand and have met the EV Ready Fleet Plan requirements for the Green Fleet Strategic Plan for the City of Courtenay. This confirmation covers both the Final Report and the EV Ready workbook.

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City of Courtenay

Zero-Emission Vehicles Fleet Transition Plan



GHD

Executive Summary

The Zero Emission Vehicle Fleet Transition Plan is a strategic roadmap to guide electrification of the City of Courtenay fleet, including charging infrastructure. The City of Courtenay fleet includes approximately 100 vehicles, comprised of passenger vehicles, light-duty and heavy-duty operations vehicles and equipment, and Fire Department vehicles.

In 2024, City of Courtenay fleet vehicles consumed a total of 170,000 L of fuel, representing 35% of greenhouse gas emissions (GHG) from corporate operations. The province of BC legislated targets to reduce transportation sector GHG emissions by 27-32% by 2030, relative to a 2007 baseline. The City of Courtenay Official Community Plan (OCP) commits to reducing greenhouse gas (GHG) emissions by 45% by 2030, and 95% by 2050, relative to a 2016 baseline. As this is a target which requires more aggressive action than the provincial target, the fleet fuel volumes that correspond with these GHG reduction targets were calculated and the City retained a consultant, GHD Limited, to prepare a strategic plan to meet these fleet fuel reduction targets.

GHD assessed the fleet and developed a transition plan for fleet units to achieve GHG emission reduction targets. Expansion of the fleet was beyond the scope of this project, and it was noted that additional fleet vehicles must be zero emission for the City to achieve the GHG reduction targets. GHD compiled data on each unit, including: vehicle age, operational function, fuel consumed in 2024, kilometers driven, and parked location. GHD engaged with staff through interviews and a survey to understand the function of the units and operational concerns related to electrification. Three different scenarios were explored, and the capital expenditures (CAPEX), operating expenses (OPEX), and resulting fuel consumption of each were modelled over time.

- Scenario 1: business as usual
- Scenario 2: meeting provincial targets
- Scenario 3: meeting OCP targets

From the analysis it was determined that Scenario 3 offered the best value to the City, meeting both the City of Courtenay OCP fleet fuel volume targets and the provincial GHG emission reduction targets. The electrical capacity at each fleet parking location was assessed to support the installation of charging infrastructure required to power the fleet. The number of chargers and the timing of charger installation was determined and aligned with the proposed vehicle transition schedule for Scenario 3. The capital cost of vehicle purchases, capital cost of charging infrastructure and fleet fuel reductions associated with scenario 3 are illustrated in Figure 1.

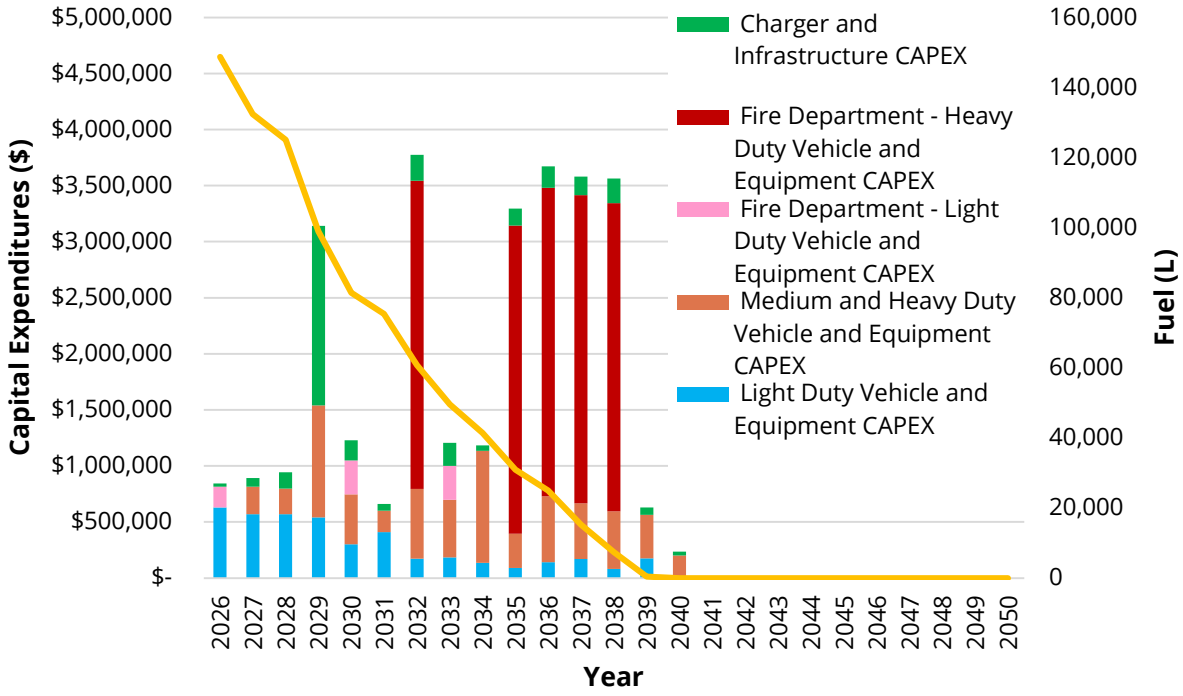


Figure 1 Scenario 3 CAPEX, OPEX, and fuel reductions

A vehicle replacement schedule (Appendix D) and charging and infrastructure schedule (Appendix E) was prepared for scenario 3. The vehicle replacement schedule notes the recommended transition year and transition costs of each fleet unit. A currently available, or soon to be available electric vehicle was selected to represent each vehicle class and estimate the purchase price. The vehicle selected for estimating purposes was intended as a proxy. At the time of purchase, the specific vehicle makes and model selected for the fleet must suit City Operations, and offer the best value to the City.

The implementation of the ZEV Fleet Transition Plan involves:

1. Allocating budget to fund electric vehicle purchases in the 5-year financial plan
2. Planning capital projects required to build charging infrastructure at fleet parking locations.
   a. Including required capital projects in the 5-year financial plan.
3. Applying for external funding to further support the electrification of the fleet
4. Taking an adaptive approach to manage risk and uncertainty.
5. Updating the vehicles replacement schedule and charging and infrastructure schedule as fleet transition progresses.

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1. Introduction

In 2007, the City of Courtenay signed the BC Climate Action Charter, initiating a community-wide commitment to foster practices that mitigate the effects of climate change. The City's 2022 Official Community Plan (OCP) identifies Climate Action as a cardinal direction for their community towards their vision of a net-zero community by 2050. To achieve this, the City of Courtenay established corporate greenhouse gas (GHG) emission reduction targets in the Official Community Plan relative to 2016 baseline emissions, with goals of a 45% reduction of emissions by 2030, an 80% reduction of emissions by 2040, and a 95% reduction of emissions by 2050. The GHG reduction targets in the OCP exceed the targets outlined in the provincial Climate Change Accountability Act. The provincial GHG emission reduction targets are defined as a 27%-32% reduction of emissions by 2030, a 60% reduction of emissions by 2040, and an 80% reduction of emissions by 2050, relative to 2007 levels.

The fuel consumption of the City's fleet increased by 20,000 L between 2016 and 2024, as vehicles were added to the fleet to provide service to a growing community. In 2024, the City's vehicle fleet contributed to approximately 35% of total corporate emissions, with 170,000 litres of fuel consumed. To help meet the upcoming 2030, 2040, and 2050 emission reduction targets, the City committed to reduce corporate emissions through the adoption of zero-emission vehicles (ZEVs) in their municipal fleet.

Fleet fuel consumption is directly related to greenhouse gas emissions. To meet the emission reduction targets, the City has outlined fleet fuel consumption targets for each target year, as presented in Table 1.

Table 1 City of Courtenay greenhouse gas emission reduction targets and associated fleet fuel volume targets

Year	City of Courtenay OCP Targets		Provincial GHG Targets	
	OCP GHG Reduction Target	Maximum Fleet Fuel Volume	Provincial GHG Reduction Target	Maximum Fleet Fuel Volume
2030	45% below 2016 levels	83,500 L	27-32% below 2007 levels	105,400 L
2040	80% below 2016 levels	30,4000 L	60% below 2007 levels	64,000 L
2050	Zero fleet fuel consumption	0 L	80% below 2007 levels	31,000 L

The City has already demonstrated initiative towards meeting these targets through the acquisition of electric vehicles (EVs) and the investment in charging infrastructure throughout the City. In 2023, the City purchased 1 hybrid SUV for use in the Development Services Department. As of 2024, the City installed 5 dual-head EV charging stations at the Operations Yard for use in future fleet charging operations. In 2025, 8 electric pick-up trucks and 1 electric SUV were put into service in the Operations Department.

1.1 Purpose

The Zero Emission Vehicle Fleet Transition Plan presents a strategic roadmap to guide electrification of fleet vehicles, including charging infrastructure. This report analyses the existing fleet, and scenarios to electrify the fleet. This plan presents a path forward for the city to transition to electric vehicles and reduce fuel consumption to meet the GHG reduction targets outlined by the Official Community Plan, and the province.

1.2 Approach

An analysis was conducted on the City of Courtenay's fleet. The fleet includes passenger vehicles, light-duty and heavy-duty operations vehicles and equipment, and Fire Department vehicles. The process began with an assessment of the existing fleet data to determine the operational requirements and the City's readiness for transitioning to zero- or low-emission vehicles.

As part of the analysis, engagement sessions were held with City of Courtenay staff to gather essential inputs, constraints, and preferences from the City for developing a feasibility model and providing financial, operational, and technological recommendations.

As part of the engagement, parameters for the transition model were established. These models are referred to as scenarios, and are summarized below:

- A "business-as-usual" reference scenario (Scenario 1) in which existing operations persist, and the City continues to purchase the same vehicle types (internal combustion engine vehicles).
- A "meeting provincial targets" scenario (Scenario 2) in which the fleet is replaced with electric and hybrid vehicles (depending on operations) at a rate that meets the provincial emission reduction targets of 27%-32% by 2030, 60% by 2040, and 80% by 2050. Applied to fleet fuel volume, this targets fleet fuel volumes of 105,400 L by 2030, 62,000 L by 2040, and 31,000 L by 2050.
- A "meeting OCP targets" scenario (Scenario 3) in which the fleet is replaced with electric and hybrid vehicles (depending on operations) at a rate that meets the fleet fuel volume targets of 83,500 L by 2030, 30,400 L by 2040, and 0 L by 2050.

The goal of constructing these scenarios was to offer the City a comprehensive comparison of different decarbonization pathways, ensuring a clear and equitable evaluation. The objective was to identify the most suitable pathway, and understand the transition's implications to budget, GHG reductions, capital infrastructure investment, and operational considerations.

This report serves as an initial guide for the City of Courtenay to begin the fleet transition and provide the next steps in maintaining consistent fleet operations amidst the change.

2. Existing Fleet

The study was initiated in June 2024. Following a kick-off meeting with GHD and the City's project team, the relevant data was collected. The data was used to assess the existing condition of the City's fleet, determine the replacement priority of the fleet, and develop transition scenarios to model and assess the feasibility of fleet electrification in the City's fleet.

2.1 Data Collection

Data pertaining to the City's fleet, budgeting, asset management, and existing policies was collected for this analysis. Fleet data included vehicle IDs, age, type, parking location, operational use, fuel type, odometer/hour meter readings, fuel usage, and maintenance costs. Some data was unable to be retrieved, and assumptions were made. These assumptions are noted in Appendix A. Data was also collected during a site visit completed on July 24th, 2024, to the four primary fleet parking locations. The purpose of the site visits was to assess the layout of the fleet locations, determine the location of the existing electrical main and panel, understand the existing and remaining electrical capacity at each site, and plan the future layout of electric vehicle charging equipment and infrastructure. For more information on the site visit and electrical infrastructure assessment, refer to Appendix B.

2.2 Existing Fleet Summary

In-scope fleet units were identified, and 100 fleet assets were assessed. To be considered in-scope for the assessment, the fleet asset must be part of the fleet (on a long-term planning basis) and consume fuel independently. This excluded fleet units such as electric vehicles, electric equipment, trailers, attachments / accessories, reserve vehicles, and rental vehicles. The fleet is stored primarily at four sites in Courtenay – City Hall, the Courtenay Fire Department, the Operations Yard, and the Lewis Centre.

Fleet unit classifications include Equipment, Light Duty, Medium Duty, and Heavy Duty. Note that Heavy Duty includes heavy-duty equipment. Under these classifications, the fleet is further classified under categories. A summary of the in-scope fleet is provided in Table 2.

Table 2 Summary of in-scope fleet

Classification	Fleet Category	Count	Average age (years)	Average fuel efficiency (L/100km or L/2 Hr*)
Light Duty	Fire Department Utility Vehicle	6	6	19.22
	Pickup ½ ton	7	10	23.08
	Pickup ¾ ton	14	9	28.08
	Pickup mid-size	3	12	18.01
	SUV	9	9	10.73
	Van - Cargo large	2	13	23.98
	Van - Cargo small	2	9	15.34
Total / *Average* (by classification)		43	*10*	*19.78*

Classification	Fleet Category	Count	Average age (years)	Average fuel efficiency (L/100km or L/2 Hr*)
Medium Duty	Bus	1	4	26.22
	Pickup 1 ton	4	10	30.75
	Truck - Arborist	1	7	32.39
	Truck - Bucket	1	7	44.65
	Truck - Flat Deck	1	9	44.19
	Truck - Garbage small	1	13	32.17
	Truck - Service	3	11	41.67
	Truck - Small Dump	2	8	41.99
Total / *Average* (by classification)		**14**	***9***	***36.75***
Heavy Duty	Backhoe	2	10	15.29*
	Backhoe/Loader	1	2	12.46*
	Fire Truck	5	12	65.66
	Grader	1	30	26.04*
	Loader	2	29	17.35*
	Loader/Brush Cutter	1	8	23.34*
	Street Sweeper	1	4	147.66
	Truck - Dump Single	6	14	51.95
	Truck - Dump Tandem	1	8	62.02
	Truck - Flat Deck	2	15	39.98
	Vacuum Truck	1	5	143.05
Total / *Average* (by classification)		**25**	**12**	**85.05, 18.90***
Equipment	Chipper	1	7	12.22*
	Compactor	1	6	3.00*
	Foamstream System	1	8	7.15*
	Forklift	1	21	5.82*
	Mower - large	3	7	6.34*
	Mower - medium	3	17	5.79*
	Sandpro	1	7	5.78*
	Skidsteer	3	4	4.59*

Table 3 Summary of in-scope fleet

Classification	Fleet Category	Count	Average age (years)
Tandem Roller	1	8	5.32*
Tractor	4	14	13.29*
Utility Vehicle	1	7	4.00*
Total / *Average* (by classification)		**20**	***10***	***6.66****

2.2.1 Fleet Operations

The City's municipal fleet purchases are guided by a 5-year Financial Plan with approved annual budgets to replace fleet vehicles. The annual budget for fleet vehicle purchases from 2024 to 2029 is summarized in Table 4 below.

Table 4 2024-2029 5-year Financial Plan for municipal fleet purchases

Municipal Fleet	2024	2025	2026	2027	2028	2029
Heavy Vehicles/Equipment	$300,000	$690,000	$375,000	$375,000	$400,000	$400,000
Light Vehicles/Equipment	$300,000	$485,000	$400,000	$400,000	$500,000	$500,000
Fleet Charging Stations		$75,000	--	--	--	--
Fire Department – Light Vehicles		$100,000		--	--	--
Fire Department – Fire Trucks			$2,000,000	$1,200,000	--	--

Fleet vehicles are replaced based on budget and need, which means many vehicles are operated beyond their service life. Additional vehicles and equipment are procured based off the needs of individual departments.

The Courtenay Fire Department is budgeted separately from the municipal fleet. The Fire Department plans replacements based on service life, and allocates annual budget based on the needs of the upcoming year.

The average age and best practice service life of each vehicle class in the municipal fleet is presented in Table 5. High priority and high-usage vehicles are often replaced prior to the end of their best practice service life, and the used vehicles are reallocated to a lower-usage duty for the remainder of their useful life.

Table 5 Service life by vehicle classification

Vehicle Category	Average Age (years)	Best Practice Service Life (years)
Light Duty (excluding fire department vehicles)	10	10
Medium Duty	9	12
Heavy Duty (excluding fire department vehicles)	12	8
Equipment	10	10
Fire Department Utility Vehicle	6	7
Fire Department Fire Truck	12	15; 25*

** 25-year best practice service life applicable for the tanker truck and rescue unit. 15-year service life applicable to all other fire truck units.*

2.2.2 Emergency Vehicles

Of the 100 in-scope vehicles in the fleet, 41 perform emergency operations duties. These include Light Duty, Medium Duty, Heavy Duty, and Equipment classifications. The emergency operations fleet performs critical duties, and may be deployed on short notice. Emergency operations include snow clearing, fire fighting, and any operation that requires the vehicles to be deployed on short notice for extended periods of time.

Emergency operations vehicles require unique considerations in fleet decarbonization plans. Currently, electric vehicle technology is limited in its typical range, charging requirements, and ability to perform consistently in adverse weather. The schedule for emergency operations vehicles is uncertain, and there are instances where they may not have time to get enough charge before the next call for service. To manage this risk, it is proposed that hybrid vehicles be used for emergency operations to guarantee their reliability for service.

2.2.3 Fleet Charging

As of 2025, the City operates a total of 9 electric vehicles across the fleet, consisting of 8 electric pickup trucks and 1 electric SUV. These vehicles are charged at their respective fleet locations through dedicated fleet chargers or public chargers. There are a total of 8 charging stations across the city that are operated by the City of Courtenay, with plans to install an additional charging station by August 2025.

2.2.3.1 Courtenay – City Hall

There are no electric fleet vehicles stored at City Hall. City Hall is equipped with one level-2 (overnight charging speed. See section 3.1.8 for more detail) EV charger that is available for public use. Additionally, there is 1 level-2 dual-head public EV charger located at 585 England Avenue, 450 metres

from City Hall. There are plans to install another level-2 dual-head public EV charger by August 2025 at 5th Street and England Avenue, 550 metres from City Hall.

2.2.3.2 Courtenay Fire Department

There are no electric fleet vehicles or existing EV chargers at the Courtenay Fire Department.

2.2.3.3 Operations Yard

There are 9 electric vehicles stored at the Operations Yard, consisting of 8 electric pickup trucks and 1 electric SUV. These vehicles service the Operational Services department. The Operations Yard is equipped with 5 level-2 dual-head chargers.

2.2.3.4 Lewis Centre

There are no electric fleet vehicles stored at Lewis Centre. Lewis Centre is equipped with 1 level-2 EV charger that is available for public use.

2.3 Engagement

To better understand each department's needs, identify gaps and opportunities in existing fleet operations, and assess the feasibility of integrating electric vehicles, two engagement methods were explored: fleet user interviews and an online survey. These methods gathered insights from approximately 35 unique respondents across various departments, including:

- Development Services
- Infrastructure and Environmental Engineering
- Operational Services
- Corporate Services
- Financial Services
- Recreation, Culture and Community Services
- Fire Department

2.3.1 Fleet User Interviews

Fleet user interviews were virtually conducted on August 7th, 2024, over Microsoft Teams. Representatives from the Operational Services, Corporate Services, and Fire Department attended and answered questions pertaining to their fleet usage, operations, and fleet requirements. The interviews were approximately 15 minutes in length. Due to only 3 departments being available for the virtual interview session, a supplemental survey was distributed to all City employees who use fleet vehicles. The results of the survey are discussed in section 2.3.5.

The following types of questions were posed to each group during the fleet user interview session, and discussed further:

- *What is the day-to-day schedule of the fleet vehicles? What time are they signed out, and what time do they return?*
- *How often are the fleet vehicles used?*
- *What is the furthest extent of travel for the fleet?*
- *What are the duties of the fleet vehicles?*
- *Is there opportunity to carpool for your job duties?*
- *Are there any needs for different sized vehicles in the fleet?*
- *What kind of accessory loads are placed on the fleet vehicles?*
- *What do you think would be a challenge in the transition to EVs in this fleet?*

2.3.2 Operational Services

Operational Services are responsible for procuring, maintaining and operating the majority of the City's fleet, across all vehicle types, with the exception of vehicles used by the Fire Department. Three employees in the Parks department were interviewed.

The Parks employees use fleet vehicles daily. Their job duties require the use of pickup trucks (mostly Ford F250s and two Ford F550s) to transport material and tow large equipment. As a result, these vehicles come equipped with electric over hydraulic (EOH) dumping mechanisms and other auxiliary power requirements such as power tailgates.

The fleet is stored at the Operations Yard. The use of Parks fleet typically will begin at 7:30am and end at 4pm on weekdays, with exceptions for special events, snow clearing or other emergencies. For example, specialty activities or events may require employees to start their duties at 5am. During snow events, Operational Services provides snow and ice control on City roads and parking lots along with sidewalks and walkways which are the responsibility of Parks Services. Historically, snow events have required all-day support with snow ploughing, and Parks has had instances of 3 consecutive all-days of continuous snow ploughing.

While these events may call for supplemental support from other Operational Services departments, the Parks department will limit the number of fleet vehicles to 6 trucks assigned for snow clearing, along with several pieces of equipment. The Parks department often focuses on prioritized sidewalks, cycling facilities, paved trails and cut-through walkways. Contractors who are currently leveraged for a portion of these routes use their own equipment.

With regards to converting the Parks fleet to electric trucks, a concern was raised regarding the size and towing capacity for electric trucks on the market. The Parks fleet requires sufficient truck bed space for plywood, materials, and other cargo, as well as liftgate compatibility.

It was concluded that the electrification of the Parks fleet can occur given that the alternative electric trucks maintain an equivalent size and towing capacity to the existing fleet. It is proposed that the transition of vehicles used for snow ploughing be converted over a number of years to verify the vehicles are reliable and capable of providing reliable service to the community.

Third party contractor fleet needs were not included in this assessment.

2.3.3 Corporate Services

The Manager of IT was interviewed. The IT Department uses 1 fleet vehicle. It is stored at the City's leased office at 315 10th Street, nearby Courtenay City Hall. In the case of converting the vehicle to an electric alternative, the vehicle would be stored at City Hall overnight to charge.

The IT Department uses the vehicle to travel between City sites to resolve IT issues. The vehicle is signed out from 8:30am to 4:30pm, Monday to Friday (excluding holidays). Staff members will use their personal vehicle for instances of after-hours or emergency support. In 2024, the IT vehicle travelled 1,635 km, which works out to an average of 6 km per working day, but the vehicle may travel up to 20 kilometres a day. The vehicle will transport electrical equipment such as monitors, computers, printer/plotters, and sometimes election machines. The current vehicle does not have sufficient space for the election machines, so alternative City fleet vehicles are required to transport the large equipment.

It was concluded that the IT Department fleet vehicle is a prime candidate for electrification and upsizing. The additional volume requirement for the IT department's fleet duties could be supported by a larger vehicle, like an electric cube van, which is available on the market. Further, the lack of charging infrastructure available at the leased office space could be resolved by storing the vehicle in the nearby City Hall lot, where additional fleet chargers may be installed.

2.3.4 Fire Department

The Deputy Fire Chief was interviewed. The Fire Department (FD) has a total of 7 large apparatus (fire trucks) and 6 utility vehicles. The utility vehicles are used for scheduled and unscheduled inspection, education, and emergencies. The FD averages approximately 850 calls per year, resulting in an average of 2-3 calls per day. The FD has 8 full-time staff that work from 8am to 4:30pm, Monday to Friday. There are additional crews and volunteers that work on weekends. The utility vehicles are taken home by deputy chiefs, and in cases of emergencies or off-hour calls, will respond from home. Five of the six utility vehicles are typically taken home by staff.

During fire responses, the FD will deploy large apparatus and utility vehicles. For example, a structure fire would require the deployment of 3-4 large apparatus and 2 utility vehicles. These responses require the vehicles to be idling to provide hazard lighting, power generation, or the water supply pump. These responses are typically 1-2 hours but could also last up to 8 hours. The FD operational guidelines require all vehicles and apparatus to always have a minimum fuel volume of 75%.

It was concluded that utility vehicles are the most feasible candidates for electrification. Their scheduled duties and sole ownership by the fire deputies allow them to be charged in off-times at the fire hall and charged at staff residences through a Level 1 charger provided with the vehicle. Otherwise, the deployment of a pilot program of an electric fire truck is an option to explore the

feasibility further. City of Vancouver and City of Victoria have recently purchased or begun operating Rosenbauer Fire Trucks. It is suggested to reach out directly to the Cities to better understand their experience with it so far and their recommendations for the City of Courtenay.

2.3.5 Fleet User Survey

To gain a representative analysis of all fleet users in all City departments, an online fleet user experience survey was distributed through Microsoft Forms. This survey was developed collaboratively with the City to include questions pertaining to fleet use, electric vehicle use, and electric bicycle (e-bike) use in the City. The survey was open for responses between August 8th, 2024, and October 25th, 2024. A total of 33 responses were received. All responses were anonymous, aside from information pertaining to the employee's department. The survey consisted of 23 questions, with the first question posing which City department the respondent works in. The detailed responses of the subsequent 22 questions are presented in Appendix C.

The survey indicated that the most common concern from staff regarding the transition to electric vehicles is range and charging requirements. Over half of the respondents (61%) noted that they would be comfortable operating an electric vehicle, while the remaining 39% responded that the opportunity for training or test driving the vehicles would increase their sense of comfort. Over half of the respondents (58%) support the use of electric vehicles to complete their job duties, while 6% do not. 35% of respondents noted neutrality in this transition.

In response to the questions related to the use of e-bikes, it was suggested that the use of electric bicycles is compatible for some job duties, but is generally incompatible with job duties that require staff to bring equipment. Currently, the City has a number of e-bikes in the fleet, and they are most commonly used by Operational and Corporate Services. Respondents who stated discomfort or incompatibility with the use of electric bicycles for job duties shared concerns regarding traffic safety, lack of training, insurance, and need for transporting equipment or materials.

2.3.6 Engagement Summary

Based on the engagement conducted, the City's fleet is generally compatible with the transition to electric vehicles, especially for departments such as Development Services, Infrastructure and Environmental Engineering, Financial Services, Corporate Services, and Recreation, Culture and Community Services, where there is support towards the transition, frequent use of vehicles, and fleet duties that align with the existing capacities of electric vehicles regarding range, payload, and size.

Table 6 summarizes the engagement of each department, based off the insights from the fleet user interviews and the responses from the fleet user survey.

Table 6 Summary of engagement for each department

Department	Fleet Engagement Summary
Development Services	This department uses fleet vehicles a few times a week to once every couple months and has access to the fleet most times at the City Hall location, with trips ranging from less than 2 hours to most of the day (6 hours). This department supports the use of electric vehicles to conduct their job duties.
Infrastructure and Environmental Engineering	This department uses one fleet vehicle a few times a week to a few times a month and has access to their fleet most times at the City Hall location, with trips completed in less than 2 hours. This department supports the use of electric vehicles to conduct their job duties.
Operational Services	This department uses fleet vehicles every single day has access to the fleet most times at the Operations Yard location, with most users requiring vehicles for most of the day (4 to 8 hours). Most of the users require the vehicles to power accessory loads. Most of the department supports the use of electric vehicles to conduct their job duties, noting that the fleet requires reliability in inclement weather and the ability to carry and tow large loads.
Financial Services	This department uses fleet vehicles a few times a month to once every couple of months and has access to the fleet all times at the Operations Yard location, with trips completed in less than 2 hours. This department supports the use of electric vehicles to conduct their job duties.
Corporate Services	This department has varying usage needs – with Bylaw and IT operating the vehicles every day, and other sectors using fleet vehicles a few times a month to a few times a year. Bylaw has access to the fleet most times at the City Hall location, with trips occurring for most of the day (6 hours). Each Bylaw staff member requires their own fleet vehicle to complete their job duties, as well as laptops in the vehicles. Human Resources requires a vehicle for short meetings or to complete shopping for an event. IT shares one vehicle between staff and transports electrical equipment, noting that the vehicle does not have sufficient storage space for all duties. This department supports the use of electric vehicles to conduct their job duties, noting that Bylaw has the most benefit to transitioning vehicles to electric as the vehicles are driven every single day for most of the day.
Recreation, Culture and Community Services	This department has varying usage needs – some users operate a vehicle daily, and some use the vehicles rarely (several times a year). The fleet is typically used for less than half a day, and users have access to a vehicle most of the time at Lewis Centre or City Hall. This department supports the use of electric vehicles to conduct their job duties.
Fire Department	This department uses fleet vehicles daily, with vehicles at the fire hall usually available to the staff. The vehicles are used throughout the day, with most vehicles parked at staff member's homes overnight. In emergency responses, the vehicles idle to provide hazard lighting, power generation, or water supply over a period of 2-8 hours. At any time, the fleet must have 75% fuel volume. This department supports the use of electric vehicles for duties such as fire prevention – but notes that they may be incompatible for emergency responses.

3. Scenario Analysis Methodology

To assess the feasibility of electrifying the City's fleet, zero-emission scenarios were modelled to understand the quantitative impacts of transitioning each existing conventional vehicle in the City's fleet to zero-emission. The results of the modelling analysis are presented in Section 4 of this report, and the recommendations based off the analysis are presented in Section 0.

The purpose of scenario assessment is to showcase the various pathways that a fleet transition could follow to achieve zero-emissions by calculating total financial and environmental outcomes based off static inputs at a point in time – including existing fleet composition, operations, fuel prices at the time of study, and the current vehicle market. The outcomes are meant to present the effects of different technologies on a fleet and should not be used as a final procurement plan of the fleet – it is a starting point to understand the total financial and environmental implications of a fleet transition. An initial implementation plan of the recommended transition plan is presented in Appendix D and further described in Section 6. As this analysis focused on the transition of the existing fleet, the effects of fleet expansion were not included.

Modelling the City's prospective zero-emission fleet followed the process below, expanded on in Appendix A:

1. **Define scenarios:** In collaboration with the City's project team, the goals and constraints for each scenario were developed.
2. **Select input parameters to use in scenarios:** In addition to provided fleet data, input parameters included expected replacement date based off best practice service life by vehicle classification, replacement vehicle specifications, and fuel prices (at the time of study).
3. **Analyze scenarios:** Each fleet unit in each scenario was analyzed using a Microsoft Excel macro to calculate the financial and environmental outcomes over the 2026 to 2050 study period. This analysis was run iteratively to most closely meet the constraints identified in each scenario by modifying the general vehicle replacement years in each scenario.
4. **Develop recommendations:** Supported by the results of the scenario analyses, recommendations were developed, and an initial implementation plan was populated with the recommended vehicle replacements by year.

3.1 Scenario Objectives and Input

Zero-emission scenarios were developed in collaboration with the City following an analysis of the City's existing fleet. These scenarios detail the constraints and goals of each model. A total of three scenarios were established: a 'business as usual' scenario (Scenario 1), a 'meeting provincial targets scenario (Scenario 2), and a 'meeting OCP targets' scenario (Scenario 3). The parameters of each scenario are outlined in Table 7.

Table 7 Scenario parameters

Scenario No.	Scenario Name	Parameters
1	Business-as-usual	– All vehicle replacements are equivalent to the existing vehicle type (gas for gas, diesel for diesel). – Serves as a baseline to compare other scenarios. – Fleet replacements prioritized by high vehicle usage and completion of best practice service life. – Fleet replacements guided by existing 5-year Financial Plan.
2	Meeting provincial targets	– Meet fleet fuel reduction goals based off provincial GHG emission reduction targets (105,400 L by 2030, 64,000 L by 2040, 31,000 L by 2050). – Transition vehicles to hybrid and electric for the entire fleet, where feasible. – Fleet replacements guided by best practice service life, and prioritized transition of high-polluting assets. – Examine financial options of leasing versus owning in electric vehicle procurement. – Proceed with recommendations for any required electrical upgrades at all fleet storage locations.
3	Meeting OCP targets	– Meet OCP-defined fleet fuel volume goals (83,500 L by 2030, 30,4000 L by 2040, 0 L by 2050). – Transition vehicles to hybrid and electric for the entire fleet, where feasible. – Fleet replacements guided by best practice service life, and prioritized transition of high-polluting assets. – Proceed with recommendations for any required electrical upgrades at all fleet storage locations.

3.1.1 Replacement Priority

Fleet units that had consumed the most fuel, surpassed their service life, and had an electric model capable of providing an equivalent level of service had the highest priority for replacement. These criteria had to be balanced as the highest fuel-consuming vehicles may be in their useful life, have emergency operations considerations, or not have a practical replacement on the market at the time of study. Fleet vehicles that consume the most fuel are Heavy Duty vehicles, including the Street Sweeper, Vacuum Truck, Truck – Dump Tandem, Pumper Truck (Fire Department), and Loader/Brush Cutter. Currently, there are few electric options available for these types of vehicles.

Light duty equipment (tractors and mowers) and light duty passenger vehicles (pickup trucks, SUVs and vans) were prioritized for electrification between 2026 and 2030. These electric vehicles are established in the market, with several available options that meet the City's operational needs. Medium-duty and heavy-duty vehicles were selected for electrification after 2030, because these

vehicles are still emerging on the market. It is expected that a wider range of options that may be more reliable will be available after 2030. GHD made estimations about the future value and operational costs of these vehicles once they are electrified, based on the market and innovation we are seeing now, to complete the analysis.

To meet the OCP fleet fuel volume targets in Scenario 3, replacement priorities in this scenario included the transition of the Street Sweeper and four Medium Duty pickup trucks prior to 2030 to meet the OCP 2030 fleet fuel volume target.

3.1.1.1 Service Lives

As this analysis aimed to compare the cost to transition to electric vehicles, no subsequent replacements after electrification were modelled.

It has been noted that the average service life of an electric vehicle's battery is between 10 to 20 years, or approximately 200,000 to 400,000 kilometres[1]. The average ICE motor is expected to last approximately the same distance. However, both of these ranges depends on the usage of the vehicle, charging and maintenance practices, and climate.

3.1.2 Emergency Vehicles

To address limitations of electric vehicle technology in emergency operations, hybrid vehicles were included in the analysis between 2026 and 2030 for the initial replacement of vehicles that perform emergency operation duties and have hybrid options available on the market. This included 8 Light Duty vehicles, classified as Pickup ½ ton, Pickup ¾ ton, and Fire Department Utility Vehicles (SUVs and pickup trucks). These vehicles are in the Operational Services and Fire Department fleets, servicing snow removal and firefighting operations. The 33 remaining emergency operations vehicles were transitioned to electric beginning in 2030.

The transition from internal combustion engine vehicle to hybrid supports the decrease of fleet fuel consumption while maintaining reliability. Following the initial replacement to hybrid, the vehicles were then converted to electric at the end of their best practice service life. This allows electric vehicle technology more time to evolve, ensuring that emergency operations vehicles are not hindered by limitations such as range and charging requirements.

In practice, the performance of the hybrid vehicles and the availability of suitable electric vehicles would be assessed prior to the full electrification of the emergency operations fleet.

3.1.3 Vehicle Selection

To simplify the modelling of vehicle replacements in the scenario analysis, all fleet categories were organized into 9 general vehicle categories based on classification. These representative vehicle categories and their corresponding fleet categories are presented in

Table 8 Representative vehicles categories in analysis

Fleet Category	Classification	Representative Vehicle Category in Analysis
Fire Department Utility Vehicle (SUV) **SUV**	Light Duty	**SUV**
Van – Cargo large **Van – Cargo small** **Bus** **Fire Department Utility Vehicle (Van)**	Light Duty	**Van**
Fire Department Utility Vehicle (Pickup) **Pickup ½ ton** **Pickup ¾ ton** **Pickup mid-size**	Light Duty	**Light Truck**
Pickup ¾ ton **Pickup 1 ton** **Truck - Arborist** **Truck - Bucket** **Truck - Flat Deck** **Truck - Garbage small** **Truck - Service** **Truck - Small Dump**	Medium Duty	**Medium Truck**
Truck – Dump Single **Truck – Dump Tandem** **Truck – Flat Deck**	Heavy Duty	**Heavy Truck**
Chipper **Compactor** **Foamstream System** **Forklift** **Mower - large** **Mower - medium** **Sandpro** **Skidsteer** **Tandem Roller** **Tractor** **Utility Vehicle**	Light Duty	**Light Equipment**
Backhoe **Backhoe/Loader** **Grader** **Loader** **Loader/Brush Cutter**	Heavy Duty	**Med/Heavy Equipment**
Street Sweeper **Vacuum Truck**	Heavy Duty	**Street Sweeper/Vacuum Truck**
Fire Truck	Heavy Duty	**Fire Truck**

3.1.3.1 Market Scan

Vehicle replacements were assigned to each representative vehicle category. The replacement vehicles included like-for-like replacements (internal combustion engine vehicles), electric vehicles, and in the case of the emergency operations fleet, hybrid vehicles.

Electric and hybrid vehicles were identified through research of all available vehicles on the market. These were validated through the Government of Canada's electric vehicle database. Refer to Section 3.1.4 for the replacement vehicles used in this analysis. For a detailed list of all electric vehicles considered, refer to Appendix A.

3.1.3.2 Alternative Fuels

Alternative fuels, such as renewable diesel, biodiesel, compressed natural gas (CNG), and hydrogen, can be used in cases where vehicle electrification is not feasible. This study focussed on vehicle electrification to reduce and eliminate the total litres of fuel consumed by the City of Courtenay fleet. Further, the modeling of alternative fuels in the City's fleet was not considered for reasons listed in Table 9.

Table 9 Exclusion of alternative fuels

Alternative fuel	Reason for exclusion from study
Biodiesel	– Carbon-based fuel source that releases CO_2 emissions – Only available for use in diesel engines
Renewable Diesel	– Carbon-based fuel source that releases CO_2 emissions – Only available for use in diesel engines
Compressed Natural Gas (CNG)	– Carbon-based fuel source that releases CO_2 emissions – Requires vehicle retrofitting
Hydrogen	– Mostly produced from carbon-based sources – Fuel not locally available in region

3.1.4 Zero-Emission Vehicle Inputs

Following the market scan, equivalent replacement vehicle models were established for each representative vehicle category for internal combustion engine (ICE) vehicles, and battery-electric vehicles (BEV), and hybrid vehicles.

Table 10 presents the representative BEV and hybrid vehicle specifications and prices. Prices include the 2025 vehicle MSRP and 12% PST.

Note that these vehicles were chosen as representative options to facilitate the scenario analysis. Some electric vehicles are not yet available on the market. As a result, not all vehicle categories are able to be represented by their equivalent replacement and must be aggregated as one type for analysis purposes. This is based in the assumption that some vehicle categories within a classification

will bear similar costs and power requirements. For example, the electrification of all Light Duty Equipment is represented by an electric mower, the electrification of all Heavy Duty equipment is represented by an electric loader, and the electrification of the vacuum truck is represented by an electric street sweeper.

As the transition scenarios model the replacement of Medium Duty and Heavy Duty vehicles in 2030, Medium Truck and Heavy Truck BEV replacements are represented by a 'Concept' vehicle wherein their parameters have been estimated based on related BEVs along with general assumptions, as the market for medium and heavy duty vehicles is expected to grow at the time of their electrification.

Table 10 Battery electric vehicle & hybrid vehicle data input into analysis

Representative Vehicle	Make and Model	Drivetrain	Battery Size (kWh)	Range (km or hour*)	Vehicle Price (2025 MSRP + 12% PST)
SUV	Chevrolet Bolt EUV	EV	65	397	$60,000
Van	Ford E-Transit	EV	89	256	$84,000
Light Truck	Ford F-150 Lightning	EV	98	386	$80,000
Medium Truck*	Concept Ford F350 EV	EV	98	270	$115,000
Heavy Truck*	Concept Ford F550 EV	EV	118	299	$200,000
Light Equipment	STIHL RZA Mower	EV	24	8*	$45,000
Med/Heavy Equipment	L25 Electric - Electric compact wheel front end loader	EV	40	6*	$190,000
Street Sweeper/Vacuum Truck	Elgin Broom Bear	EV	400	240	$1,000,000
Fire Truck	Rosenbauer Electric Fire Truck	EV	132	340	$2,750,000
SUV**	Ford Escape PHEV	PHEV	-	-	$40,000
Light Truck**	Ford Maverick XL	PHEV	-	-	$45,000

3.1.5 Capital Expenditures (CAPEX)

Capital expenditures (CAPEX) in this analysis are comprised of vehicle purchases including provincial sales tax (12%), EV charger purchases, and EV charging infrastructure. Vehicle capital expenditures may also include the cost to outfit vehicles with accessories, such as lift gates, lights, sirens, and dispatch systems. For the elected vehicles in the Operations Services and Fire Department, these costs were assumed to be an additional $15,000 for Operations vehicles, and $20,000 for Fire Department

Utility Vehicles. These assumed costs were estimated by referencing costs to equip new fleet vehicles purchased recently, provided by the City.

Each scenario's annual vehicle CAPEX was compared against the 5-Year Financial Plan for purchasing municipal fleet vehicles (Table 4) to align expenditures with existing operations. Medium Duty vehicle expenditures were included in the Heavy Duty Vehicles and Equipment budget group.

EV charger costs consist of level-2 charger costs and level-3 charger costs. The cost of EV charging infrastructure includes costs related to underground civil trenching and above-ground electrical work.

The recommended implementation plans in Appendix D and Appendix E present the vehicle and infrastructure CAPEX with a 2% inflation factor applied, pertaining to the year of replacement/implementation.

3.1.6 Operating Expenses (OPEX)

Operating expenses (OPEX) in this analysis are comprised of maintenance costs for vehicles and chargers, fuel costs, and energy costs. For vehicles, total fuel costs were derived from average fuel prices for gasoline and diesel and annual fuel usage by fleet vehicle at the time of study. Total energy costs were derived from the BC Hydro Medium General Service Rate and the estimated annual energy demand of the electric vehicles at the time of study.

Annual maintenance costs were provided for each assessed fleet vehicle. These expenses included insurance & licensing, reactive maintenance labour costs, preventative maintenance labour costs, inspections & testing labour costs, and total maintenance costs. These values were divided by the unit's annual kilometres or hours travelled in 2024 to obtain an average maintenance cost per kilometre travelled. Hour-tracked asset values were further multiplied by 0.02 to normalize the costs when compared to kilometre-tracked assets, assuming that an hour-tracked asset will consume the same amount of fuel in 0.02 hours that a vehicle will consume in 1 kilometre driven.

Average ICE vehicle maintenance costs were grouped by vehicle classification. Electric vehicle maintenance expenses are cited as 30% lower than conventional vehicle maintenance expenses[2]. To estimate average BEV maintenance costs per vehicle class, the average ICE vehicle operating expense value was multiplied by 70%. The average maintenance costs per vehicle class used in the analysis is presented in Table 11.

Note that battery replacement costs were not considered in the operational expenses of BEVs. Additionally, battery electric vehicles are heavier than conventional vehicles, which may require more frequent tire replacements. There is no consideration for increased tire costs associated with BEVs in this analysis.

Table 11 Average ICE and BEV maintenance costs by vehicle classification

Vehicle Classification	Average ICE maintenance costs ($/km or $/0.02 hr)	Average BEV maintenance costs ($/km or $/0.02 hr)
Equipment	0.59	0.41
Light Duty	0.70	0.49
Medium Duty	0.75	0.53
Heavy Duty	2.49	1.74

Operating costs for EV chargers include software costs and maintenance on the units due to regular wear and tear. This can include screen cleaning and hose replacement.

3.1.7 Leasing

Leasing electric vehicles is an option that can mitigate the risks associated with the evolving landscape of electric vehicle technology. It can allow users to test electric vehicles against their required duties prior to committing to their permanent adoption into the fleet.

To assess the financial feasibility of this option, leasing options were considered with a 3-year term for the business-as-usual model (Scenario 1) and the meeting provincial targets transition model (Scenario 2). To maintain consistency in leasing costs, the Government of Canada's Vehicle Lease or Loan Calculator[3] was used. For each vehicle type, the MSRP was inputted as the pre-tax selling price. The tax rate included a PST of 12%. The leasing analysis assumed a lease period of 3 years (36 months). Further, a conservative interest rate of 8.35% was assumed, accounting for the typical prime rate of 6.35%, and a contingency of 2%. The leasing analysis assumed no buyout value, such that the monthly leasing costs over the lease period would cover the total cost of the vehicle to align with the comparison scenario of purchasing the vehicle outright. The results of the leasing analysis are presented in Section 4.5.1.

3.1.8 Infrastructure

The transition to electric vehicles includes the consideration and planning of electric vehicle supply equipment (EVSE) or plainly, EV chargers. Different EV chargers are required for different electric vehicle classifications.

AES Engineering developed the infrastructure plan for this ZEV fleet transition plan. Each fleet location's existing electrical capacity was assessed to understand the capacity and grid impacts of installing and using EV chargers. For more information on the electrical analysis, refer to Appendix B.

Scenario 2 and Scenario 3 will have the same infrastructure requirements at full electrification, proposed chargers and implementations schedule with the exception of the Operations Yard. In Scenario 3, 4 Medium Trucks and the Street Sweeper located at the Operations Yard are electrified prior to 2030.

Three (3) levels of electric vehicle charging exist – Levels One (1), Two (2) and Three (3). Level-1 chargers were not considered as their charging speed is considerably slower than Level-2 chargers. Level-1 chargers can take up to 30 hours to achieve full charge which does not meet the needs of the City of Courtenay.

Level-2 Charger (L2) – Based on fleet range and efficiency modeling, it is expected that most of the fleet will be adequately served by Level-2 chargers, ranging typically between 5 kW to 18 kW, which is sufficient to charge most small to medium-sized EVs overnight.

Direct Current Fast Charger (DCFC) / Level-3 (L3) – The City of Courtenay has several large, specialized vehicles with substantial electrical demands. To provide sufficient charging for daily use of these vehicles, it is proposed to install direct current fast chargers (DCFC/Level-3).

City of Courtenay's fleet is comprised of an array of vehicles and pieces of equipment. In consideration of the ZEVs suggested as replacements in this fleet plan and the energy demands of the vehicles with respect to usage history, Table 12 shows a key of the proposed charging solution for each vehicle and equipment type.

Table 12 EV charger and infrastructure required by vehicle classification

Vehicle/Equipment Type	Charger Power (kW)	Charger Costs	Infrastructure Costs per Charger
Light Duty Vehicles	6.6	$7,500	$5,000
Medium/Heavy Duty Vehicles	24	$11,000	$24,000
Fire Trucks	50	$50,000	$50,000
Light Equipment	3.3	$0	$4,500
Medium/Heavy Equipment	6.6	$0	$5,000

As seen in Table 12, the Light Equipment and the Medium/Heavy Equipment is assumed to not have costs for the charger. It is assumed that the equipment will not use standard car chargers and will be supplied with their own form of charger from the manufacturer. An infrastructure cost is associated with the implementation of the equipment to account for the electrical breaker and wire they will require for their chargers to be connected to the building's distribution system.

Replacement Cycle – Charging equipment replacement is projected to be on a 15-year cycle. This is considering factors such as the technology development cycle, equipment build quality, built-in electronics, exposure to the environment, and other human factors. Because of the relative infancy of EV charging technologies, insufficient data is available to substantiate the expected useful life of a typical EV charger.

Design Review – The recommendations contained in this report are based on the information available at the time of producing the report. It is recommended that the City re-evaluate the EV charging infrastructure after the initial pilot vehicles and 5 years of operating an EV fleet.

4. Scenario Analysis Results

This section reviews the outputs of the scenario models to provide an overall evaluation of the transition to zero-emission fleet from 2026 to 2050 based on the constraints in Scenario 2 (meeting provincial targets) and Scenario 3 (meeting OCP targets). Scenario 1 (business-as-usual) outcomes are included to provide a comparison against the zero-emission fleet scenarios.

Each zero-emission fleet scenario (Scenario 2 and 3) only considers the initial vehicle electrification, totalling one vehicle replacement per unit. In the case of emergency operations vehicles requiring replacement prior to 2030, these vehicles considered two replacements: one initial hybrid replacement followed by an electric replacement. This analysis allowed for the estimation of the cost to transition the fleet to zero-emission vehicles. To compare the cost of fleet electrification to the cost of maintaining the conventional vehicle fleet, Scenario 1 (business-as-usual) considers a total of one replacement for the conventional vehicles. As a result of this comparison, it should be noted that the Total Cost of Operation for each scenario only considers initial vehicle replacements and is presented as the Total Cost of Operation to transition the fleet and is thus not applicable to estimating the Total Cost of Operation of maintaining or expanding the fleet.

The implementation of EV chargers and their associated infrastructure are aligned with the electrification schedule of the vehicles. Scenarios 2 and 3 have identical charging schedules, apart from the Operations Yard, which differs in Scenario 3. Details on site-by-site EV charging are presented in Section 4.4.

4.1 Scenario 1 – Business-as-usual

Scenario 1 models the equivalent, conventional replacement of fleet units. Replacements prioritized vehicles and equipment that had high usage, consumed the most fuel, and had surpassed their service life. The 5-Year Financial Plan for purchasing municipal fleet vehicles was used as a guide for modelling the fleet replacements in each year.

For each fleet unit, one vehicle replacement was modelled. The purpose of Scenario 1 is to act as a comparison to the zero-emission scenarios.

4.1.1 Vehicle capital expenditures (CAPEX)

Table 13 presents the annual vehicle capital expenditures for each fleet budget classification in the municipal fleet. Table 14 presents the annual vehicle capital expenditures for each fleet budget classification in the Fire Department fleet.

Table 13 Scenario 1 municipal vehicle replacement counts and CAPEX (by classification)

Year	Light Duty Vehicle and Equipment Replacements	Medium and Heavy Duty Vehicle and Equipment Replacements	Light Duty Vehicle and Equipment CAPEX ($)	Medium and Heavy Duty Vehicle and Equipment CAPEX ($)
2026	5	4	$345,000	$375,000
2027	6	3	$385,000	$395,000
2028	8	4	$410,000	$470,000
2029	7	4	$385,000	$520,000
2030	7	4	$415,000	$425,000
2031	7	4	$400,000	$330,000
2032	7	1	$355,000	$560,000
2033	7	1	$345,000	$560,000
2034	1	4	$45,000	$355,000
2035	1	2	$45,000	$260,000
2036	1	1	$45,000	$185,000
2037	0	0	$-	$-
2038	0	0	$-	$-
2039	0	0	$-	$-
2040	0	0	$-	$-
2041	0	0	$-	$-
2042	0	0	$-	$-
2043	0	0	$-	$-
2044	0	0	$-	$-
2045	0	0	$-	$-
2046	0	0	$-	$-
2047	0	0	$-	$-
2048	0	0	$-	$-
2049	0	0	$-	$-
2050	0	0	$-	$-
Total	**57**	**32**	**$3,175,000**	**$4,435,000**

Table 14 Scenario 1 Fire Department vehicle replacement counts and CAPEX (by classification)

Year	Light Duty Utility Vehicle Replacements	Heavy Duty Vehicle Replacements	Light Duty Utility Vehicle CAPEX ($)	Heavy Duty Vehicle CAPEX ($)
2026	3	0	$200,000	$-
2027	1	0	$90,000	$-
2028	0	1	$-	$650,000
2029	0	0	$-	$-
2030	2	0	$140,000	$-
2031	0	0	$-	$-
2032	0	1	$-	$650,000
2033	0	0	$-	$-
2034	0	0	$-	$-
2035	0	1	$-	$650,000
2036	0	0	$-	$-
2037	0	1	$-	$650,000
2038	0	1	$-	$650,000
2039	0	0	$-	$-
2040	0	0	$-	$-
2041	0	0	$-	$-
2042	0	0	$-	$-
2043	0	0	$-	$-
2044	0	0	$-	$-
2045	0	0	$-	$-
2046	0	0	$-	$-
2047	0	0	$-	$-
2048	0	0	$-	$-
2049	0	0	$-	$-
2050	0	0	$-	$-
Total	**6**	**5**	**$430,000**	**$3,250,000**

4.1.2 Vehicle operational expenses (OPEX)

Table 15 presents the annual vehicle operating expenses for each fleet budget classification in the municipal fleet.

Table 16 presents the annual vehicle operating expenses for each fleet budget classification in the Fire Department fleet.

Table 15 Scenario 1 municipal fleet OPEX (by classification)

Year	Light Duty OPEX ($)	Medium Duty OPEX ($)	Heavy Duty OPEX ($)	Equipment OPEX ($)
2026	$215,314	$117,673	$233,141	$25,160
2027	$215,314	$117,673	$233,141	$25,160
2028	$215,314	$117,673	$233,141	$25,160
2029	$215,314	$117,673	$233,141	$25,160
2030	$215,314	$117,673	$233,141	$25,160
2031	$215,314	$117,673	$233,141	$25,160
2032	$215,314	$117,673	$233,141	$25,160
2033	$215,314	$117,673	$233,141	$25,160
2034	$215,314	$117,673	$233,141	$25,160
2035	$215,314	$117,673	$233,141	$25,160
2036	$215,314	$117,673	$233,141	$25,160
2037	$215,314	$117,673	$233,141	$25,160
2038	$215,314	$117,673	$233,141	$25,160
2039	$215,314	$117,673	$233,141	$25,160
2040	$215,314	$117,673	$233,141	$25,160
2041	$215,314	$117,673	$233,141	$25,160
2042	$215,314	$117,673	$233,141	$25,160
2043	$215,314	$117,673	$233,141	$25,160
2044	$215,314	$117,673	$233,141	$25,160
2045	$215,314	$117,673	$233,141	$25,160
2046	$215,314	$117,673	$233,141	$25,160
2047	$215,314	$117,673	$233,141	$25,160
2048	$215,314	$117,673	$233,141	$25,160
2049	$215,314	$117,673	$233,141	$25,160
2050	$215,314	$117,673	$233,141	$25,160
Total	**$5,382,850**	**$2,941,825**	**$5,828,525**	**$629,000**

Table 16 Scenario 1 Fire Department OPEX (by classification)

Year	Light Duty OPEX ($)	Heavy Duty OPEX ($)
2026	$70,704	$64,776
2027	$70,704	$64,776
2028	$70,704	$64,776
2029	$70,704	$64,776
2030	$70,704	$64,776
2031	$70,704	$64,776
2032	$70,704	$64,776
2033	$70,704	$64,776
2034	$70,704	$64,776
2035	$70,704	$64,776
2036	$70,704	$64,776
2037	$70,704	$64,776
2038	$70,704	$64,776
2039	$70,704	$64,776
2040	$70,704	$64,776
2041	$70,704	$64,776
2042	$70,704	$64,776
2043	$70,704	$64,776
2044	$70,704	$64,776
2045	$70,704	$64,776
2046	$70,704	$64,776
2047	$70,704	$64,776
2048	$70,704	$64,776
2049	$70,704	$64,776
2050	$70,704	$64,776
Total	**$1,767,600**	**$1,619,400**

4.1.3 Total Cost of Operation (TCO)

Table 17 presents the TCO of the municipal fleet conventional replacements. Table 18 presents the TCO of the Fire Department fleet conventional replacements. Both TCO are presented in the 5-Year Financial Plan periods for comparison against the zero-emission scenarios. Note that the charger, infrastructure, and infrastructure operation costs are $0 for this scenario, as no vehicles are being converted to electric, and there are thus no costs associated with electric vehicle supply equipment.

The TCO of Scenario 1 from 2026 to 2050 is $22.4 million for the municipal fleet, and $7.1 million for the Fire Department fleet, totalling **$29.5 million** across the entire City fleet.

Table 17 Scenario 1 Total Cost of Operation of municipal fleet conventional replacement

Scenario 1	Total
Vehicle Purchase Cost (CAPEX)	$7,610,000
Vehicle Operation Cost (OPEX)	$14,782,200
Charger Cost (CAPEX)	$0
Infrastructure Cost (CAPEX)	$0
Infrastructure Operation Cost (OPEX)	$0
Total	**$22,392,200**

Table 18 Scenario 1 Total Cost of Operation of Fire Department fleet conventional replacement

Scenario 1	Total
Vehicle Purchase Cost (CAPEX)	$3,680,000
Vehicle Operation Cost (OPEX)	$3,387,000
Charger Cost (CAPEX)	$0
Infrastructure Cost (CAPEX)	$0
Infrastructure Operation Cost (OPEX)	$0
Total	**$7,067,000**

4.1.4 Environmental analysis

The in-scope fleet fuel consumption in 2024 was approximately 170,500 litres. Scenario 1 models the like-for-like replacement of the existing fleet. As such, the fleet continued to consume 170,0500 litres of fuel annually through to 2050 in Scenario 1. With the same annual fuel consumption and the continued use of conventional vehicles, the 2030, 2040, and 2050 provincial and OCP fuel consumption goals are not met.

4.1.5 Key impacts and implications

The continued purchase and replacement of conventional vehicles does not allow the City to meet future fuel or GHG reduction targets outlined by the Province nor the City's OCP.

Maintaining the conventional vehicles in the fleet would not impact the current operations of the fleet, as it would be a "business-as-usual" instance where operations and the existing level of service can persist with no change. However, the continued use of conventional vehicles contributes to greenhouse gas emissions, which can result in increased pollution and negative impacts to the environment and public health. Additionally, the modelled OPEX costs of maintaining the conventional fleet present consistent expenditures throughout the study period. However, with aging conventional fleet assets, the risk of more costly maintenance increases as the vehicle is operated beyond its best practice service life.

The continued purchase and use of conventional vehicles in the fleet presents risks related to non-compliance with regulatory fuel standards as outlined by the Province. Other potential risks include decreased availability of conventional vehicles on the market, increased fuel prices, and the potential for the implementation of more stringent environmental regulations that can impact the fleet's operations.

4.2 Scenario 2 – Meeting provincial emission targets

Scenario 2 models the replacement of fleet units to hybrid and electric options to meet the provincial emission reduction targets in 2030, 2040, and 2050. The provincial emission reduction targets applied to litres of fleet fuel are 105,400 L by 2030, 64,000 L by 2040, and 31,000 L by 2050.

To achieve this, replacements prioritized vehicles at the end of their best practice service life with high fuel usage. From 2026 to 2030, these replacements included Light Duty vehicles such as SUVs, Vans, and Light Trucks, and some light equipment, such as mowers and tractors. Beginning in 2030, the replacement of Medium and Heavy Duty vehicles begins. For some applicable emergency operations vehicles scheduled for replacement prior to 2030, a hybrid vehicle was implemented. At the end of its best practice service life, the hybrid vehicle was replaced with an electric option.

4.2.1 Vehicle capital expenditures (CAPEX)

Table 19 presents the annual vehicle capital expenditures for each fleet budget classification in the municipal fleet. Table 20 presents the annual vehicle capital expenditures for each fleet budget classification in the Fire Department fleet. These values were approximated by choosing one model of vehicle to represent the average cost of each vehicle type, and summing the approximate cost to replace the vehicles required each year.

Table 19 Scenario 2 municipal vehicle replacement counts and CAPEX (by classification)

Year	Light Duty Vehicle and Equipment Electrification	Medium and Heavy Duty Vehicle and Equipment Electrification	Light Duty Vehicle and Equipment CAPEX ($)	Medium and Heavy Duty Vehicle and Equipment CAPEX ($)
2026	7	0	$630,000*	$-
2027	7	0	$569,000*	$-
2028	7	0	$568,000*	$-
2029	6	0	$540,000*	$-
2030	6	3	$300,000	$445,000
2031	5	3	$410,000	$420,000
2032	3	4	$174,000	$620,000
2033	3	5	$185,000	$644,000
2034	3	1	$135,000	$1,000,000
2035	2	3	$90,000	$420,000
2036	2	3	$140,000	$590,000
2037	3	3	$170,000	$495,000
2038	1	1	$80,000	$1,000,000
2039	2	3	$175,000	$515,000
2040	0	2	$-	$390,000
2041	0	1	$-	$200,000
2042	0	0	$-	$-
2043	0	0	$-	$-
2044	0	0	$-	$-
2045	0	0	$-	$-
2046	0	0	$-	$-
2047	0	0	$-	$-
2048	0	0	$-	$-
2049	0	0	$-	$-
2050	0	0	$-	$-
Total	**57**	**32**	**$4,166,000**	**$6,739,000**

**includes cost of hybrid vehicles (1 in 2026, 1 in 2027, 1 in 2028, 2 in 2029)*

Table 20 Scenario 2 Fire Department vehicle replacement counts and CAPEX (by classification)

Year	Light Duty Utility Vehicle Electrification	Heavy Duty Vehicle Electrification	Light Duty Utility Vehicle CAPEX ($)	Heavy Duty Vehicle CAPEX ($)
2026	0	0	$185,000*	$-
2027	0	0	$-	$-
2028	0	0	$-	$-
2029	0	0	$-	$-
2030	3	0	$304,000	$-
2031	0	0	$-	$-
2032	0	1	$-	$2,750,000
2033	3	0	$300,000	$-
2034	0	0	$-	$-
2035	0	1	$-	$2,750,000
2036	0	1	$-	$2,750,000
2037	0	1	$-	$2,750,000
2038	0	1	$-	$2,750,000
2039	0	0	$-	$-
2040	0	0	$-	$-
2041	0	0	$-	$-
2042	0	0	$-	$-
2043	0	0	$-	$-
2044	0	0	$-	$-
2045	0	0	$-	$-
2046	0	0	$-	$-
2047	0	0	$-	$-
2048	0	0	$-	$-
2049	0	0	$-	$-
2050	0	0	$-	$-
Total	**6**	**5**	**$789,000**	**$13,750,000**

**includes cost of hybrid vehicles (3 in 2026)*

4.2.2 Vehicle operational expenses (OPEX)

Table 22 presents the annual vehicle operating expenses for each fleet budget classification in the municipal fleet. Table 21 presents the annual vehicle operating expenses for each fleet budget classification in the Fire Department fleet.

Table 22 Scenario 2 municipal fleet OPEX (by classification)

Year	Light Duty OPEX ($)	Medium Duty OPEX ($)	Heavy Duty OPEX ($)	Equipment OPEX ($)
2026	$188,298	$117,673	$233,141	$20,576
2027	$169,529	$117,673	$233,141	$15,147
2028	$159,675	$117,673	$233,141	$15,147
2029	$132,525	$117,673	$233,141	$12,785
2030	$131,711	$105,082	$226,971	$8,543
2031	$118,182	$97,718	$226,658	$7,775
2032	$115,720	$86,661	$206,141	$7,661
2033	$111,070	$71,514	$202,838	$6,167
2034	$111,070	$71,514	$185,894	$5,861
2035	$111,070	$58,852	$179,756	$5,780
2036	$108,625	$58,852	$172,951	$5,972
2037	$107,211	$54,665	$163,452	$5,813
2038	$105,302	$54,665	$133,053	$5,813
2039	$102,036	$48,326	$116,463	$5,813
2040	$102,036	$48,326	$102,706	$5,813
2041	$102,036	$48,326	$101,058	$5,813
2042	$102,036	$48,326	$101,058	$5,813
2043	$102,036	$48,326	$101,058	$5,813
2044	$102,036	$48,326	$101,058	$5,813
2045	$102,036	$48,326	$101,058	$5,813
2046	$102,036	$48,326	$101,058	$5,813
2047	$102,036	$48,326	$101,058	$5,813
2048	$102,036	$48,326	$101,058	$5,813
2049	$102,036	$48,326	$101,058	$5,813
2050	$102,036	$48,326	$101,058	$5,813
Total	**$2,894,420**	**$1,710,127**	**$3,860,027**	**$192,796**

Table 23 Scenario 2 Fire Department fleet OPEX (by classification)

Year	Light Duty OPEX ($)	Heavy Duty OPEX ($)
2026	$63,897	$64,776
2027	$63,897	$64,776
2028	$63,897	$64,776
2029	$63,897	$64,776
2030	$45,553	$64,776
2031	$45,553	$64,776
2032	$45,553	$62,402
2033	$35,438	$62,402
2034	$35,438	$62,402
2035	$35,438	$49,415
2036	$35,438	$41,390
2037	$35,438	$36,335
2038	$35,438	$33,912
2039	$35,438	$33,912
2040	$35,438	$33,912
2041	$35,438	$33,912
2042	$35,438	$33,912
2043	$35,438	$33,912
2044	$35,438	$33,912
2045	$35,438	$33,912
2046	$35,438	$33,912
2047	$35,438	$33,912
2048	$35,438	$33,912
2049	$35,438	$33,912
2050	$35,438	$33,912
Total	**$1,030,131**	**$1,143,858**

4.2.3 Total Cost of Operation (TCO)

Table 24 presents the TCO of the municipal fleet transition. Table 25 presents the TCO of the Fire Department fleet transition.

The TCO of Scenario 2 from 2026 to 2050 is $22.0 million for the municipal fleet, and $18.1 million for the Fire Department fleet, totalling **$40.1 million** across the entire City fleet. In comparison, the Scenario 1 (BAU) TCO is $29.5 million.

Table 24 Scenario 2 Total Cost of Operation of municipal fleet electrification

Scenario 2	Total
Vehicle Purchase Cost (CAPEX)	$10,905,000
Vehicle Operation Cost (OPEX)	$8,657,370
Charger Cost (CAPEX)	$477,500
Infrastructure Cost (CAPEX)	$1,855,500
Infrastructure Operation Cost (OPEX)	$116,050
Total	**$22,011,420**

Table 25 Scenario 2 Total Cost of Operation of Fire Department fleet electrification

Scenario 2	Total
Vehicle Purchase Cost (CAPEX)	$14,539,000
Vehicle Operation Cost (OPEX)	$2,173,989
Charger Cost (CAPEX)	$295,000
Infrastructure Cost (CAPEX)	$1,075,000
Infrastructure Operation Cost (OPEX)	$35,100
Total	**$18,118,089**

Table 26 presents the average annual CAPEX required in each 5-Year Financial Plan period to support the Scenario 2 transition for the municipal fleet. Table 27 presents the sum of the CAPEX required in each 5-Year Financial Plan period for the transition of the Fire Department fleet and the charging infrastructure across all fleet sites. Table 28 presents all Scenario 2 fleet transition costs and the resulting fuel reduction from 2026 to 2050. Figure 2 presents the Scenario 2 fleet transition costs and fuel reduction from 2026 to 2050.

Table 26 **Average annual municipal fleet transition CAPEX in 5-Year Financial Plan periods (Scenario 2)**

Scenario 2	2026-2029	2030-2034	2035-2039	2040-2044	2045-2050
Light Duty Vehicle and Equipment CAPEX ($)	$576,750	$240,800	$131,000	$0	$0
Medium and Heavy Duty Vehicle and Equipment CAPEX ($)	$0	$625,800	$604,000	$118,000	$0

Table 27 **Sum of Fire Department and Charging Infrastructure transition CAPEX in 5-Year Financial periods (Scenario 2)**

Scenario 2	2026-2029	2030-2034	2035-2039	2040-2044	2045-2050
Fire Department - Light Duty Vehicle and Equipment CAPEX ($)	$185,000	$604,000	$0	$0	$0
Fire Department - Heavy Duty Vehicle and Equipment CAPEX ($)	$0	2,750,000	$11,000,000	$0	$0
Charger and Infrastructure CAPEX ($)	$680,500	$1,832,500	$820,000	$75,000	$0

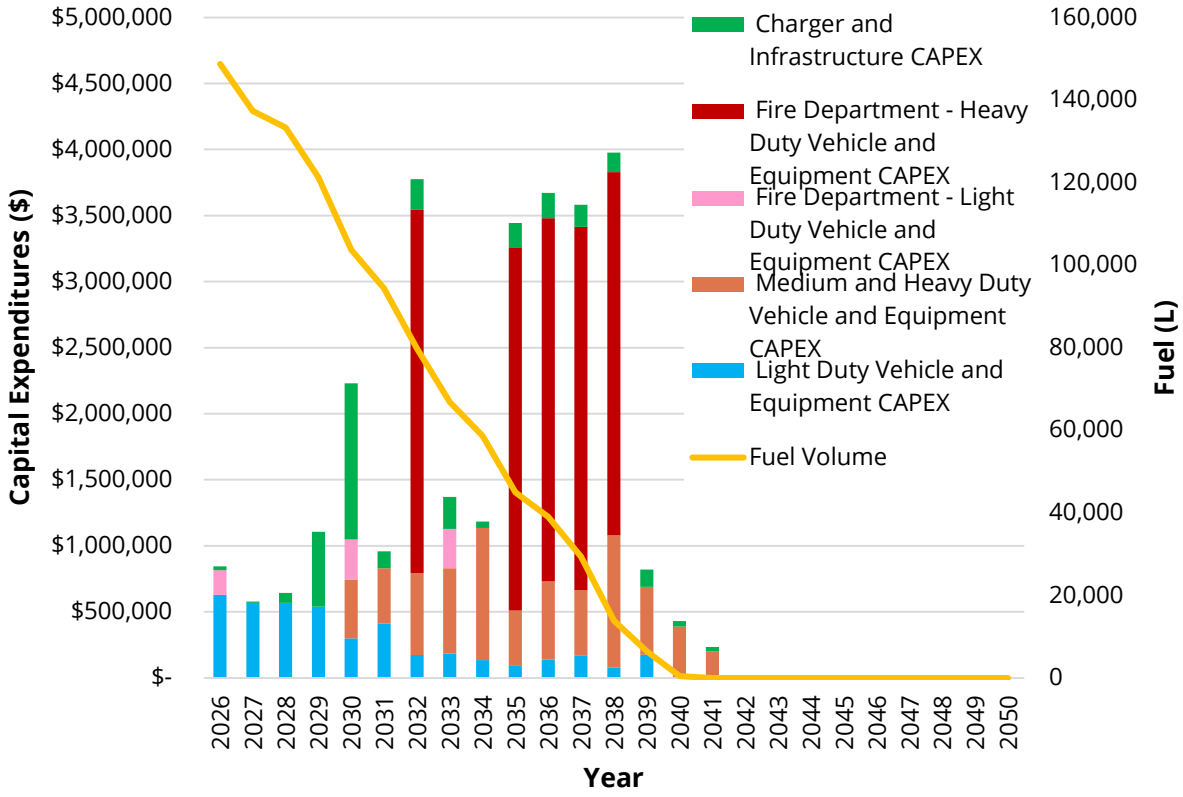


Figure 3 **Scenario 2 fleet transition costs and fuel reduction (2026-2050)**

4.2.4 Environmental analysis

Table 28 presents the fuel reduction by year resulting in the Scenario 2 transition plan. Scenario 2 aimed to meet the provincially mandated emission reduction goals. Converted to fleet fuel, these goals are 105,400 L by 2030, 64,000 L by 2040, and 31,000 L by 2050. Scenario 2 meets the 2030 goal and exceeds the 2040 and 2050 goal through the complete transition of the fleet by 2041.

Table 28 Scenario 2 fuel reduction by year

Year	Fleet fuel consumed (L)	Percent decrease from 2007 levels (155,000L)
2026	148,761	4%
2027	137,346	11%
2028	133,311	14%
2029	121,298	22%
2030	103,707	33%
2031	94,401	39%
2032	79,789	49%
2033	66,828	57%
2034	58,682	62%
2035	44,964	71%
2036	39,065	75%
2037	29,325	81%
2038	13,816	91%
2039	6,446	96%
2040	415	100%
2041	-	100%
2042	-	100%
2043	-	100%
2044	-	100%
2045	-	100%
2046	-	100%
2047	-	100%
2048	-	100%
2049	-	100%
2050	-	100%

4.2.5 Key impacts and implications

The transition of the existing fleet's high-fuel consuming Light Duty vehicles and applicable equipment to electric between 2026 and 2030 allows the City to meet the 2030 provincial GHG emission reduction target, and the continued transition of other vehicles such as Medium and Heavy Duty vehicles allows the fleet to exceed the 2040 and 2050 provincial GHG emission reduction targets. As electric vehicles eliminate all fuel consumption, achieving the 2040 and 2050 fuel reduction goals is highly attainable

with careful planning. Efforts to transition the fleet to achieve the approaching 2030 target must be focussed with planning and high upfront investments. Achieving these goals is contingent on the transition of the existing fleet, and the expansion of the fleet through other zero-emission options.

Currently, electric vehicles are more costly than conventional vehicles. However, lower operating expenses of electric vehicles can alleviate their high upfront capital expenditures. The transition scenarios indicate approximately 44% lower total operating costs due to vehicle electrification, with earlier vehicle transitions further decreasing the overall operating costs.

The vehicle transitions up to 2030 that prioritize Light Duty vehicles and equipment are low-risk as there are many market-ready options available, with electric pickup trucks, an electric SUV, an electric hauler, and an electric scissor lift already existing in the fleet. The transition scenario analysis indicated that if only Light Duty vehicles are transitioned prior to 2030, including Light Duty vehicles still in their useful life, the provincial 2030 goal was not met. The transition of high fuel-consuming equipment greatly supports the attainment of the 2030 goal.

The implementation of hybrid vehicles in the emergency vehicle transitions prior to 2030 supports lower fuel consumption while maintaining reliability, as electric vehicles in these conditions may pose operational issues. In 2030, it is assumed that electric vehicles will be able to reliably complete emergency operations duties, and the remaining emergency operations vehicles will be transitioned to electric, and the hybrid vehicles will complete their full transition to electric at the end of their best practice service life. If the technology does not allow for full transition of the emergency operations fleet to occur in 2030, the vehicles can be transitioned to hybrid or transitioned later and still meet the 2040 and 2050 fuel targets.

This analysis includes the electrification of the Fire Trucks, beginning in 2030. These transitions are limited to 1 a year to allow for the trial of the vehicle prior to full fleet transition. The existing electric fire truck on the market (Rosenbauer Electric Fire Truck) can reach a full charge in 45 minutes through a level-3 charger and is equipped with a backup diesel generator that deploys after the battery depletes to 20%, which recharges the battery and powers the truck's pump[4]. Overall, the reliability of this critical fleet is imperative, and the transition to electric options may pose operational challenges and are approximately twice the cost of a conventional fire truck. Further, other large apparatus required in the fleet such as pumper trucks and ladder trucks do not currently have electric alternatives available on the market. The transition beginning in 2030 allows the technology to evolve further, the potential for more fire truck models to become available, and costs to become more affordable. However, note that some fire trucks were among the high fuel-consuming vehicles in 2024, and their transition can greatly support decreased emissions and fuel consumption in the fleet. The Fire Department has stringent regulations on best-practice service lives of fire trucks based on the Fire Underwriters Survey (FUS) regulations. Fire trucks at the end of their best practice service life are maintained as reserve units, and the vehicle is replaced. The availability of reserve units can support emergency operations and reliable responses as the fleet is transitioned to zero-emission options in the future.

Achieving fuel reduction goals means that new conventional vehicle purchases should not be planned, if possible. During the fleet transition, existing conventional vehicles are recommended to be used up to the end of their useful life, or until their electric replacement occurs. The Fire Department is an exception due to the FUS regulations surrounding their fleet practices. When conventional fire trucks are replaced prior to 2030, they are replaced with a conventional fire truck. The transition scenarios assume that these conventional fire trucks will be replaced upon availability of a suitable electric replacement, and the conventional fire truck will be held in reserve.

For the direct community, electric vehicles eliminate tailpipe emissions, resulting in cleaner air and reduced risk of health issues, such as lung disease and asthma. It should be noted that EV battery production results in greenhouse gas emissions, however, electric vehicles produce approximately 99% less emissions over their lifetime compared to gas and diesel vehicles.

Further, the City of Courtenay's transition to an electric fleet supports a positive public perception of the City and visibly presents the investments that the City is making for the community's health and growth.

4.3 Scenario 3 – Meeting OCP targets

Scenario 3 models the replacement of fleet units to hybrid and electric options to meet the City of Courtenay's fleet fuel reduction targets in 2030, 2040, and 2050. As outlined in the OCP, the fleet fuel reduction targets are 83,500 L by 2030, 30,400 L by 2040, and 7,600 L by 2050.

Similar to Scenario 2, replacements prioritized vehicles at the end of their best practice service life with high fuel usage, with Light Duty vehicles and equipment transitioned from 2026 to 2030 (including the hybrid transition of some applicable emergency operations vehicles), and Medium and Heavy Duty vehicles beginning transition in 2030. However, the OCP targets are more ambitious than the provincially mandated reduction targets, with a 2030 target that is 21,800 litres less than the 2030 provincial target. To achieve the 2030 goal, more vehicles were electrified prior to 2030, including the street sweeper and 4 Medium Trucks.

4.3.1 Vehicle capital expenditures (CAPEX)

Table 29 presents the annual vehicle capital expenditures for each fleet budget classification in the municipal fleet. Table 30 presents the annual vehicle capital expenditures for each fleet budget classification in the Fire Department fleet.

Table 29 Scenario 3 municipal vehicle replacement counts and CAPEX (by classification)

Year	Light Duty Vehicle and Equipment Electrification	Medium and Heavy Duty Vehicle and Equipment Electrification	Light Duty Vehicle and Equipment CAPEX ($)	Medium and Heavy Duty Vehicle and Equipment CAPEX ($)
2026	7	0	$630,000*	$-
2027	7	2	$569,000*	$245,000
2028	7	2	$568,000*	$230,000
2029	6	1	$540,000*	$1,000,000
2030	6	3	$300,000	$445,000
2031	5	1	$410,000	$190,000
2032	3	4	$174,000	$620,000
2033	3	4	$185,000	$514,000
2034	3	1	$135,000	$1,000,000
2035	2	2	$90,000	$305,000
2036	2	3	$140,000	$590,000
2037	3	3	$170,000	$495,000
2038	1	3	$80,000	$515,000
2039	2	2	$175,000	$390,000
2040	0	1	$-	$200,000
2041	0	0	$-	$-
2042	0	0	$-	$-
2043	0	0	$-	$-
2044	0	0	$-	$-
2045	0	0	$-	$-
2046	0	0	$-	$-
2047	0	0	$-	$-
2048	0	0	$-	$-
2049	0	0	$-	$-
2050	0	0	$-	$-
Total	**57**	**32**	**$4,166,000**	**$6,739,000**

**includes cost of hybrid vehicles (1 in 2026, 1 in 2027, 1 in 2028, 2 in 2029)*

Table 30 Scenario 3 Fire Department vehicle replacement counts and CAPEX (by classification)

Year	Light Duty Utility Vehicle Electrification	Heavy Duty Vehicle Electrification	Light Duty Utility Vehicle CAPEX ($)	Heavy Duty Vehicle CAPEX ($)
2026	0	0	$185,000*	$-
2027	0	0	$-	$-
2028	0	0	$-	$-
2029	0	0	$-	$-
2030	3	0	$304,000	$-
2031	0	0	$-	$-
2032	0	1	$-	$2,750,000
2033	3	0	$300,000	$-
2034	0	0	$-	$-
2035	0	1	$-	$2,750,000
2036	0	1	$-	$2,750,000
2037	0	1	$-	$2,750,000
2038	0	1	$-	$2,750,000
2039	0	0	$-	$-
2040	0	0	$-	$-
2041	0	0	$-	$-
2042	0	0	$-	$-
2043	0	0	$-	$-
2044	0	0	$-	$-
2045	0	0	$-	$-
2046	0	0	$-	$-
2047	0	0	$-	$-
2048	0	0	$-	$-
2049	0	0	$-	$-
2050	0	0	$-	$-
Total	**6**	**5**	**$789,000**	**$13,750,000**

**includes cost of hybrid vehicles (3 in 2026)*

4.3.2 Vehicle operational expenses (OPEX)

Table 31 presents the annual vehicle operating expenses for each fleet budget classification in the municipal fleet. Table 32 presents the annual vehicle operating expenses for each fleet budget classification in the Fire Department fleet.

Table 31 Scenario 3 municipal fleet OPEX (by classification)

Year	Light Duty OPEX ($)	Medium Duty OPEX ($)	Heavy Duty OPEX ($)	Equipment OPEX ($)
2026	$188,298	$117,673	$233,141	$20,576
2027	$169,529	$105,850	$233,141	$15,147
2028	$159,675	$98,487	$233,141	$15,147
2029	$132,525	$98,487	$202,742	$12,785
2030	$131,711	$85,895	$196,572	$8,543
2031	$118,182	$85,895	$196,259	$7,775
2032	$115,720	$74,838	$175,742	$7,661
2033	$111,070	$64,090	$172,439	$6,167
2034	$111,070	$64,090	$155,495	$5,861
2035	$111,070	$58,852	$149,357	$5,780
2036	$108,625	$58,852	$142,552	$5,972
2037	$107,211	$54,665	$133,053	$5,813
2038	$105,302	$48,326	$116,463	$5,813
2039	$102,036	$48,326	$102,706	$5,813
2040	$102,036	$48,326	$101,058	$5,813
2041	$102,036	$48,326	$101,058	$5,813
2042	$102,036	$48,326	$101,058	$5,813
2043	$102,036	$48,326	$101,058	$5,813
2044	$102,036	$48,326	$101,058	$5,813
2045	$102,036	$48,326	$101,058	$5,813
2046	$102,036	$48,326	$101,058	$5,813
2047	$102,036	$48,326	$101,058	$5,813
2048	$102,036	$48,326	$101,058	$5,813
2049	$102,036	$48,326	$101,058	$5,813
2050	$102,036	$48,326	$101,058	$5,813
Total	**$2,894,420**	**$1,595,912**	**$3,554,441**	**$192,796**

Table 32 Scenario 3 Fire Department fleet OPEX (by classification)

Year	Light Duty OPEX ($)	Heavy Duty OPEX ($)
2026	$63,897	$64,776
2027	$63,897	$64,776
2028	$63,897	$64,776
2029	$63,897	$64,776
2030	$45,553	$64,776
2031	$45,553	$64,776
2032	$45,553	$62,402
2033	$35,438	$62,402
2034	$35,438	$62,402
2035	$35,438	$49,415
2036	$35,438	$41,390
2037	$35,438	$36,335
2038	$35,438	$33,912
2039	$35,438	$33,912
2040	$35,438	$33,912
2041	$35,438	$33,912
2042	$35,438	$33,912
2043	$35,438	$33,912
2044	$35,438	$33,912
2045	$35,438	$33,912
2046	$35,438	$33,912
2047	$35,438	$33,912
2048	$35,438	$33,912
2049	$35,438	$33,912
2050	$35,438	$33,912
Total	**$1,030,131**	**$1,143,858**

4.3.3 Total Cost of Operation (TCO)

Table 33 presents the TCO of the municipal fleet transition. Table 34 presents the TCO of the Fire Department fleet transition.

The TCO of Scenario 3 from 2026 to 2050 is $21.6 million for the municipal fleet, and $18.1 million for the Fire Department fleet, totalling **$39.7 million** across the entire City fleet. In comparison, the Scenario 1 (BAU) TCO is $29.5 million, and the Scenario 2 TCO is $40.1 million.

Table 35 presents the average annual CAPEX required in each 5-Year Financial Plan period to support the Scenario 3 transition for the municipal fleet.

Table 36 presents the sum of the CAPEX required in each 5-Year Financial Plan period for the transition of the Fire Department fleet and the charging infrastructure across all fleet sites.

Figure 4 presents all Scenario 3 fleet transition costs and the resulting fuel reduction from 2026 to 2050.

Table 33 Scenario 3 Total Cost of Operation of municipal fleet electrification

Scenario 3	Total
Vehicle Purchase Cost (CAPEX)	$10,905,000
Vehicle Operation Cost (OPEX)	$8,237,569
Charger Cost (CAPEX)	$477,500
Infrastructure Cost (CAPEX)	$1,855,500
Infrastructure Operation Cost (OPEX)	$121,150
Total	**$21,596,719**

Table 34 Scenario 3 Total Cost of Operation of Fire Department fleet electrification

Scenario 3	Total
Vehicle Purchase Cost (CAPEX)	$14,539,000
Vehicle Operation Cost (OPEX)	$2,173,989
Charger Cost (CAPEX)	$295,000
Infrastructure Cost (CAPEX)	$1,075,000
Infrastructure Operation Cost (OPEX)	$35,100
Total	**$18,118,089**

Table 35 **Average annual municipal fleet transition CAPEX in 5-Year Financial Plan periods (Scenario 3)**

Scenario 3	2026-2029	2030-2034	2035-2039	2040-2044	2045-2050
Light Duty Vehicle and Equipment CAPEX ($)	$576,750	$240,800	$131,000	$0	$0
Medium and Heavy Duty Vehicle and Equipment CAPEX ($)	$368,750	$553,800	$459,000	$40,000	$0

Table 36 **Sum of Fire Department and Charging Infrastructure transition CAPEX in 5-Year Financial periods (Scenario 3)**

Scenario 3	2026-2029	2030-2034	2035-2039	2040-2044	2045-2050
Fire Department - Light Duty Vehicle and Equipment CAPEX ($)	$185,000	$604,000	$0	$0	$0
Fire Department - Heavy Duty Vehicle and Equipment CAPEX ($)	$0	$2,750,000	$11,000,000	$0	$0
Charger and Infrastructure CAPEX ($)	$1,855,500	$727,500	$790,000	$35,000	$0

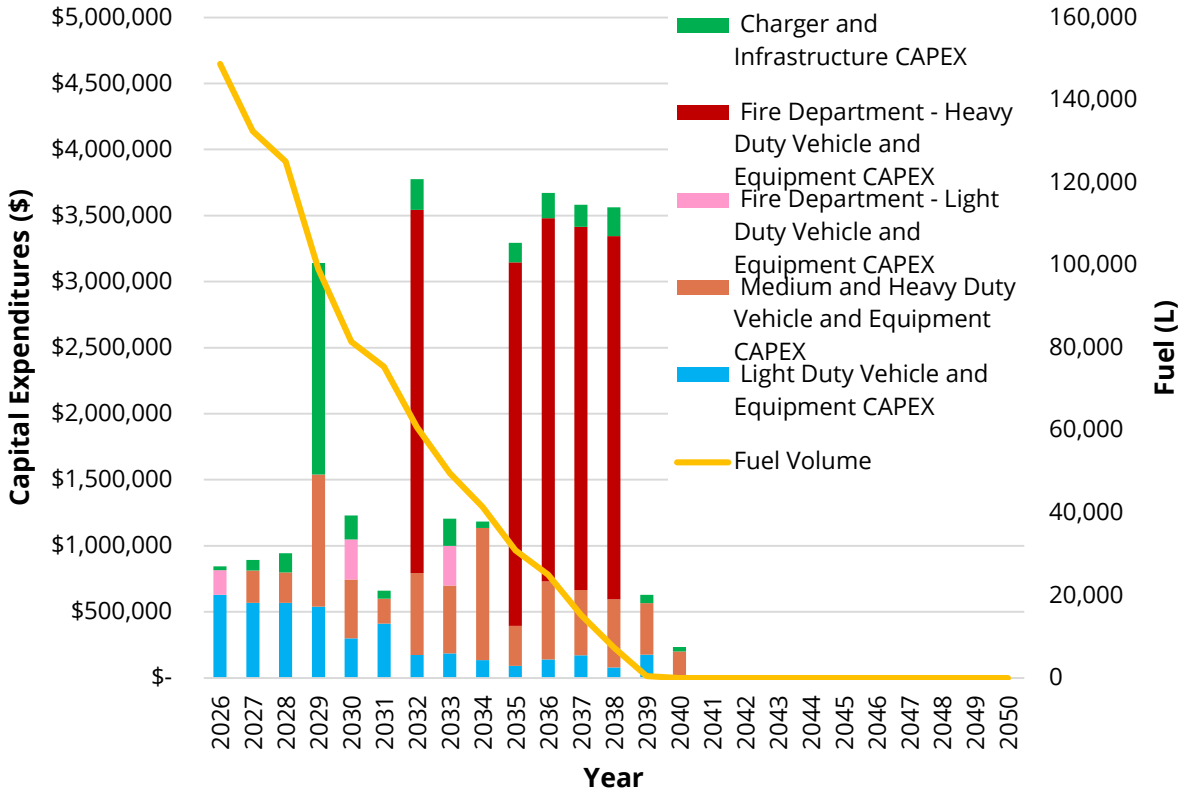


Figure 4 **Scenario 3 fleet transition costs and fuel reduction (2026-2050)**

4.3.4 Environmental analysis

Table 37 presents the fuel reduction by year resulting in the Scenario 3 transition plan. Scenario 3 aimed to meet the City of Courtenay fleet fuel reduction goals as outlined in the OCP. These goals are 83,500 L by 2030, 30,400 L by 2040, and 7,600 L by 2050. Scenario 3 meets the 2030 goal and exceeds the 2040 and 2050 goal through the complete transition of the fleet by 2040.

Table 37 Scenario 3 fuel reduction by year

Year	Fleet fuel consumed (L)	Percent decrease from 2016 levels (152,000L)
2026	148,761	2%
2027	132,424	13%
2028	125,105	18%
2029	99,006	35%
2030	81,415	46%
2031	75,393	50%
2032	60,781	60%
2033	49,593	67%
2034	41,448	73%
2035	30,878	80%
2036	24,978	84%
2037	15,239	90%
2038	7,305	95%
2039	415	100%
2040	-	100%
2041	-	100%
2042	-	100%
2043	-	100%
2044	-	100%
2045	-	100%
2046	-	100%
2047	-	100%
2048	-	100%
2049	-	100%
2050	-	100%

4.3.5 Key impacts and implications

Scenario 3 expands on the Scenario 2 transition plan to meet the ambitious 2030 OCP fuel reduction target. Scenario 3 is identical to Scenario 2, with exception of the earlier transition of the street sweeper and 4 Medium Trucks. For the general baseline impacts and implications of the fleet transition, refer to section 4.2.5.

As the highest fuel consuming vehicle in the fleet with over 14,000 litres consumed in 2024, the electrification of the street sweeper advances the fleet's fuel reductions greatly. The Elgin Electric Broom Bear is an available model that can reach full charge in a minimum of 3 hours using a level-3 charger[5] and priced at an estimated 5 As a non-emergency vehicle, the transition of the street sweeper can occur as soon as possible (or at the end of its best practice service life) to achieve the highest fuel and emission reductions and support the attainment of the 2030 OCP fuel target.

The electrification of some Medium Trucks in the 2026 to 2030 period can further support fleet fuel reductions. This transition assumes the availability of Medium Duty electric trucks in 2027 and 2028. If no suitable electric Medium Trucks are market-available in these years, the transition could occur by downsizing select Medium Trucks to Light Trucks. If required, the downsizing could prioritize Medium Trucks that do not complete emergency duties, and whose operations would not be impacted by the transition to an electric model.

4.4 Zero-Emission Fleet Charging Infrastructure

Each fleet location's existing electrical capacity was assessed to understand the capacity and grid impacts of installing and using EV chargers. The analysis included the consideration of the existing EV chargers at each fleet location. With the recommended chargers for each vehicle type, it is expected that charging the vehicles overnight will fully charge the vehicles. Upon the procurement of electric vehicles and chargers, it is recommended for the City to charge fleet overnight and determine if that works for their driving and usage patterns.

4.4.1 Courtenay – City Hall

The representative fleet modelled at the City Hall includes 4 SUVs and 2 Light Trucks. To charge the fleet vehicles, it is proposed to add six level-2, 6.6 kW chargers.

The peak demand for the proposed new chargers is **39.6 kW** which is well within the amount of site-wide capacity at the City Hall. There are no concerns about the ability of the City Hall to accommodate the proposed chargers as the historic peak demand added with the projected peak demand of the chargers comes to 89.9 kW which is well within the site-wide capacity of 231 kVA. Table 38 presents the annual EV charger and infrastructure costs associated with the zero-emission fleet at City Hall.

Table 38 Summary of charger and infrastructure costs at City Hall

Year	Site-wide Capacity (kVA)	Cumulative L2 Chargers	Infrastructure CAPEX ($)	Charger CAPEX ($)	Infrastructure OPEX ($)
2026	231	2	$5,000	$7,500	$100
2027	231	2	$-	$-	$100
2028	231	3	$5,000	$7,500	$200
2029	231	3	$-	$-	$200
2030	231	5	$10,000	$15,000	$400
2031	231	5	$-	$-	$400
2032	231	5	$-	$-	$400
2033	231	7	$10,000	$15,000	$600
2034	231	7	$-	$-	$600
2035	231	7	$-	$-	$600
2036	231	7	$-	$-	$600
2037	231	7	$-	$-	$600
2038	231	7	$-	$-	$600
2039	231	7	$-	$-	$600
2040	231	7	$-	$-	$600
2041	231	7	$-	$-	$600
2042	231	7	$-	$-	$600
2043	231	7	$-	$-	$600
2044	231	7	$-	$-	$600
2045	231	7	$-	$-	$600
2046	231	7	$-	$-	$600
2047	231	7	$-	$-	$600
2048	231	7	$-	$-	$600
2049	231	7	$-	$-	$600
2050	231	7	$-	$-	$600
Total	**231**	**7**	**$30,000**	**$45,000**	**$12,600**

4.4.2 Courtenay Fire Department

The representative fleet modelled at the Courtenay Fire Department includes 3 SUVs, 1 Van, 2 Light Trucks, and 5 Fire Trucks. Note that the 3 SUVs are modelled to be replaced with Light Trucks. To charge the fleet vehicles, it is proposed to add six level-2, 6.6 kW chargers and five level-3, 50 kW chargers. Please note that the exact power output of the Fire Truck chargers is dependent on recommendations from the manufacturer of the trucks, determined during the vehicle procurement phase.

The peak demand for the proposed new chargers is estimated to be **289.6 kW**, which exceeds the available capacity at the Fire Department. Adding the peak demand of the proposed chargers with the recorded peak demand of the firehall is 340.8 kW, exceeding the existing site-wide capacity of 173 kVA.

To increase electrical capacity, it is proposed upgrade the existing service connection by adding a 500 kVA BC Hydro transformer. Ultimately, it is up to BC Hydro to determine what service size can be given to a property, so the service upgrade details would be determined by BC Hydro. It is understood that a new fire hall is being designed, it is recommended to reserve capacity for EV charging during the design phase, as well as reserve spaces for breakers in the new electrical room for future charger connections.

The proposed approach for electrical infrastructure would involve adding new pieces of electrical distribution equipment, such as a switchboard, various electrical breakers and step-down transformers for charger connections. It is proposed to maintain the existing switchboard of the firehall and feed it by a new switchboard. Table 39 presents the annual EV charger and infrastructure costs associated with the zero-emission fleet at Courtenay Fire Department.

Table 39 Summary of charger and infrastructure costs at Courtenay Fire Department

Year	Site-wide Capacity (kVA)	Cumulative L2 Chargers0	Cumulative L3 Chargers	Infrastructure CAPEX ($)	Charger CAPEX ($)	Infrastructure OPEX ($)
2026	173	0	0	$-	$-	$-
2027	173	0	0	$-	$-	$-
2028	173	0	0	$-	$-	$-
2029	500	0	0	$500,000	$-	$-
2030	500	3	0	$15,000	$22,500	$300
2031	500	3	0	$-	$-	$300
2032	500	3	1	$50,000	$50,000	$600
2033	500	6	1	$15,000	$22,500	$900
2034	500	6	1	$-	$-	$900
2035	500	6	2	$50,000	$50,000	$1,200
2036	500	6	3	$50,000	$50,000	$1,500
2037	500	6	4	$50,000	$50,000	$1,800
2038	500	6	5	$50,000	$50,000	$2,100
2039	500	6	5	$-	$-	$2,100
2040	500	6	5	$-	$-	$2,100
2041	500	6	5	$-	$-	$2,100
2042	500	6	5	$-	$-	$2,100
2043	500	6	5	$-	$-	$2,100
2044	500	6	5	$-	$-	$2,100
2045	500	6	5	$-	$-	$2,100
2046	500	6	5	$-	$-	$2,100
2047	500	6	5	$-	$-	$2,100
2048	500	6	5	$-	$-	$2,100
2049	500	6	5	$-	$-	$2,100
2050	500	6	5	$-	$-	$2,100
Total	**500**	**6**	**5**	**$780,000**	**$295,000**	**$34,800**

4.4.3 Operations Yard

The representative fleet modelled at the Operations Yard is comprised of 5 Vans, 5 SUVs, 19 Light Trucks, 14 Medium Trucks, 9 Heavy Trucks, 1 Street Sweeper and 1 Vacuum Truck, 19 units of Light Equipment and 7 units of Medium/Heavy Equipment. There is a total of 80 fleet vehicles at the Operations Yard.

At the Operations Yard, there are five existing level-2 dual-head chargers. These chargers are incorporated into the proposed charging solution at the Operations Yard.

In Scenarios 2 and 3, it is proposed to add 19 level-2, 6.6 kW chargers and 25 level-3 24 kW DC fast chargers for the Medium/Heavy Duty vehicles. In addition to this, 3.3 kW of power is proposed to be delegated to each of the 19 pieces of Light Equipment and 6.6 kW to each of the 7 pieces of Medium/Heavy Equipment. The equipment will not require typical EV chargers but will require electrical capacity to be charged. The schedule of implementation differs in Scenario 3 to reflect the accelerated vehicle electrification schedule.

The peak demand for the proposed new chargers and equipment is estimated to be **834.4 kW for Scenarios 2 and 3.** Both of these values exceed the site-wide capacity at the Operations Yard of 300 kVA and the spare capacity at the site of 235.2 kW.

To increase the amount of electrical capacity, it is proposed to upgrade the existing service connection site, upgrading the 300 kVA transformer to a 1,000 kVA transformer. The ability to upgrade the transformer is up to BC Hydro to determine. With this proposed upgrade to increase the site-wide capacity, new distribution equipment including a distribution enclosure, panel boards and transformers would be required. The new 1,000 kVA transformer may require a new pad underground connection to the distribution cabinet. The proposed solution would involve maintaining the existing distribution equipment and powering it by the new distribution equipment and BC Hydro transformer.

Table 40 presents the annual EV charger and infrastructure costs associated with the Scenario 2 zero-emission fleet at the Operations Yard. Table 41 presents the annual EV charger and infrastructure costs associated with the Scenario 3 zero-emission fleet at the Operations Yard.

Table 40 Summary of charger and infrastructure costs at Operations Yard (Scenario 2)

Year	Site-wide Capacity (kVA)	Cumulative L2 Chargers0	Cumulative L3 Chargers	Infrastructure CAPEX ($)	Charger CAPEX ($)	Infrastructure OPEX ($)
2026	300	10	0	$4,500	$-	$-
2027	300	10	0	$9,000	$-	$-
2028	300	14	0	$20,000	$30,000	$400
2029	300	19	0	$29,500	$37,500	$900
2030	1000	19	3	$1,085,500	$33,000	$1,350
2031	1000	23	5	$77,500	$52,000	$2,050
2032	1000	24	8	$91,000	$40,500	$2,600
2033	1000	24	13	$124,500	$55,000	$3,350
2034	1000	24	14	$37,500	$11,000	$3,500
2035	1000	24	16	$62,000	$22,000	$3,800
2036	1000	25	18	$62,500	$29,500	$4,200
2037	1000	26	19	$48,000	$18,500	$4,450
2038	1000	27	20	$29,000	$18,500	$4,700
2039	1000	29	23	$82,000	$48,000	$5,350
2040	1000	29	24	$29,000	$11,000	$5,500
2041	1000	29	25	$24,000	$11,000	$5,650
2042	1000	29	25	$-	$-	$5,650
2043	1000	29	25	$-	$-	$5,650
2044	1000	29	25	$-	$-	$5,650
2045	1000	29	25	$-	$-	$5,650
2046	1000	29	25	$-	$-	$5,650
2047	1000	29	25	$-	$-	$5,650
2048	1000	29	25	$-	$-	$5,650
2049	1000	29	25	$-	$-	$5,650
2050	1000	29	25	$-	$-	$5,650
Total	**1000**	**29**	**25**	**$1,815,500**	**$417,500**	**$98,650**

Table 41 Summary of charger and infrastructure costs at Operations Yard (Scenario 3)

Year	Site-wide Capacity (kVA)	Cumulative L2 Chargers0	New L3 Chargers	Infrastructure CAPEX ($)	Charger CAPEX ($)	Infrastructure OPEX ($)
2026	300	10	0	$4,500	$-	$-
2027	300	10	2	$57,000	$22,000	$300
2028	300	14	4	$68,000	$52,000	$1,000
2029	1000	19	5	$1,053,500	$48,500	$1,650
2030	1000	19	8	$85,500	$33,000	$2,100
2031	1000	23	8	$29,500	$30,000	$2,500
2032	1000	24	11	$91,000	$40,500	$3,050
2033	1000	24	15	$100,500	$44,000	$3,650
2034	1000	24	16	$37,500	$11,000	$3,800
2035	1000	24	17	$38,000	$11,000	$3,950
2036	1000	25	19	$62,500	$29,500	$4,350
2037	1000	26	20	$48,000	$18,500	$4,600
2038	1000	27	23	$77,000	$40,500	$5,150
2039	1000	29	24	$39,000	$26,000	$5,500
2040	1000	29	25	$24,000	$11,000	$5,650
2041	1000	29	25	$-	$-	$5,650
2042	1000	29	25	$-	$-	$5,650
2043	1000	29	25	$-	$-	$5,650
2044	1000	29	25	$-	$-	$5,650
2045	1000	29	25	$-	$-	$5,650
2046	1000	29	25	$-	$-	$5,650
2047	1000	29	25	$-	$-	$5,650
2048	1000	29	25	$-	$-	$5,650
2049	1000	29	25	$-	$-	$5,650
2050	1000	29	25	$-	$-	$5,650
Total	**1000**	**29**	**25**	**$1,815,500**	**$417,500**	**$103,750**

4.4.4 Lewis Centre

The representative fleet modelled at the Lewis Centre includes 2 Light Trucks. To charge the light trucks, it is proposed to add two new 6.6 kW, level-2 chargers. The peak demand for the proposed new chargers is **13.2 kW**, which is well within the amount of existing available capacity at the Lewis Centre. There are no concerns about the ability of the electrical distribution equipment at the Lewis Centre to accommodate the proposed chargers as the site wide capacity is 346 kVA and 220 kW of it is unused spare capacity.

At the Lewis Centre, there is one existing level-2 charger. This charger is incorporated into the proposed charging solution at the Lewis Centre.

The City of Courtenay has noted that the parking lot at the Lewis Centre often experiences flooding. If EV charging is implemented at this location, consideration of an appropriate installation place for the chargers that is not subject to floods should be chosen during detailed design. Further measures to protect electrical equipment from risks of floods can be taken during the detailed design phase. It is recommended that the city record details of the flooding experiences at this centre prior to detailed EV charger design. Table 42 presents the annual EV charger and infrastructure costs associated with the zero-emission fleet at Lewis Centre.

Table 42 Summary of charger and infrastructure costs at Lewis Centre

Year	Site-wide Capacity (kVA)	Cumulative L2 Chargers	Infrastructure CAPEX ($)	Charger CAPEX ($)	Infrastructure OPEX ($)
2026	346	2	$5,000	$7,500	$100
2027	346	2	$-	$-	$100
2028	346	3	$5,000	$7,500	$200
2029	346	3	$-	$-	$200
2030	346	3	$-	$-	$200
2031	346	3	$-	$-	$200
2032	346	3	$-	$-	$200
2033	346	3	$-	$-	$200
2034	346	3	$-	$-	$200
2035	346	3	$-	$-	$200
2036	346	3	$-	$-	$200
2037	346	3	$-	$-	$200
2038	346	3	$-	$-	$200
2039	346	3	$-	$-	$200
2040	346	3	$-	$-	$200
2041	346	3	$-	$-	$200
2042	346	3	$-	$-	$200
2043	346	3	$-	$-	$200
2044	346	3	$-	$-	$200
2045	346	3	$-	$-	$200
2046	346	3	$-	$-	$200
2047	346	3	$-	$-	$200
2048	346	3	$-	$-	$200
2049	346	3	$-	$-	$200
2050	346	3	$-	$-	$200
Total	**346**	**3**	**$10,000**	**$15,000**	**$4,800**

4.5 Scenario Cost Summary

Table 43 presents the total costs from 2026 to 2050 for all fleets in all scenarios. Note that while the transition scenarios offer the same count and total CAPEX of vehicle replacements, the accelerated replacement schedule in Scenario 3 offers lower total vehicle OPEX resulting from the lower operating costs of ZEVs.

Table 44 presents the scenario summary of the annual average transition CAPEX required for the municipal fleet in 5-Year Financial Plan periods. Table 45 presents the scenario summary of the total transition CAPEX required for the Fire Department fleet and the municipal and fire department fleet Charging Infrastructure in 5-Year Financial Plan periods.

Table 43 Cost summary of all scenarios

Budget	Scenario 1 (Business-as-usual)		Scenario 2 (Meeting provincial targets)		Scenario 3 (Meeting OCP targets)	
	Municipal	Fire Department	Municipal	Fire Department	Municipal	Fire Department
Vehicle Purchase Cost (CAPEX)	$7,610,000	$3,680,000	$10,905,000	$14,539,000	$10,905,000	$14,539,000
Vehicle Operation Cost (OPEX)	$14,782,000	$3,387,000	$8,657,370	$2,173,989	$8,237,569	$2,173,989
Charger Cost (CAPEX)	N/A	N/A	$477,500	$295,000	$477,500	$295,000
Infrastructure Cost (CAPEX)	N/A	N/A	$1,855,500	$780,000	$1,855,500	$780,000
Infrastructure Operation Cost (OPEX)	N/A	N/A	$116,050	$34,800	$121,150	$34,800
Total	**$29,459,000**		**$39,834,209**		**$39,419,508**	

Table 44 **Average annual municipal fleet transition CAPEX in 5-Year Financial Plan periods for each transition scenario**

Budget	Scenario	2026-2029	2030-2034	2035-2039	2040-2044	2045-2050
Light Duty Vehicle and Equipment CAPEX ($)	1	$387,500	*N/A*	*N/A*	*N/A*	*N/A*
	2	$576,750	$240,800	$131,000	$0	$0
	3	$576,750	$240,800	$131,000	$0	$0
Medium and Heavy Duty Vehicle and Equipment CAPEX ($)	1	$450,000	*N/A*	*N/A*	*N/A*	*N/A*
	2	$0	$625,800	$604,000	$118,000	$0
	3	$368,750	$553,800	$459,000	$40,000	$0

Table 45 **Sum of Fire Department and Charging Infrastructure transition CAPEX in 5-Year Financial periods for each transition scenario**

Budget	Scenario	2026-2029	2030-2034	2035-2039	2040-2044	2045-2050
Fire Department - Light Duty Vehicle and Equipment CAPEX ($)	*1*	$945,000	*N/A*	*N/A*	*N/A*	*N/A*
	2 / 3	$185,000	$604,000	$0	$0	$0
Fire Department - Heavy Duty Vehicle and Equipment CAPEX ($)	*1*	$3,200,000	*N/A*	*N/A*	*N/A*	*N/A*
	2 / 3	$0	$2,750,000	$11,000,000	$0	$0
Charger and Infrastructure CAPEX ($)	*1*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*
	2	$680,500	$1,832,500	$820,000	$75,000	$0
	3	$1,855,000	$727,500	$790,000	$35,000	$0

4.5.1 Leasing cost summary

Table 46 presents the results of the leasing analysis on the business-as-usual and transition scenarios' vehicle capital expenditures in the 5-Year Financial Plan periods.

While leasing vehicles can decrease annual costs and support the trial of new technologies in electric vehicles, the leasing analysis yielded higher costs than the cost to purchase vehicles outright as a result of the increased interest on the lease payments.

Table 46 Leasing summary (Municipal and Fire Department fleets)

Financial Period	Scenario 1 (business-as-usual)			Scenario 2 (Meeting provincial targets)				
	Vehicle Purchase CAPEX ($)	Vehicle Lease CAPEX ($)	Vehicle Purchase CAPEX ($)	Vehicle Lease CAPEX ($)	Vehicle Purchase CAPEX ($)	Vehicle Lease CAPEX ($)	Vehicle Purchase CAPEX ($)	Vehicle Lease CAPEX ($)
2026-2029	$3,285,000	$2,696,943	$940,000	$804,453	$2,307,000	$1,999,827	$185,000	$200,765
2030-2034	$3,790,000	$4,603,820	$790,000	$1,128,557	$4,333,000	$4,251,345	$3,354,000	$3,324,950
2035-2039	$535,000	$1,242,482	$1,950,000	$1,951,893	$3,675,000	$4,211,998	$11,000,000	$10,173,423
2040-2044	$0	$0	$0	$243,987	$590,000	$1,534,510	$0	$916,667
2045-2050	$0	$0	$0	$0	$0	$0	$0	$0
Total	$7.6M	$8.5M	$3.7M	$4.1M	$10.9M	$12.0M	$14.5M	$14.6M

5. Recommendations

The recommended ZEV fleet transition scenario is **Scenario 3,** as it offers the following advantages over the other scenarios:

- Meets both the City of Courtenay OCP fleet fuel volume targets and exceeds the provincial GHG emission reduction targets in 2030, 2040, and 2050, providing space to manage uncertainty related to market availability.
- The accelerated vehicle electrification schedule offers lower total operating costs due to savings in operational expenses, and reduced inflation.
- The accelerated vehicle electrification schedule offers more opportunities to claim electric vehicle and infrastructure rebates prior to program termination.

6. Implementation Plan

Appendix D provides a vehicle replacement schedule aligned with scenario 3. The vehicle replacement schedule notes the recommended transition year and transition costs of each fleet unit. This schedule provides an initial plan for fleet electrification that can be modified to reflect the current needs and opportunities available during fleet planning. Appendix E provides a charging and infrastructure schedule aligned with the vehicle replacement schedule for each fleet location. This charging and infrastructure schedule provides the minimum number of chargers required in each year to support the zero-emission fleet described in the vehicle replacement schedule.

To execute the vehicle replacement and charging and infrastructure schedules, an implementation plan is required. This implementation plan will look to allocate budget, plan capital projects, seek additional funding, and manage risk and uncertainties associated with the zero-emission fleet transition.

6.1 Budget Allocation

Table 47 presents the recommended average annual municipal fleet budgets required to transition the existing fleet to zero-emission vehicles in each 5-Year Financial Plan period. Table 48 presents the sum of the Fire Department and Charging and Infrastructure budgets required in each 5-Year Financial Plan period. These budgets include the cost of accessories and exclude inflation factors. Note that projected inflation factors may increase the recommended budgets from 5% to 25%. For inflated costs pertaining to the recommended year of vehicle replacement, please refer to Appendix D.

Table 47 **Average annual municipal fleet transition CAPEX in 5-Year Financial periods for recommended implementation plan (in 2025 dollars)**

Scenario 3	2026-2029	2030-2034	2035-2039	2040-2044	2045-2050
Light Duty Vehicle and Equipment CAPEX ($)	$576,750	$240,800	$131,000	$0	$0
Medium and Heavy Duty Vehicle and Equipment CAPEX ($)	$368,750	$553,800	$459,000	$40,000	$0

Table 48 **Sum of Fire Department and Charging Infrastructure transition CAPEX in 5-Year Financial periods for recommended implementation plan (in 2025 dollars)**

Scenario 3	2026-2029	2030-2034	2035-2039	2040-2044	2045-2050
Fire Department - Light Duty Vehicle and Equipment CAPEX ($)	$185,000	$604,000	$0	$0	$0
Fire Department - Heavy Duty Vehicle and Equipment CAPEX ($)	$0	$2,750,000	$11,000,000	$0	$0
Charger and Infrastructure CAPEX ($)	$1,855,500	$727,500	$790,000	$35,000	$0

6.2 Capital Project Planning

Appendix E notes the minimum number of chargers required at each fleet location in each transition year, as well as the estimated cost and timing of infrastructure upgrades at each fleet location. To support the increased electrical demand of the electric fleet, the Operations Yard and the Courtenay Fire Department require service upgrades in 2029. Table 49 presents the combined charger and infrastructure CAPEX for each fleet location in each 5-Year Financial Plan period. These costs exclude inflation factors. Note that projected inflation factors may increase the recommended budgets from 5% to 25%. For inflated costs pertaining to the recommended year of infrastructure upgrade and charger purchase, please refer to Appendix E.

Table 49 **Sum of charging and infrastructure CAPEX in 5-Year Financial periods by fleet location for recommended implementation plan (in 2025 dollars)**

Scenario 3	2026-2029	2030-2034	2035-2039	2040-2044	2045-2050
City Hall	$25,000	$50,000	$0	$0	$0
Courtenay Fire Department	$500,000	$175,000	$400,000	$0	$0
Operations Yard	$1,305,500	$502,500	$390,000	$35,000	$0
Lewis Centre	$25,000	$0	$0	$0	$0

6.3 Seek Additional Funding

To support the funding of this strategy, seven opportunities have been identified in Table 50 along with their eligibility requirements and the maximum allowable rebate associated with the opportunity.

It should be noted that some opportunities come with limitations related to funding availability, time of purchase and window of reimbursement, and restrictions related to combining funds. Namely, Transport Canada's Incentives for Zero-Emission Vehicle Program (iZEV) was officially paused on January 12th, 2025. The Province of British Columbia states that **stacking provincial rebates** (e.g., the Clean BC Go Electric Rebates program & the CleanBC Go Electric Commercial Vehicle Pilots (CVP) program) is **not permitted.**

However, **combining federal and provincial rebates** (e.g., CleanBC Go Electric Rebates program & the federal iMHZEV rebate) **is permitted,** up to a combined rebate value of 75% of the Manufacturer's Suggested Retail Price (MSRP). If the combined rebate value exceeds 75% of the MSRP, the respective provincial program (e.g., CleanBC Go Electric) will adjust its rebate amount to adhere to the permitted stacking limit. Additional details on stacking eligibility and reimbursement windows should be further discussed with the chosen funding entity prior to their application process.

Given that the City of Courtenay is a municipal government agency, the Green Freight Program (Stream 1 and 2) is eligible for combination with other funds up to a maximum of 100% of total project costs. This could include full transitions, energy-saving retrofits, or the retrofit devices themselves. However, this program does not pre-approve projects. The funding application can only be completed following the completion of the decarbonization work.

It is recommended to re-evaluate the availability of these rebates prior to their application or planned use as they may be suddenly paused or eliminated.

Table 50 Overview of funding opportunities

Fund Name	Funds Available for:	Maximum Allowable Funds/Services
FCM[6] **(Green Municipal Fund)**	– Capital project funding for **Municipal Fleet Electrification** – Pilot project funding for **Net-Zero Transformation**	Capital project: Municipal Fleet Electrification – **Receive a combined grant and loan of up to $10 million and a grant worth up to 15% of the loan; combined grant and loan will cover up to 80% of eligible costs.** Pilot: Net-Zero Transformation – **Receive a grant of up to 50% of eligible costs, up to a maximum of $500,000.**
CleanBC[7] **(Go Electric Fleet Charging Program)**	– **Purchase and installation of eligible & new Level 2 charging equipment** – **Purchase and installation of Direct Current Fast Chargers (DCFC)** (20kW to 49kW; 50 kW to 99kW; 100Kw to 199kW; 200kW or greater chargers)	– **Up to 75% of total costs to a maximum of $4,000 per L2 charging station, capped at $50,000 per applicant, per year.** – 20kW-49kW DCFCs **receive up to 50% of project costs to a maximum of $20,000 per charger, capped at $60,000 per project or 50% of total project costs**, whichever is lower. – 50kW-99kW DCFCs **receive up to 50% of project costs to a maximum of $50,000 per charger, capped at $150,000 per project or 50% of total project costs**, whichever is lower. – 100kW-199kW DCFCs **receive up to 50% of project costs to a maximum of $75,000 per charger, capped at $225,000 per project or 50% of total project costs**, whichever is lower. – 200kW or greater DCFCs **receive up to 50% of project costs to a maximum of $100,000 per charger, capped at $300,000 per project or 50% of total project costs**, whichever is lower.

Table 49 Overview of funding opportunities

Fund Name	Funds Available for:	Maximum Allowable Funds/Services
BC Hydro[8]	– **Electrical infrastructure** to support EV charging (linked) – **Pilot projects** (linked)	Electrical infrastructure incentive: – **Up to 50% of infrastructure costs**, not including charging equipment – **Funding amount** is determined **based on** a review of **costs, electrification opportunities, emission savings,** and the overall **business case** EV fleet pilot project incentive: – **Short-term trials of commercial battery EVs**. Funding amounts are based on an evaluation of the scope of work, the projected benefits and value proposition, in addition to the associated costs for the testing. – **Funding will be on a reimbursement basis** in accordance with your agreement. You will need to submit copies of all paid invoices and any other required documents or reports as identified in your agreement
Green Freight Program[8]	– Third-party fleet **energy assessments** – Truck/trailer **equipment retrofits**	Fleet energy assessments: – The program provides **up to 50% per company**, to a **maximum of $40,000** Truck/trailer equipment retrofits: – The program has established a list of **eligible technologies** and will provide **up to 50% per device.** The **maximum amount** payable for eligible activities under Stream 1 is **$250,000 per applicant**
iMHZEV[10] **(Incentives for Medium- and Heavy-Duty Zero-Emission Vehicles)**	– Canadian organizations and businesses (subject to funding availability) who **buy or lease an eligible MHZEV**. Only the **vehicles listed on the website are eligible** for an incentive when they're **purchased or leased for at least 12 months,** on or after the **eligibility date** – **Source for which vehicles are eligible for an incentive, or a vehicle's eligibility date** (linked)	– Eligible organizations can receive up to **10 incentives or a maximum of $1,000,000 per calendar year (whichever comes first).** – Maximum available **incentive for each vehicle** is **up to $200,000**

Table 49 Overview of funding opportunities

Fund Name	Funds Available for:	Maximum Allowable Funds/Services
iZEV[11] **(Incentives for Zero-Emission Vehicles)**	– ***This program has been paused effective January 12th, 2025, due to full commitment of the allocated funds.*** – Consumers (subject to funding availability) who **buy or lease an eligible ZEV vehicle.** Only the vehicles listed on our website are eligible for an incentive when they're **purchased or leased for at least 12 months**, on or after the **eligibility date**	**Total limit of 10 incentives per applicant** – Battery-electric, hydrogen fuel cell, and longer-range plug-in hybrid EVs (range **greater than or equal to 50 km**): – Eligible for **up to $5,000** Shorter-range plug-in hybrid EVs (range **under 50 km**): – Eligible for **up to $2,500**
CleanBC[12] **(Go Electric Rebates) *previously named SUVI***	– **On-road medium- and heavy-duty vehicles, low-speed vehicles, utility vehicles**	On road medium & heavy duty vehicle: – Maximum rebate of **$150,000 or 33% of the purchase price**, whichever is lower Low-speed vehicle – For battery capacity 15.9kwh & below : **$2,000 (max rebate)** – For battery capacity 16kwh and above: **$5,000 (max rebate)** Utility Vehicles – **$2000 (max rebate)**

– Additional details on the application process of each of the seven **funding** opportunities are listed in Table 51. Some fields are hyperlinked to the relevant website. These links are labelled.

Table 52 Funding programs and application/eligibility process

Fund	Application/Eligibility Requirements
FCM[6] **(Green Municipal Fund)**	1. Download and **review the application guide (linked).** 2. Review the **prerequisites and required supporting documents (linked).** 3. Review **eligible and ineligible costs (linked).** 4. Ensure you have a **detailed project budget** in place. 5. Visit the **FCM funding portal (linked)** to create your profile and request a PIN to access the system. ***Already have an FCM funding portal profile? Skip to Step 7.*** 6. Complete the **pre-application form** available on the platform.
CleanBC[7] **(Go Electric Fleet Charging Program)**	1. Be located in B.C 2. Legal entities validly incorporated or registered in Canada, including not-for-profit and for-profit organizations installing EV infrastructure in B.C. 3. Have fleet vehicles registered to your organization registered in B.C. 4. Apply for pre-approval
BC Hydro[8]	– **Electrical infrastructure incentive:** 1. You must have an EV Ready fleet plan that's been approved by BC Hydro and have received pre-approval for electrical infrastructure funding based on that plan. – **EV fleet pilot project:** 1. Submit an EV fleet pilot project application. 2. BC hydro reviews application to determine project eligibility. 3. If approved, BC Hydro will send a funding agreement for the project, including the amount of funding BC Hydro will be able to provide. – **Application process depends on the specific rebate or incentive and are subject to frequent changes. It is suggested to liaise with the BC Hydro EV Fleets website to assess the specific requirements.**

Table 50 Funding programs and application/eligibility process

Fund	Application/Eligibility Requirements
Green Freight Program[9]	Vehicles and/or trailers must: – Have been **in service for a minimum of one (1) year**; and – Be within the **eligible vehicles weight classes** (2B to 8) Apply for a **Third-Party Fleet Energy Assessment Grant** 1. Applicant must review and ensure they **meet the eligibility criteria**; 2. **Purchase and complete** a third-party **Fleet Energy Assessment** that meets NRCan's Assessment Criteria; 3. **Email** freightassessment-evaluationdeflotte@nrcan-rncan.gc.ca to **receive a copy of the application form**; 4. **Email a signed and completed Grant Application Form** with all supporting documentation to freightassessment-evaluationdeflotte@nrcan-rncan.gc.ca; 5. If the application is deemed acceptable, **NRCan will send the applicant a Grant Agreement** which they must sign and email to freightassessment-evaluationdeflotte@nrcan-rncan.gc.ca; and 6. **Receive grant.** Apply for a **Truck/Trailer Retrofit Grant** 1. Applicant must review and ensure they **meet the eligibility criteria;** 2. Have a **valid Fleet Energy Assessment report** that meets the minimum requirements in NRCan's Fleet Energy Assessment Checklist; 3. **Purchase and install new fuel-saving device(s)** that was recommended in the Applicant's Fleet Energy Assessment; 4. **Email** freightassessment-evaluationdeflotte@nrcan-rncan.gc.ca to **receive a copy of the application form**; 5. **Email a signed and completed Grant Application Form** with all supporting documentation to freightassessment-evaluationdeflotte@nrcan-rncan.gc.ca; 6. If the application is deemed acceptable, **NRCan will send the applicant a Grant Agreement** which they must sign and email to freightassessment-evaluationdeflotte@nrcan-rncan.gc.ca; 7. **Receive grant.**

Table 50 Funding programs and application/eligibility process

Fund	Application/Eligibility Requirements
iMHZEV[10]	The following vehicle attributes meet the **eligibility criteria (MHZEV):** – **Battery-electric;** – **Plug-in hybrid electric; or** – **Hydrogen fuel cell** – **Medium or heavy-duty vehicle** (i.e., have a gross weight rating greater than 8,500 lbs); – **Adherence to all of Canada's Motor Vehicle Safety Standards**, where **applicable**; – **Available for order/purchase/lease in Canada**; – **Intended for use on public streets, roads, and highways** or other paved surfaces; – **Registered in Canada** in the eligible recipient organization's name, where applicable; and – **Vehicle classes 2B and 3 only**: a medium-duty passenger vehicle **(MDPV) with an MSRP equal to or below $100,000**, **or a commercial vehicle.** o To be considered a commercial vehicle, the vehicle model must satisfy one or more of the following **commercial vehicle criteria:** ▪ have a **seating capacity of 9 passengers or more;** ▪ have a **cargo area** (for example, a pick-up truck box or bed) **of at least 183 cm** (72 in. or 6ft) **in interior length**; or ▪ be a **truck with container attachment capabilities** (e.g., chassis cab, half truck). – **Zero emission vocational on-road trucks** (e.g., refuse or dump trucks) **are eligible as yard/shunt and drayage trucks**. Zero-emission shuttle or coach buses are also eligible. • Transport Canada may exclude certain types of vehicles from the program such as transit buses, school buses, recreational vehicles (RVs), or off-road vehicles. – **Conversions** (i.e., converting an existing internal combustion engine (ICE) vehicle to ZEV) **are not eligible.** To be eligible under the iMHZEV Program, an **eligible recipient organization must:** – **be a Canadian Business / Organization** with an office registered in Canada.

Table 50 Funding programs and application/eligibility process

Fund	Application/Eligibility Requirements
iZEV[11]	– ***This program has been paused effective January 12th, 2025, due to full commitment of the allocated funds.***
CleanBC[12] **(Go Electric Rebates)** ***previously named SUVI***	1. **Applicant must be** an **individual, a business, a non-profit, or a public entity**. 2. If you are applying as business/fleets, a **copy of the valid business license** must be uploaded with the application. 3. You must **submit copies of proof of ID, utility bills, vehicle insurance, vehicle registration, and WorkSafe BC number**. 4. Vehicle must be **purchased in Canada** and through authorized dealers or directly from the OEM. 5. The vehicle must be **listed on the Go Electric Other Rebates eligibility list** prior to purchase. 6. **Applications** for any vehicle category must be **received within 90 days of purchasing the vehicle.** 7. If the **vehicle is leased**, it must be for a minimum of 36 months to quality for the full value of the rebate. 8. **Proof of Vehicle Purchase** showing it is **new, certified and constructed entirely from new parts** that have never been the subject of a retail sale, or previously registered in British Columbia or other jurisdiction. See program guide for details.

6.4 Risk and Uncertainty Management

Table 53 presents a list of potential risks and uncertainties associated with the implementation of the recommended ZEV fleet transition plan, as well as potential mitigation strategies.

Table 53 Risks and mitigation strategies of recommended implementation plan

Risks and Uncertainties	Mitigation Strategies
Financial Uncertainties – The estimated cost and recommended budgets for implementing this plan may be affected by external factors, such as inflation rates, tariffs, EV price variations, and rebate availability.	– Stay informed of ZEV pricing as ZEV costs are estimated to decrease with an influx in production efficiency and market competition. – Stay informed on available rebates and utilize them prior to program termination. – Obtain contracts or quotes with ZEV vehicle suppliers in early phases of the implementation plan to confirm procurement strategies.
Fuel Volume Targets – This implementation plan focussed on the electrification of existing fleet units to decrease the annual fuel consumption of the existing fleet units. Thus, the effect of increased fuel volumes due to new fleet vehicles or increased use was excluded from this assessment. If fleet operations change significantly to utilize more fuel or obtain more conventional vehicles, there is a risk that the OCP fleet fuel volume goals in 2030, 2040, and 2050 may not be met.	– Where possible, procure zero-emission vehicles for fleet expansion. – Where possible, operate existing conventional vehicles and equipment beyond their best-practice service life as they await electrification. – Decrease fleet fuel consumption through other methods such as behavioural or policy shifts (e-bike usage, trip planning, anti-idling policy).
Vehicle Availability and Market Readiness – Some fleet units do not currently have an equivalent ZEV model on the market. The implementation plan assumes the availability of all equivalent models at the time of their replacement (2030 and beyond). The implementation plan also recommends the electrification of 4 Medium Duty trucks in 2027 and 2028, noting the risk of potential market unavailability. Further, recommended ZEV replacement models in the implementation plan may be subject to change as more ZEV models become available.	– Stay informed of ZEV market availability and modify the vehicle replacement schedule based on ZEV availability and high-fuel consuming units. – If ZEV models are unavailable at the time of vehicle replacement, opt to electrify other units with available models, or electrify other units earlier than scheduled to progress fuel reduction goals. – Consider downsizing fleet vehicles with an available electric alternative, where possible.

Table 51 Risks and mitigation strategies of recommended implementation plan

Risks and Uncertainties	Mitigation Strategies
Emergency Operations Vehicles – The implementation plan recommends that eight emergency operations units are replaced with hybrid options between 2026 and 2029 to reduce fuel consumption and provide back-up power for emergency operations. Beginning in 2030, all emergency operations units transition to BEV, assuming BEV models pose no impacts to operations and can maintain reliability in emergency operations. There is uncertainty that the proposed hybrid and BEV options are suitable for use in emergency operations at the time of vehicle replacement.	– Stay informed on market availability as EV technology further develops to assess the need for hybrid vehicles in the emergency operations fleet. – Pilot hybrid and electric vehicles to assess their feasibility and effectiveness to complete emergency operations duties.
Vehicle Charging and Fleet Site Capacity – The implementation plan focussed on the transition of the existing fleet. This includes schedules for EV infrastructure, such as charging equipment and infrastructure upgrades. Should new electric fleet units be added to the fleet, the infrastructure and charging strategy will require consideration of the new fleet vehicles. This presents uncertainty of additional infrastructure upgrades and charging equipment at each fleet location.	– When purchasing new EV units, refer to recommended charger sizing and capacities of different vehicle classifications for capital project planning. – Consult with EV consultants and electricity service providers regarding EV charger expansion and site capacities. – Consider alternative energy sources in the charging plan, such as solar-powered backup charging for high-capacity sites such as the Operations Yard. – Update vehicle operations management and policy to include considerations for EV charging practices and charger sharing.

6.5 Future Considerations

To support the implementation of the zero-emission fleet transition plan, the following considerations are recommended for further study:

- Investigate microgrids and battery energy storage systems (BESS) for increased reliability of EV chargers. Microgrids are powered by renewable energy sources such as solar power or wind power and can be used to charge electric vehicles. Microgrids reduce reliance on the main grid (beneficial in times of power outages or peak demand) and can store excess power generated to be used later or sold back to the grid.
- BC Hydro has rebates available for the purchase of solar panels and battery energy storage systems for this endeavor. The combined value of the solar panel and battery storage rebates is a maximum of $50,000.

- Engage fleet maintenance staff on current knowledge and educational opportunities for electric vehicle maintenance training. Allocate necessary budget for training and upskilling maintenance staff to prevent operational delays and unexpected costs.
    - Locally, Camosun College and BCIT offer courses (up to 36 hours total) and micro-credentials toward EV Maintenance Training.
- Update fleets management policies and decision-making processes to support the zero-emission vehicle transition and the progress towards decreasing fleet fuel consumption. Investigate options to reduce fleet size and only procure zero-emission vehicles for fleet expansion, where possible.
- Explore options for electric fleet parking and charging at staff residences. Develop a cost per kilometre compensation rate that reimburses the cost of electricity for employees who charge fleet vehicles at their residences (Fire Department).

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8. Scope and Limitations

1. This report has been prepared by GHD for the City of Courtenay and may only be used and relied on by the City of Courtenay for the purpose agreed between GHD and the City of Courtenay as set out in this report.
2. GHD has prepared this report on the basis of information provided by the City of Courtenay and others who provided information to GHD (including Government authorities), which GHD has not independently verified or checked beyond the agreed scope of work. GHD does not accept liability in connection with such unverified information, including errors and omissions in the report which were caused by errors or omissions in that information.
3. Funding opportunities and information is current as of June 12th, 2025.
4. Cost estimates (unless otherwise stated within this report) are projections based on 2025 available data and are subject to market changes, inflation, and site situational requirements for the City of Courtenay as detailed design progresses. Additional study and design will be required to further evaluation capital costs for the fleet transition.

City of Courtenay

Appendix A
Fleet Analysis



GHD

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1. Methodology

All calculations were completed using the input parameters specified and processed using the GHD ZEVO™ tool.

1.1. Assumptions

To address gaps and uncertainties within the dataset, various external data sources were consulted. A summary of the assumptions made in the analysis are presented in Table 1.

Table 1 Project assumptions utilized for data gaps

Project section	Data gap	Assumption and source, if applicable
Emissions	Fuel Efficiency	City of Courtenay 2024 fuel usage and efficiency data were used for ICE vehicles. 4 pieces of equipment did not have recorded fuel data, and assumptions were made based of similar equipment units in the fleet. BEV efficiency was based on OEM data or interpolated estimates when no OEM data were available.
Operating Expenditure (OPEX)	Maintenance Costs	ICE vehicle maintenance costs were provided by the City, and averages were calculated by class, including labor, maintenance, and insurance. BEV maintenance costs are assumed to be 70% of ICE costs, based on literature and referencing maintenance trends.
OPEX	Energy Prices	Gasoline, diesel, and electricity prices from August 2024 were used as the base for analysis.
OPEX	Cost per kilometre	OPEX costs were averaged by classification, noting that some units may bear higher maintenance costs.
CAPEX	Leasing	To maintain consistency in leasing costs, the Government of Canada's Vehicle Lease or Loan Calculator was used. The leasing period was selected as 36 months (3 years). An interest rate of 8.35% (prime + 2%) was assumed as a conservative scenario for leasing. The leasing analysis assumed no buyout value, such that the monthly leasing costs over the lease period would cover the total cost of the vehicle to align with the comparison scenario of purchasing the vehicle outright.
Fleet Assessment	Working Days	As the result of the analysis are presented year-by-year, the parameters focus on annual metrics, such as kilometres or hours of operation per year, litres per year, fuel cost per year, and

		maintenance cost per year. It should be noted that the analysis assumes a year as 260 working days for each fleet vehicle.
Total Cost of Operation	Inflation	Factors for inflation were not applied in the analysis. Inflation factors are available in the Implementation Plans presented in Appendix D and Appendix E.
Fleet Assessment	Concept Vehicles	Medium- and heavy-duty vehicles which don't have a market-available BEV replacement were replaced with Concept Vehicles, with estimated parameters based on related BEVs along with general assumptions.

2. Data Collection

GHD gathered quantitative and qualitative data to assess the current conditions and operations of the City of Courtenay fleet. This data collection involved spreadsheet exchanges, asset management logs, annual odometer and fuel usage logs, site visits, and fleet management interviews. The data collected and provided to GHD included:

- Vehicle information, such as make & model, build year, duty classification, unit number, and VIN
- Vehicle usage details, including department, emergency status, overnight parking location, and service life
- Vehicle type and segment (e.g., SUV, truck, forklift)
- Odometer readings (used to calculate average yearly kilometers or hours)
- Annual maintenance costs
- Annual fuel usage
- Annual average fuel efficiency

Fleet management interviews were conducted to obtain information regarding vehicle and site operations, covering the vehicle usage in both day-to-day work and potential extreme case scenarios. The data collected and provided to GHD included:

- Parking locations
- Fleet sizing
- Payload and towing requirements
- Daily cycles (first to leave, last to return) and daily travel (in kilometers)
- Weather considerations (snow plowing, heating/cooling)
- Emergency vehicle operations

- General concerns regarding electrification and/or decarbonization

A site investigation was also conducted on July 24th, 2024. The objective of the site investigation was to assess the existing electrical infrastructure at each of the four key vehicle parking sites:

1. Courtney – City Hall
2. Courtenay Fire Department
3. Operations Yard
4. Lewis Centre

2.1. Market Scan

The primary barriers to battery electric vehicle (BEV) adoption are the availability of BEV models and the accessibility and reliability of charging infrastructure, especially for units that are required to always be on emergency standby. While the availability of BEVs is expanding rapidly, it remains primarily concentrated in popular light-duty vehicle categories, with limited options for medium/heavy-duty and specialty models. A market scan conducted by GHD identified potential BEV models for the City's fleet, highlighting MSRPs, battery capacities, ranges, and emerging technologies to support long-term planning.

The market scan is not exhaustive, as BEV information for certain vehicle types is not readily available online, however, the data collected has been used in scenario analyses to estimate BEV pricing and in infrastructure planning to assess energy requirements. Summaries of the market scan for each vehicle type in the fleet are provided in Table 2Table 8, with all prices listed in Canadian dollars. Please note that this scan is current as of 2025 and may not accurately reflect future market conditions, as the BEV landscape is rapidly evolving.

Table 2 Market Scan – SUVs

Chevrolet Bolt EUV – MSRP: $44,000 – Range: 397 km – Efficiency: 17.6 kWh/100 km	

KIA Niro EV – MSRP: $45,000 – Range: 407 km – Efficiency: 18.3 kWh/100 km	

Table 3 Market Scan - Pick-up trucks

Ford F-150 Lightning (98 kWh) – MSRP: $63,000 – Battery Size: 98 kWh (386 km range) – Towing: 5,000 lbs	
Chevy Silverado EV – MSRP: $80,000 – Battery Size: 205 kWh (792 km range) – Towing: 12,500 lbs	
Dodge Ram 1500 BEV *(2026 availability)* – MSRP: $85,000 (estimation) – Battery Size: 168 kWh (560 km range) – Towing: 14,000 lbs	

Table 4 Market Scan – Medium-duty trucks

Greenpower EV Star – MSRP: $75,000 – Battery size: 118 kWh battery (241 km range)	

– Class 4 (medium) – Van, cube or chassis cab models	
Ford E-transit Cargo Van – MSRP: $75,000 – Battery size: 60 kWh battery (203 km range) – Class 2B (light duty) – Van, cube or chassis cab models	

Table 5 Market Scan – Heavy-duty trucks

Peterbilt 579EV – MSRP: $834,135 – Battery size: 500 kWh (150km range)	

Table 6 Market Scan – Fire trucks

Rosenbauer RT – MSRP: Approximately $2,450,000 – Battery size: Unknown – Currently used by City of Vancouver and City of Victoria	
Pierce Volterra – MSRP: Unknown – Battery Size: 155 kWh battery pack (Plug in Hybrid model) – One dealer in Delta, BC	

Table 7 Market Scan - Excavators

Soletrac e25 Backhoe Tractor – MSRP: from $26,000 – Battery size: 22 kW	
JCB 19C-1E Excavator – MSRP: $130,000 – Battery size: 19.8 kWh	
Large excavators No commercially available EVs currently. Check availability during periodic market revaluations.	

Table 8 Market Scan - Equipment

Mower - Cub cadet ZT1 42E – MSRP: $7,600 – Battery size: Unknown (3kWh range or approximately 3.5 acres) – Can be charged using a 110 V outlet	
Forklift - CAT EP40-55(C)N(H) – MSRP: Unknown – Battery size: Unknown – 4500 kg capacity – Battery voltage: 80V (Power: 16 kWh)	

UTV - Greenworks U800SD – MSRP: $42,000 – Battery size: 16 kWh – Range: 120km	
Skid Steer - Kovavo Elise 900 – MSRP: $80,000 – Battery size: Unknown (6 hours of battery operation) – 700-1200 kg load capacity	

3. Analysis Details

Table 9 summarizes the existing conventional vehicles in the fleet that were included in the analysis and implementation plan (Appendix D).

Table 9 City of Courtenay fleet units in study

Unit	Year	Make	Model	Vehicle Category	Vehicle Location
E16003	2023	Ford	F550 Dump Truck	Operations Yard	Truck - Dump Single
E17018	2003	Volvo	Loader	Operations Yard	Loader
E17032	2003	GMC	Dump	Operations Yard	Truck - Dump Single
E17034	2004	Sterling	Dump	Operations Yard	Truck - Dump Single
E17055	1990	Cat	Loader	Operations Yard	Loader
E17071	1997	Freightliner	Crane Truck	Operations Yard	Truck - Flat Deck
E17087	1999	Kubota	Tractor	Operations Yard	Tractor
E17104	2005	GMC	Sierra	Operations Yard	Pickup ¾ ton
E17105	2005	GMC	Sierra	Operations Yard	Pickup ¾ ton
E17113	2006	Kubota	Mower	Operations Yard	Mower - medium
E17115	2007	Sterling	L8500	Operations Yard	Truck - Dump Single
E17116	1995	Champ	720 A	Operations Yard	Grader

E17124	2008	Ford	F250	Operations Yard	Pickup ¾ ton
E17125	2008	Ford	F250	Operations Yard	Pickup ¾ ton
E17126	2008	Chevrolet	SILVR - Cab/Chassis	Operations Yard	Pickup 1 ton
E17131	2009	Chevrolet	Colorado LS Extended Cab	City Hall	Pickup mid-size
E17134	2009	Pontiac	Vibe	City Hall	SUV
E17137	2009	Freightliner	Dump	Operations Yard	Truck - Dump Single
E17140	2008	Kubota	F3680	Operations Yard	Mower - medium
E17144	2009	Kubota	Cab Tractor	Other	Tractor
E17145	2008	Dodge	Sprinter Van	Operations Yard	Van - Cargo large
E17148	2010	Dodge	Patriot	City Hall	SUV
E17149	2004	Daewooo	D45S-2	Operations Yard	Forklift
E17150	2011	Ford	F450	Operations Yard	Truck - Service
E17151	2011	Ford	F450	Operations Yard	Truck - Service
E17154	2012	Dodge	Ram 1500	Operations Yard	Pickup ½ ton
E17155	2012	Dodge	Ram 1500	Operations Yard	Pickup ½ ton
E17156	2012	Dodge	Ram 1500	Operations Yard	Pickup ½ ton
E17157	2011	Kubota	2D331	Operations Yard	Mower - medium
E17158	2012	Ford	F150	Lewis Centre	Pickup ½ ton
E17159	2012	Ford	F550 Chassis 1400 Haul All	Operations Yard	Truck - Garbage small
E17160	2013	Dodge	Cargo Van	Operations Yard	Van - Cargo small
E17164	2015	Nissan	Rogue S	Operations Yard	SUV
E17165	2015	Nissan	Rogue S	Operations Yard	SUV
E17166	2015	Nissan	Frontier 4 WD	Operations Yard	Pickup mid-size
E17167	2015	Nissan	Frontier S 2 WD	Lewis Centre	Pickup mid-size
E17168	2015	Ford	F250	Operations Yard	Pickup ¾ ton
E17169	2015	Ford	Focus	City Hall	SUV
E17170	2015	Ford	F-350 S	Operations Yard	Pickup 1 ton
E17171	2015	Ford	F-350 SR	Operations Yard	Pickup 1 ton
E17173	2015	John Deere	410L	Operations Yard	Backhoe

E17174	2015	John Deere	410L	Operations Yard	Backhoe
E17176	2017	Western Star	114SD	Operations Yard	Truck - Dump Tandem
E17178	2016	Dodge	RAM 4500 FLATDECK	Operations Yard	Truck - Flat Deck
E17179	2017	Ford	F250 4WD	Operations Yard	Pickup ¾ ton
E17180	2016	Toro	Groundmaster 4010D	Operations Yard	Mower - large
E17181	2017	Ford	F550	Operations Yard	Truck - Small Dump
E17182	2017	Kubota	SVL75	Operations Yard	Skidsteer
E17184	2017	MISC	MW Series	Operations Yard	Foamstream System
E17185	2017	Ford	F250	Operations Yard	Pickup ¾ ton
E17186	2017	GMC	Terrain SLE AWD	Operations Yard	SUV
E17187	2017	GMC	Terrain SLE AWD	Operations Yard	SUV
E17188	2017	Volvo	Bomag BW120	Operations Yard	Tandem Roller
E17189	2017	Ford	F550	Operations Yard	Truck - Small Dump
E17190	2017	Ford	Transit 250 Van	Operations Yard	Van - Cargo large
E17191	2018	Peterbilt	348	Operations Yard	Truck - Dump Single
E17192	2018	Ford	F150	Operations Yard	Pickup ½ ton
E17193	2017	Cat	924K	Operations Yard	Loader/Brush Cutter
E17194	2017	Kubota	M4900	Operations Yard	Tractor
E17196	2018	Ver-Mac	BC1000XL	Operations Yard	Chipper
E17197	2018	Toro	Sandpro 08705	Operations Yard	Sandpro
E17198	2018	Kubota	L5460	Operations Yard	Tractor
E17199	2018	Toro	Groundmaster 3280D	Operations Yard	Mower - large
E17200	2018	Ford	F150 Supercab	Operations Yard	Pickup ½ ton
E17201	2018	Ford	Ford F550 Dakota Body Versalif	Operations Yard	Truck - Bucket
E17202	2018	Toro	Workman HDX	Operations Yard	Utility Vehicle
E17203	2019	Chevrolet	Equinox LS AWD	Operations Yard	SUV
E17204	2018	Izuzu	NPRHD	Operations Yard	Truck - Arborist

E17205	2019	Ford	F250	Operations Yard	Pickup ¾ ton
E17207	2019	Wacker	DPU6555	Operations Yard	Compactor
E17209	2019	Ford	F550	Operations Yard	Truck - Service
E17210	2019	Ventrac	4500Z	Operations Yard	Mower - large
E17211	2019	Nissan	NV200S	Operations Yard	Van - Cargo small
E17213	2020	Freightliner	Vacall	Operations Yard	Vacuum Truck
E17214	2019	Ford	F150 Crewcab 4x4	Operations Yard	Pickup ½ ton
E17216	2019	Ford	F250	Operations Yard	Pickup ¾ ton
E17217	2019	Ford	F250	Operations Yard	Pickup ¾ ton
E17218	2021	ELGIN	Crosswind	Operations Yard	Street Sweeper
E17219	2021	Ford	F350	Operations Yard	Pickup 1 ton
E17220	2021	Ford	F205 XL	Operations Yard	Pickup ¾ ton
E17221	2021	Ford	F250 XL	Operations Yard	Pickup ¾ ton
E17222	2021	Chevrolet	Shuttle Bus	Operations Yard	Bus
E17224	2022	Bobcat	S7 Skidsteer	Operations Yard	Skidsteer
E17226	2023	Ford	Escape	City Hall	SUV
E17227	2023	Ford	F250	City Hall	Pickup ¾ ton
E17228	2023	John Deere	410P Backhoe Loader	Operations Yard	Backhoe/Loader
E17229	2024	International	HV607	Operations Yard	Truck - Flat Deck
E17231	2024	Bobcat	S70	Operations Yard	Skidsteer
E65930	2021	GMC	Sierra 2500	Operations Yard	Pickup ¾ ton
FD10-B	2015	Spartan	Pumper Truck	Courtenay Fire Department	Fire Truck
FD11*	1995	Superior	Superior	Courtenay Fire Department	Fire Truck
FD12-A*	2002	Spartan	Spartan	Courtenay Fire Department	Fire Truck
FD12-B	2022	Sutphen	SPH100 Aerial Platform	Courtenay Fire Department	Fire Truck
FD14-A	2007	Freightliner	Freightliner	Courtenay Fire Department	Fire Truck

FD15-A	2008	Spartan	Gladiator	Courtenay Fire Department	Fire Truck
FD16C	2023	GMC	Silverado 1500	Courtenay Fire Department	Fire Department Utility Vehicle
FD18-B	2016	Chevrolet	Tahoe	Courtenay Fire Department	Fire Department Utility Vehicle
FD18-C	2023	Chevrolet	Tahoe	Courtenay Fire Department	Fire Department Utility Vehicle
FD19-B	2019	Chevrolet	Tahoe	Courtenay Fire Department	Fire Department Utility Vehicle
FD71-B	2013	Spartan	Pumper Truck	Courtenay Fire Department	Fire Truck
FD72-B	2018	Chevrolet	Silverado	Courtenay Fire Department	Fire Department Utility Vehicle
FD73	2015	Nissan	NV3500	Courtenay Fire Department	Fire Department Utility Vehicle

** Reserve unit. These are active Fire Department units, however, were not included in the fleet assessment nor financial analysis due to their short-term availability.*

As the results of the analysis are presented year-by-year, the parameters focus on annual metrics, such as kilometres or hours of operation per year, litres per year, fuel cost per year, and maintenance cost per year. It should be noted that the analysis assumes a year as 260 working days for each fleet vehicle and uses 2024 data.

3.1. Scenario Objectives and Input

The evaluation of multiple scenarios aims to provide the City with a clear understanding of how different paths affect the transition to an electric fleet. The baseline scenario assumes no decarbonization efforts, with vehicles replaced by equivalent ICE models throughout the study period. While this scenario is not intended as a viable future option, it serves as a reference point to compare the outcomes of decarbonization scenarios. The other two scenarios explore transition strategies to assess the budget required to transition the fleet to meet emission and fuel reduction gaols. Table 10 provides a summary of static and variable parameters within each scenario, with detailed input parameter values listed in Table 11.

Table 10 Static vs. variable scenario parameters

Static Parameters	Variable Parameters
Fleet composition (no vehicles are added or removed)	Vehicle replacement models (ICE vs. BEV)
Fleet operations (no changes to driving distances, driving times, yard locations, daily duties, etc.)	Energy Type (gasoline, diesel, electric, etc.)
Vehicle replacement schedule	BEV Conversion Rate

Table 11 Summary of input parameters

Parameter	Value	Unit	Source
Gasoline price*	$1.74	$/L	Average gasoline price in Courtenay during study
Diesel price*	$1.77	$/L	Average diesel price in Courtenay during study
Electricity price**	$0.1044	$/kWh	Blended rate for electricity costs based on 2024 BC Hydro rates
Grid carbon intensity	11.5	gCO_2e/kWh	Canada Energy Regulator – National Inventory Report

** Gas and diesel prices for scenario analysis were established in August 2024.*

*** The electricity rate is a blended rate between the fleet electrification overnight rate (which does not include demand charges), and the medium general services rate.*

3.2. Scenario Selection

Zero-emission scenarios were developed in collaboration the City following an analysis of the City's existing fleet. These scenarios detail the constraints and goals of each model. A total of three scenarios were established: a 'business as usual' scenario (Scenario 1), a 'meeting provincial targets scenario (Scenario 2), and a 'meeting OCP targets' scenario (Scenario 3). The parameters of each scenario are outlined in Table 12.

Table 12 Decarbonization scenario parameters

Scenario No.	Scenario Name	Parameters
1	**Business-as-usual**	– All vehicle replacements are equivalent to the existing vehicle type (gas for gas, diesel for diesel). – Serves as a baseline to compare other scenarios. – Fleet replacements prioritized by high vehicle usage and completion of best practice service life. – Fleet replacements guided by existing 5-year Financial Plan.
2	**Meeting provincial targets**	– Meet fleet fuel reduction goals based off provincial GHG emission reduction targets (105,400 L by 2030, 64,000 L by 2040, 31,000 L by 2050). – Transition vehicles to hybrid and electric for the entire fleet, where feasible. – Fleet replacements guided by best practice service life, and prioritized transition of high-polluting assets. – Examine financial options of leasing versus owning in electric vehicle procurement. – Proceed with recommendations for any required electrical upgrades at all fleet storage locations.
3	**Meeting OCP targets**	– Meet OCP-defined fleet fuel volume goals (83,500 L by 2030, 30,380 L by 2040, 0 L by 2050). – Transition vehicles to hybrid and electric for the entire fleet, where feasible. – Fleet replacements guided by best practice service life, and prioritized transition of high-polluting assets. – Examine financial options of leasing versus owning in electric vehicle procurement. – Proceed with recommendations for any required electrical upgrades at all fleet storage locations.

3.3. Vehicle Pricing

Average vehicle pricing was identified for each vehicle type listed in Table 13. All vehicle prices include 12% PST and are rounded to the nearest $1,000. ICE vehicle prices are based on the City's past vehicle purchases and manufacturer's suggested retail price (MSRP), with PST and rounding applied. BEV prices are based on MSRP's from manufacturer websites for light duty vehicles, the CleanBC database

for medium and heavy-duty vehicles, and industry averages, with PST and rounding applied. On average, light-duty BEVs are 30% more expensive than their ICE equivalents, while medium/heavy-duty BEVs are 100% more. Note that the vehicle types, makes, and models in the analysis are representative vehicle types of similarly grouped vehicles. For example, Light Equipment consists of units such as mowers, skid steers, and loaders, and Medium/ Heavy equipment consists of units such as tractors, graders, and backhoes. These types were consolidated as a result of their similar average pricing and power consumption.

Note that the vehicles used in the analysis are representative for the scenario analysis. The list of analyzed vehicles and the list of vehicles to procure may not be the same, however, the BEVs identified in the analysis have similar ranges and power consumption to other vehicles on the market.

Table 13 ICE vehicle and corresponding BEV replacement options

Vehicle Category	Make and Model	Type	Average Pricing ($)
SUV	Chevrolet Bolt EUV	BEV	$60,000
SUV	Nissan Rogue S	ICE	$40,000
Van	Ford E-Transit	BEV	$84,000
Van	Ford Transit	ICE	$70,000
Light Truck	Ford F-150 Lightning Pro	BEV	$80,000
Light Truck	Nissan Frontier	ICE	$60,000
Medium Truck	Concept Ford 350 EV	BEV	$115,000
Medium Truck	Ford F-350	ICE	$75,000
Heavy Truck	Concept Ford F550 EV	BEV	$200,000
Heavy Truck	Ford F-550	ICE	$105,000
Light Equipment	STIHL RZA	BEV	$45,000
Light Equipment	Kubota Mower	ICE	$45,000
Med/Heavy Equipment	L25 Electric - Electric compact wheel loader	BEV	$190,000
Med/Heavy Equipment	Bobcat Skidsteer	ICE	$185,000
Street Sweeper/Vacuum Truck	Elgin Broom Bear	BEV	$1,000,000
Street Sweeper/Vacuum Truck	Elgin Crosswind	ICE	$560,000
Fire Truck	Rosenbauer Electric Fire Truck	BEV	$2,750,000
Fire Truck	Spartan Pumper Truck	ICE	$650,000
SUV	Ford Escape PHEV	*Hybrid (PHEV)*	$40,000
Light Truck	Ford Maverick XL	*Hybrid (mild)*	$45,000

City of Courtenay

Appendix B
Infrastructure Analysis



1. Infrastructure 1

1.1. Existing Electrical Infrastructure 1

1.1.1. Courtenay - City Hall 1

1.1.2. Courtenay Fire Department 1

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1.5. Energy Rates 13

1. Infrastructure

As part of the fleet transition study, AES Engineering investigated the electrical capacity at the four (4) proposed sites and provided an estimate of the work required to sufficiently support fleet charging. The estimate of required work was informed by the site visit results, conducted on July 26th, 2024, and supporting information provided by the City.

The proposed electrical vehicle charging infrastructure is for electrifying the fleet vehicles at the Courtenay City Hall located at 830 Cliffe Avenue, the Courtenay Fire Department located at 650 Cumberland Road, the Courtenay Operations Yard located at 1000 Piercy Avenue, and the Lewis Centre located at 489 Old Island Highway.

The electrical implementation options explored are for Scenarios 2 and 3, which require the same amount of infrastructure but differ in implementation schedules.

The opinion of probable costs for infrastructure for the combined four (4) sites is $2,635,500. The combined cost of chargers is estimated to be an additional $772,500.

1.1. Existing Electrical Infrastructure

1.1.1. Courtenay - City Hall

There is one (1) existing level-2 EV charger at the City Hall that is dedicated to public charging.

The existing electrical service to the City Hall is 208V and 3-phase. The main switch of the site has an ampacity rating of 800A. The site-wide capacity is **231 kilo-volt-amperes (kVA)**.

Historical data recorded from BC Hydro over one year found that the peak demand at the City Hall was **50 kilowatts (kW)**. Subtracting the peak demand from the site-wide capacity leaves **181 kW** of available capacity that can be used for EV charging.

1.1.2. Courtenay Fire Department

The electrical service to the Courtenay Fire Department is 208V and 3-phase. The main switch at the Fire Department has an ampacity rating of 600A. The site-wide capacity is **173 kVA**.

Historical data recorded from BC Hydro over one year found that the peak demand at the Fire Department was **51 kW**. Subtracting the peak demand from the site-wide capacity leaves **122 kW** of available capacity that can be used for EV charging.

1.1.3. Operations Yard

There are five (5) existing level-2, dual-head chargers at the Operations Yard.

The Operations Yard has an electrical service of 208V and 3-phase. The main switch at the Operations Yard has an ampacity rating of 1200A. The site-wide capacity is **300 kVA** and is limited by the existing 300 kVA BC Hydro transformer.

Historical data recorded from BC Hydro over one year found that the peak demand at the Operations Yard was **65 kW**. Subtracting the peak demand from the site-wide capacity leaves **235 kW** of available capacity that can be used for EV charging.

1.1.4. Lewis Centre

There is one (1) existing level-2, dual-head EV charger at the Lewis Centre that is meant for public charging.

The existing electrical service to the Lewis Centre is 208-Volt (V) and 3-phase. The main switch of the site has an ampacity rating of 1200-Amps (A). The site wide capacity is **346 kVA.**

Based on data taken from BC Hydro over one year, the Peak Demand at the Lewis Centre was found to be **126 kW.** Subtracting the peak electrical demand from the site-wide capacity leaves a total of **220 kW** of available electrical capacity that can be used for EV fleet charging.

1.2. Proposed EV Charging Infrastructure

Each fleet location's existing electrical capacity was assessed to understand the capacity and grid impacts of installing and using EV chargers. With the recommended chargers for each vehicle type, it is expected that charging the vehicles overnight will fully charge the vehicles. Upon the procurement of electric vehicles and chargers, it is recommended for the City to charge fleet overnight and determine if that works for their driving and usage patterns.

1.2.1. General

Scenario 2 and Scenario 3 will have the same infrastructure requirements at full electrification. The only difference between the two scenarios is the implementation schedule for the Operations Yard.

Three (3) levels of electric vehicle charging exist – Levels One (1), Two (2) and Three (3). Level-1 chargers were not considered as their charging speed is considerably slower than Level-2 chargers. Level-1 chargers can take up to 30 hours to achieve full charge which does not meet the needs of the City of Courtenay.

Level-2 Charger (L2) – Based on fleet range and efficiency modeling, it is expected that most of the fleet will be adequately served by Level-2 chargers, ranging typically between 5 kW to 18 kW, which is sufficient to charge most small to medium-sized EVs overnight.

Direct Current Fast Charger (DCFC) / Level-3 (L3) – The City of Courtenay has several large, specialized vehicles with substantial electrical demands. To provide sufficient charging for daily use of these vehicles, it is proposed to install direct current fast chargers (DCFC/Level-3).

City of Courtenay's fleet is comprised of an array of vehicles and pieces of equipment. In consideration of the ZEVs suggested as replacements in this fleet plan and the energy demands of the vehicles with respect to usage history, Table 1 shows a key of the proposed charging solution for each vehicle and equipment type.

Table 1 Charging and infrastructure guidelines by vehicle type

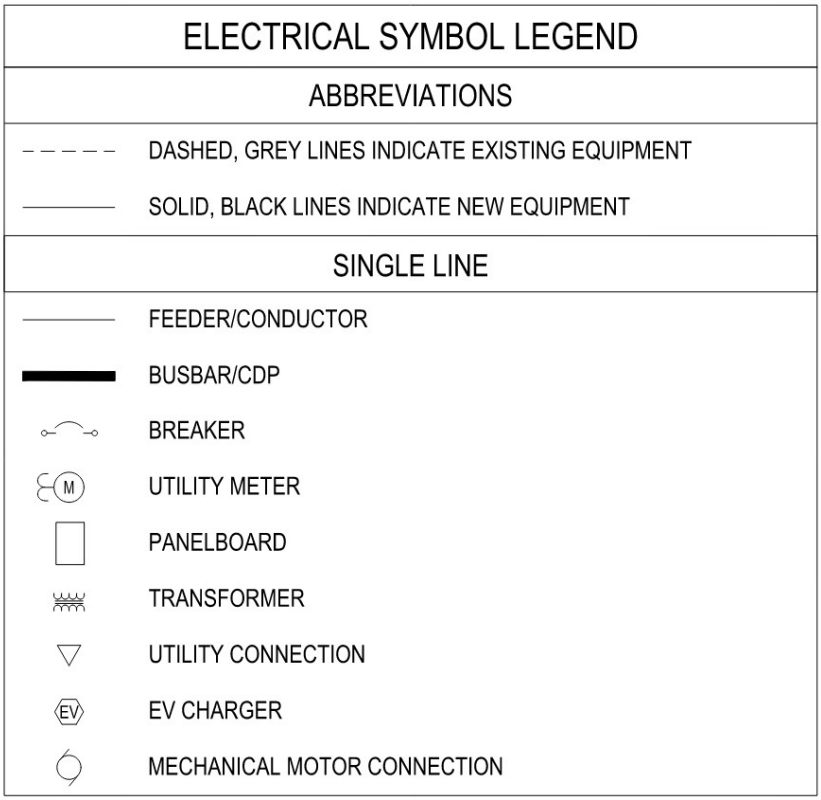
Vehicle/Equipment Type	Charger Power (kW)	Charger Costs	Infrastructure Costs per charger
Light Duty Vehicles	6.6	$7,500	$5,000
Medium/Heavy Duty Vehicles	24	$11,000	$24,000
Fire Trucks	50	$50,000	$50,000
Light Equipment	3.3	$0	$4,500
Medium/Heavy Equipment	6.6	$0	$5,000

As seen in Table 1, the Light Equipment and the Medium/Heavy Equipment is assumed to not have costs for the charger. It is assumed that the equipment will not use standard car chargers and will be supplied with their own form of charger from the manufacturer. An infrastructure cost is associated with the implementation of the equipment to account for the electrical breaker and wire they will require for their chargers to be connected to the building's distribution system.

Replacement Cycle – Charging equipment replacement is projected to be on a 15-year cycle. This is considering factors such as the technology development cycle, equipment build quality, built-in electronics, exposure to the environment, and other human factors. Because of the relative infancy of EV charging technologies, insufficient data is available to substantiate the expected useful life of a typical EV charger.

Design Review – The recommendations contained in this report are based on the information available at the time of producing the report. It is recommended that the City re-evaluate the EV charging infrastructure after the initial pilot vehicles and 5 years of operating an EV fleet.

Single-Line-Diagrams – The following subsections include single-line diagrams to explain how the electrical distribution equipment will be connected to the EV chargers. The single-line diagrams also show key pieces of new equipment required for accommodating EV charging. The symbols used in these single-line diagrams are outlined in the below legend. In the legend, CDP stands for central distribution panel.



1.2.2. Courtenay – City Hall

The representative fleet modelled at the City Hall includes 4 SUVs and 2 Light Trucks. To charge the fleet vehicles, it is proposed to add six level-2, 6.6 kW chargers.

The peak demand for the proposed new chargers is **39.6 kW**, which is well within the amount of site-wide capacity at the City Hall. There are no concerns about the ability of the City Hall to accommodate the proposed chargers as the historic peak demand added with the projected peak demand of the chargers comes to 89.9 kW which is well within the site-wide capacity of 231 kVA.

A site review of the City Hall found that there is available space in Panel 'S' to connect the proposed chargers.

A single-line diagram depicting the existing electrical distribution equipment and the connection of the proposed new chargers is seen in Figure 1.

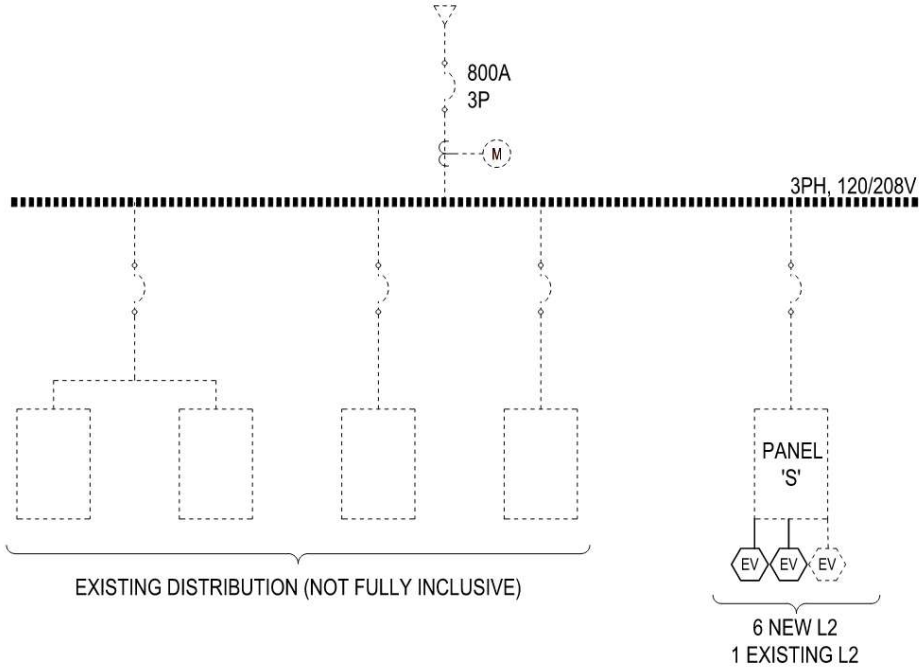


Figure 1 Single-line diagram of proposed chargers at City Hall

A satellite image of the City Hall property annotated with relevant existing infrastructure and proposed locations for the new EV chargers is seen in Figure 2.



Figure 2 Proposed layout of electric vehicle supply equipment at City Hall

1.2.3. Courtenay Fire Department

The representative fleet modelled at the Courtenay Fire Department includes 3 SUVs, 1 Van, 2 Light Trucks, and five Fire Trucks. Note that the 3 SUVs are modelled to be replaced with Light Trucks. To charge the fleet vehicles, it is proposed to add six level-2, 6.6 kW chargers and five level-3, 50 kW chargers. Please note that the exact power output of the Fire Truck chargers is dependent on recommendations from the manufacturer of the trucks, determined during the vehicle procurement phase.

The peak demand for the proposed new chargers is estimated to be **289.6 kW**, which exceeds the available capacity at the fire hall. Adding the peak demand of the proposed chargers with the recorded peak demand of the fire hall results in a new peak demand of 340.8 kW, exceeding the existing site-wide capacity of 173 kVA.

To increase electrical capacity, it is proposed to upgrade the existing service connection to a 500 kVA BC Hydro transformer. Ultimately, it is up to BC Hydro to determine what service size can be given to a property, so the service upgrade details would be determined by BC Hydro. It is understood that a new Fire Department is being designed; it is recommended to reserve capacity for EV charging during the design phase, as well as reserve spaces for breakers in the new electrical room for future charger connections.

A single-line diagram depicting the existing and new electrical distribution equipment and the connection of the proposed new chargers is seen in Figure 3.

The proposed approach for electrical infrastructure would involve adding new pieces of electrical distribution equipment, such as a switchboard, various electrical breakers and step-down transformers for charger connections. It is proposed to maintain the existing switchboard of the fire hall and feed it by a new switchboard.

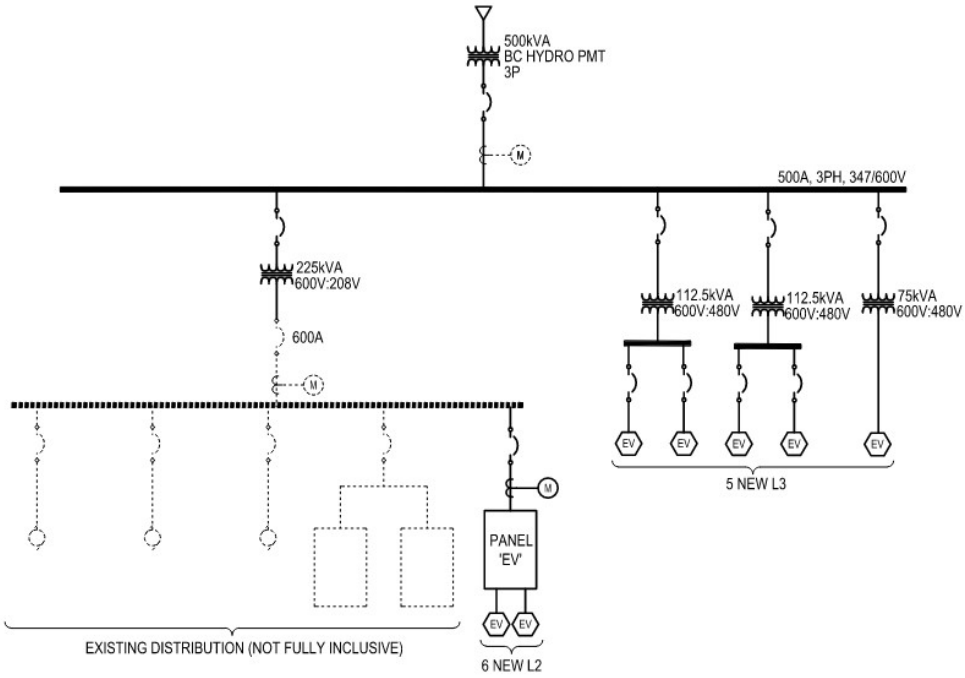


Figure 3 Single-line diagram of proposed chargers at Courtenay Fire Department

A satellite image of the Fire Department property with marked locations for proposed new infrastructure and new EV chargers is seen in Figure 4**Error! Reference source not found.**. Given that a new fire hall is being designed, this equipment placement can be altered to be incorporated into the new fire hall building. The exact placement of the new BC Hydro transformer discussed above is not shown in the figure; further investigation of underground connections would be required to suggest a placement in adherence to BC Hydro standards.

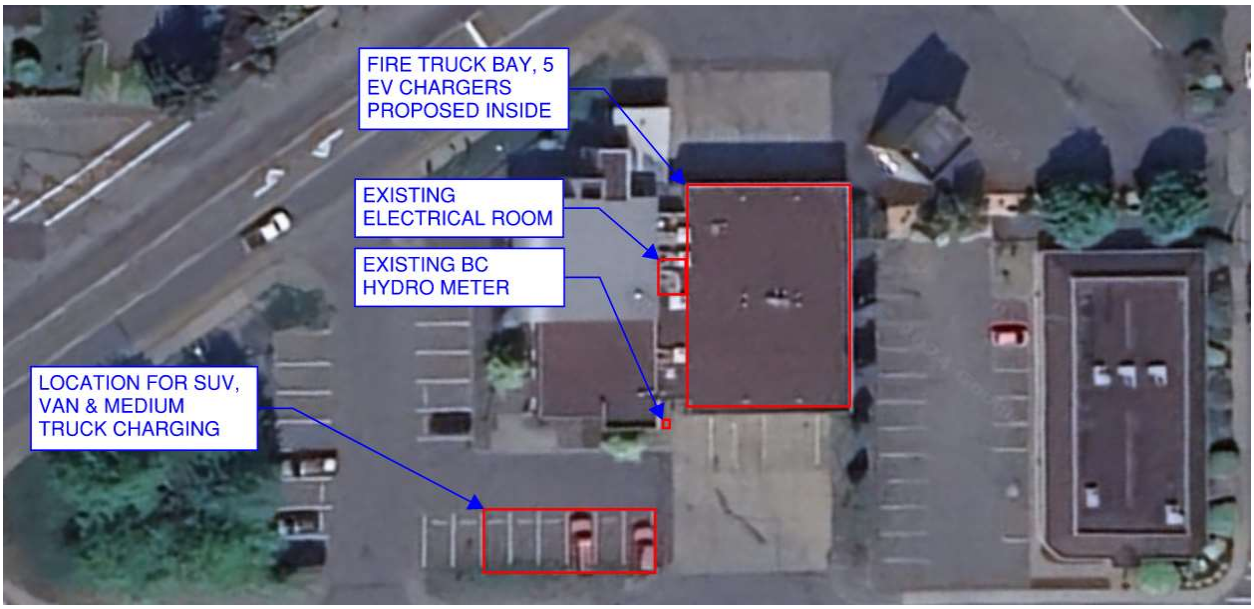


Figure 4 **Proposed layout of electric vehicle supply equipment at Courtenay Fire Department**

1.2.4. Operations Yard

The representative fleet modelled at the Operations Yard is comprised of 5 Vans, 5 SUVs, 19 Light Trucks, 14 Medium Trucks, 9 Heavy Trucks, 1 Street Sweeper and 1 Vacuum Truck, 19 units of Light Equipment and 7 units of Medium/Heavy Equipment. There is a total of 80 fleet vehicles at the Operations Yard. Between Scenarios 2 and 3, the implementation schedule of the vehicles differ slightly for different vehicles to suit realistic replacement schedules of the city.

At the Operations Yard, there are five existing level-2 dual-head chargers. These chargers are incorporated into the proposed charging solution at the Operations Yard.

For the Operations Yard, it is proposed to add 19 level-2, 6.6 kW chargers and 25 level-3 24 kW DC fast chargers for the Medium/Heavy Duty vehicles. In addition to this, 3.3 kW of power is proposed to be delegated to each of the 19 pieces of Light Equipment and 6.6 kW to each of the 7 pieces of Medium/Heavy Equipment. The equipment will not require typical EV chargers but will require electrical capacity to be charged. The schedule of implementation differs in Scenario 3 to reflect the accelerated vehicle electrification schedule.

The peak demand for the proposed new chargers and equipment is estimated to be **834.4 kW** for Scenarios 2 and 3**.** This peak demand exceeds the site-wide capacity at the Operations Yard of 300 kVA and the spare capacity at the site of 235.2 kW.

To increase the amount of electrical capacity, it is proposed to upgrade the existing service connection site, upgrading the 300 kVA transformer to a 1,000 kVA transformer. The ability to

upgrade the transformer is up to BC Hydro to determine. With this proposed upgrade to increase the site-wide capacity, new distribution equipment including a distribution enclosure, panel boards and transformers would be required. The new 1,000 kVA transformer may require a new pad and underground connections to the distribution cabinet. The proposed solution would involve maintaining the existing distribution equipment and powering it by the new distribution equipment and BC Hydro transformer.

A single-line diagram depicting the proposed solution is seen in Figure 5.

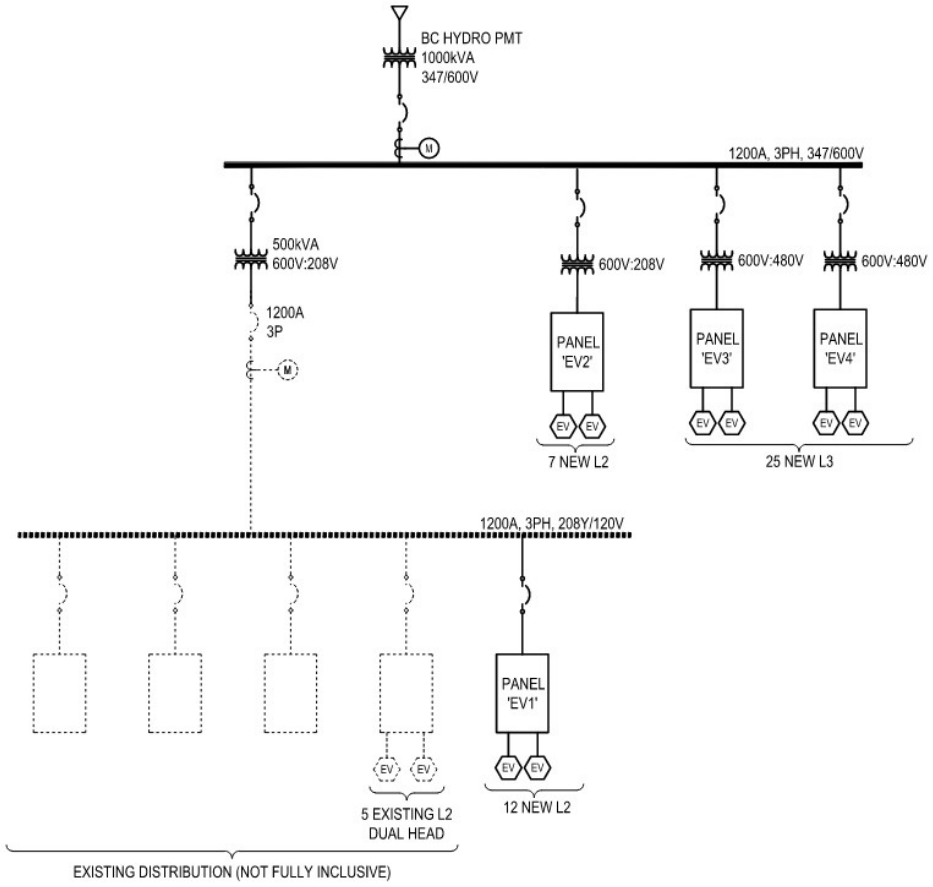


Figure 5 Single-line diagram of proposed chargers at Operations Yard

A satellite image of the Operations Yard property with marked locations for proposed new infrastructure and new EV chargers is seen in Figure 6.

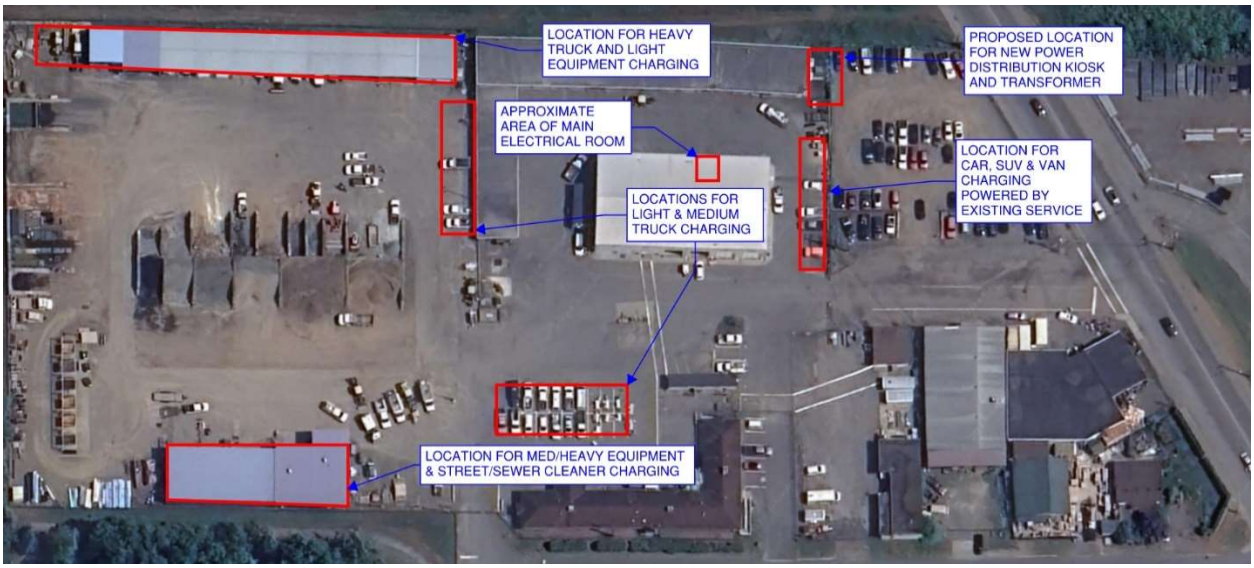


Figure 6 Proposed layout of electric vehicle charging equipment at Operations Yard

1.2.5. Lewis Centre

The representative fleet modelled at the Lewis Centre includes 2 Light Trucks. To charge the light trucks, it is proposed to add two new 6.6 kW, level-2 chargers. The peak demand for the proposed new chargers is **13.2 kW**, which is well within the amount of existing available capacity at the Lewis Centre. There are no concerns about the ability of the electrical distribution equipment at the Lewis Centre to accommodate the proposed chargers as the site wide capacity is 346 kVA and 220 kW of it is unused spare capacity.

The City of Courtenay has noted that the parking lot at the Lewis Centre often experiences flooding. If EV charging is implemented at this location, consideration of an appropriate installation place for the chargers that is not subject to floods should be chosen during detailed design. Further measures to protect electrical equipment from risks of floods can be taken during the detailed design phase. It is recommended that the city record details of the flooding experiences at this centre prior to detailed EV charger design.

A site review of the Lewis Centre found that there is available space in Panel 'S' to connect the proposed chargers.

A single-line diagram depicting the existing electrical distribution equipment and the connection of the proposed new chargers is seen in Figure 7.

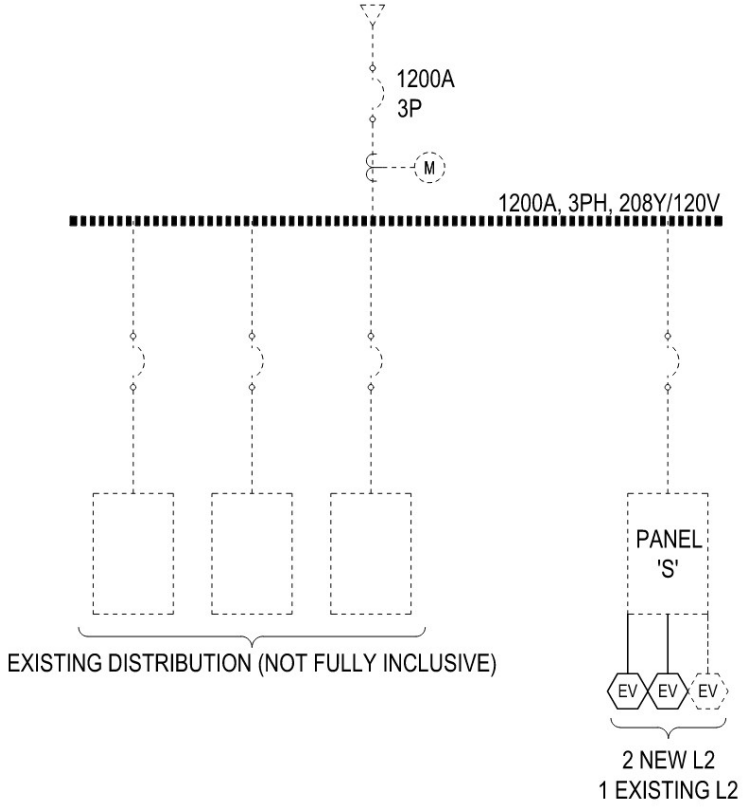


Figure 7 Single-line diagram of proposed chargers at Lewis Centre

A satellite image of the Lewis Centre property annotated with relevant existing infrastructure and proposed locations for the new EV chargers is seen in Figure 8.

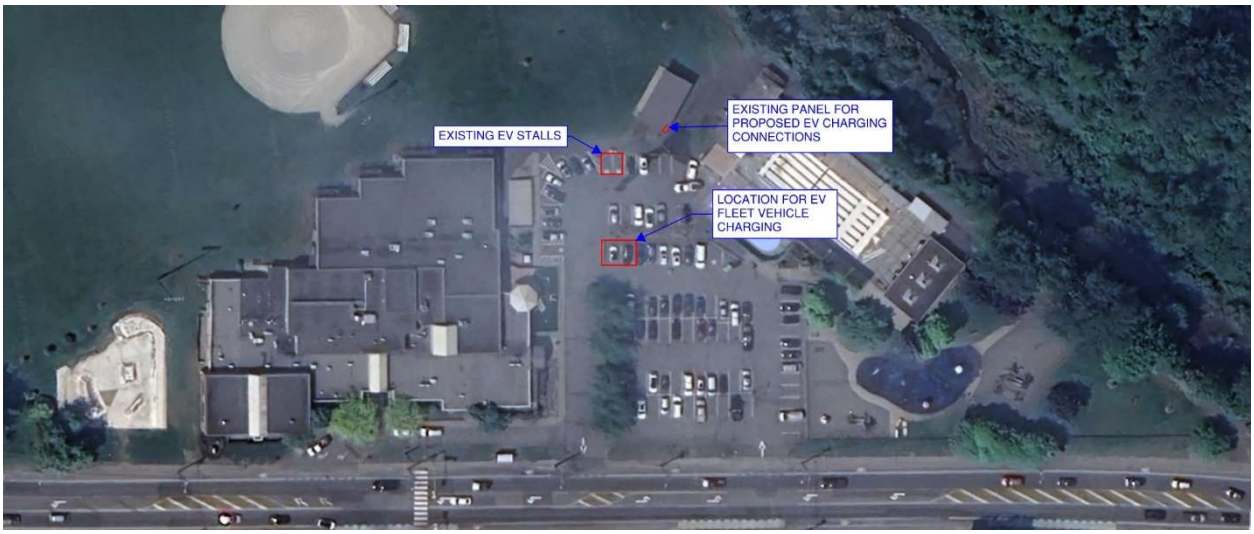


Figure 8 Proposed layout of electric vehicle supply equipment at Lewis Centre

1.3. Cost of Infrastructure

The infrastructure required for the addition of charging equipment described above will include some underground trenching and civil work as well as above-ground electrical work.

To accommodate the increase in electrical demand required at the Fire Department and the Operations Yard, electrical service upgrades are required in addition to new distribution equipment. The EV chargers may be added as required, based on the fleet replacement schedule.

Table 2 presents the opinions of probable costs for the charger and infrastructure requirements at each site. All figures are sourced from industry averages and based on AES Engineering's local experience. All costs shown are without the inclusion of rebates.

Table 2 Opinion of probable cost of charger and infrastructure costs at fleet sites

Location	Charger Costs	Infrastructure Costs	Notes
Lewis Centre	$15,000	$10,000	
City Hall	$45,000	$30,000	
Fire Department	$295,000	$780,000	Opinion of probable cost of service upgrade is $500,000 total
Operations Yard	$417,500	$1,815,500	Opinion of probable cost of service upgrade is $1,000,000 total

The figures presented in Table 2 are based on order of magnitude costs. Full detailed design will be required to provide Class A estimates.

1.4. Other Considerations for Electrical Infrastructure

The proposed EV charging solution is designed to minimize the electrical infrastructure upgrades required while meeting the expected energy demand of the 100% electrification of the projected fleet. The following are further considerations that may affect the design and upgrading of infrastructure:

- The analysis is based on the electrification of the existing fleet as reported in the data gathering stage, parked at the existing four locations. If the size, quality, or distribution of the fleets change significantly, the electrical service size will need to be re-evaluated.
- The analysis is based on maintaining the same number of fleet vehicles and daily travel distances. Should these parameters increase significantly, the electrical load will need to be re-evaluated.
- A standby power source (such as a diesel generator) or upgrades to existing standby power sources, is not being considered currently as it is out of the scope of this project. A negotiated change in scope for this plan, additional discussion, as well as further resiliency scenario and risk analysis would be necessary to determine if backup power sources are beneficial.

1.5. Energy Rates

BC Hydro offers various rate structures, including “Overnight,” where prices vary based on the time of day, “Demand Transition,” focusing on on-route charging for EV fleets, and “General Rate

Structures," which apply to most customers. For EV Charging, leveraging off-peak hours under the "Overnight" rate can be cost-effective.

This "Overnight" rate is for customers who charge their fleet overnight at a depot, which is planned for these facilities. The program has a fixed Energy Charge, and only charges for electrical demand during daytime hours of 6am-10pm. There are no Demand Charges between the hours of 10pm and 6am.

Typically, energy use profiles exhibit a peak during the daytime and a valley during the nighttime. The peak values are usually during the late afternoon to early evening when businesses are operating, and residential demand is high due to activities such as cooking, lighting, and electronic devices. These peak periods can strain the utility power grid and result in higher energy costs. Conversely, the valley values occur during the late night to early morning hours when most people are asleep, and industrial and commercial operations are minimal.

During this time, energy demand decreases, and BC Hydro has offered this lower "Overnight" rate to encourage off-peak usage. The specific peak and valley values can vary depending on geographical location, climate, and local factors, but these general patterns hold in many regions.

This rate structure may incentivize the City to charge during off-peak times, reducing the strain on the utility power grid. Commercial access to these rates involves working with BC Hydro to set up appropriate metering and agreements.

The overnight charging rate is only available for systems that are metered separately. The charging distribution system for the Fire Department and the Operations Yard could be designed with a single meter upstream to ensure eligibility. The charging demand at the Lewis Centre and the City Hall is not anticipated to be high enough to meet the minimum 150kW for the Overnight rate.

Future pricing forecasts for EV Charging could be influenced by increasing adoption, technological advancements, and government policies promoting sustainable energy practices. Energy prices are subject to complex and interconnected influences, making precise predictions for future trends to be challenging. In conclusion, optimizing EV Charging costs involves strategic use of available rate structures while considering future industry developments.

City of Courtenay

Appendix C
Engagement



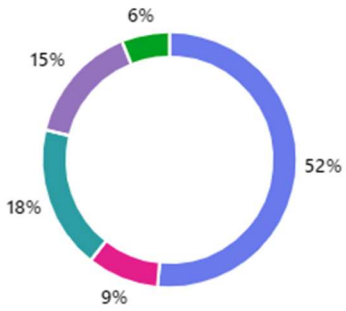
GHD

To gain a representative analysis of all fleet users in all City departments, an online fleet user experience survey was distributed through Microsoft Forms. This survey was developed collaboratively with the City to include questions pertaining to fleet use, electric vehicle use, and electric bicycle (e-bike) use in the City. The survey was open for responses between August 8th, 2024, and October 25th, 2024. A total of 33 responses were received. All responses were anonymous, aside from information pertaining to the employee's department.

The survey consisted of 23 questions, with the first question posing which City department the respondent works in. The responses of the following 22 questions are presented below. Note that some questions offered opportunities to further explain the response or add additional comments. The type-in responses are included below the relevant question.

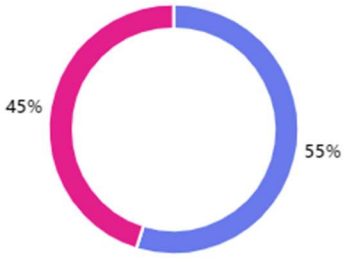
2. How often do you drive a fleet vehicle?

Every day	17
A few times a week	3
A few times a month	6
Once every couple of months	5
Rarely (less than four times a year)	2



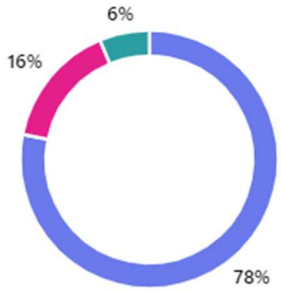
3. How often are fleet vehicles available when you need them?

There are **always** fleet vehicles available to use.	17
There are **usually** fleet vehicles available to use.	14
There are **rarely** fleet vehicles available to use.	0



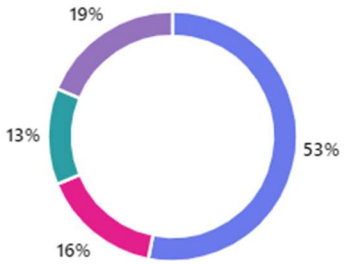
4. What time do you typically 'sign out' or begin operating the fleet vehicle?

Between 7am and 12pm	25
Between 12pm and 5pm	5
After hours (5pm-7am)	2



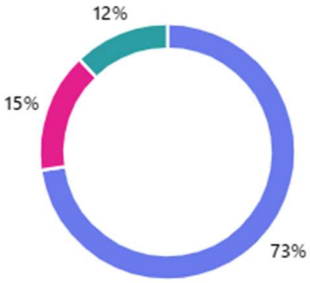
5. How long do you typically spend with the fleet vehicle?

Less than 2 hours	17
Half a day (approximately 4 hours)	5
Most of the day (approximately 6 hours)	4
The entire day (approximately 8 hours)	6



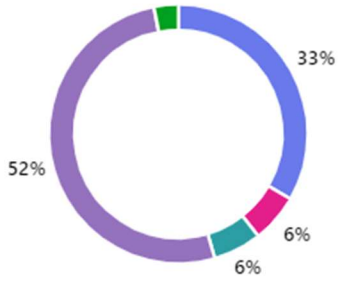
6. What is the typical trip distance that you operate the fleet vehicle in one use?

Less than 25 kilometers	24
Between 25 and 50 kilometers	5
Between 50 and 100 kilometers	4
Over 100 kilometers	0



7. Following use, where do you typically park your fleet vehicle?

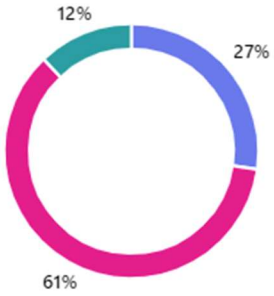
City Hall	11
Courtenay Fire Department	2
Lewis Centre	2
Public Works Yard	17
Other	1



The 'Other' response in question 7 noted 'Home' as the parking location. This was submitted by a Fire Department employee.

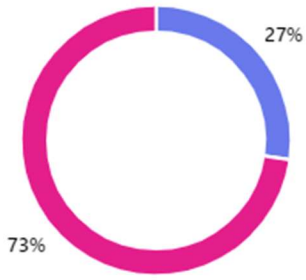
8. What time do you typically return the vehicle to its parking location?

Between 7am and 12pm	9
Between 12pm and 6pm	20
After working hours (6pm - 7am)	4



9. When operating the fleet vehicle, do your job duties require you to idle the vehicle to power an accessory load? (e.g. h...

Yes	9
No	24



10. During your time spent operating fleet vehicles, have you carpooled with other City of Courtenay staff?



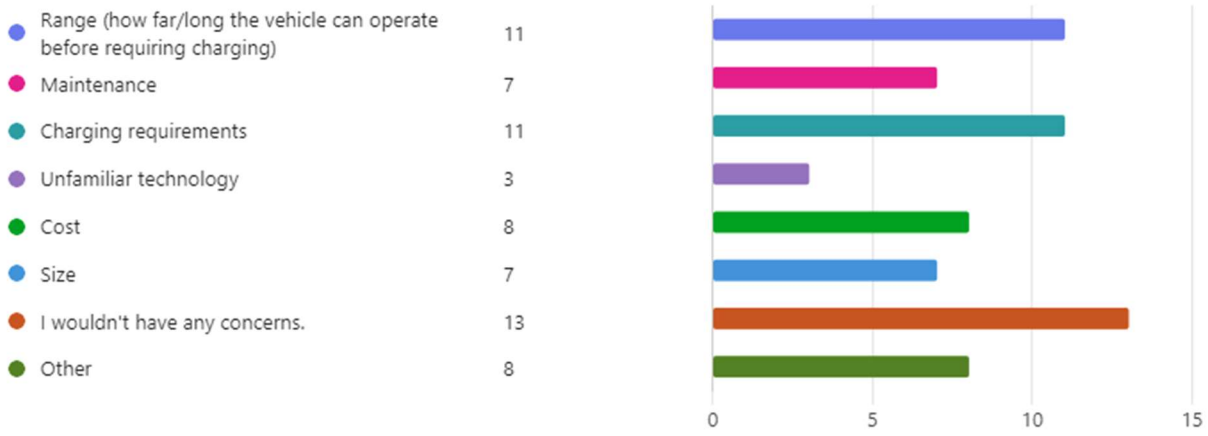
11. Is the work you fulfill with the fleet vehicles compatible with carpooling or vehicle sharing? If not, please write a short...



The 'Other' response in question 11 captured the following comments:

- Some tasks cannot accommodate carpooling. Ex: emergency response, one person site visits, independent jobs, pick-ups and deliveries, and driving around to outbuildings.

12. If your typical fleet vehicle was to be converted to an electric vehicle, what would be your concern with the transition?...



The 'Other' response in question 12 captured the following descriptions:

- Ability to carry supplies/equipment, and tow heavy loads
- Limited accessories. IE: Lift gate compatibility with EV
- Not being able to charge at home during stand-by
- Being able to maintain charge during emergency situations, power outages, or earthquakes.
- The lifecycle of the vehicle and batteries.

13. Does your typically used fleet vehicle suit the needs of your job duties? If not, please describe why.

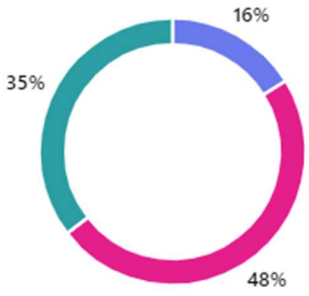


The 'Other' response in question 13 captured the following descriptions:

- We do need laptops in the vehicles
- We used to have an e-bike and that worked well for site visits that are relatively close
- Box is not big enough. I would prefer a more capable truck (2500, 3500) that I can let my staff use when their trucks are down

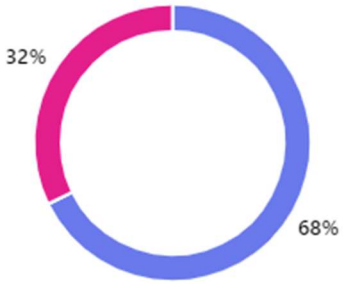
14. Have you ever operated an electric vehicle?

Yes, often	5
Yes, once or twice	15
No	11



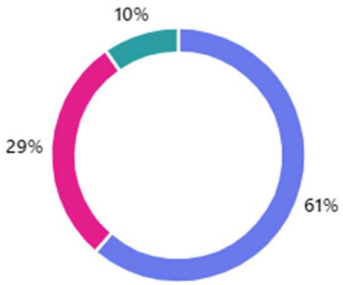
15. Have you ever been a passenger in an electric vehicle?

Yes	21
No	10



16. What kind of support/training would you need to feel comfortable operating an electric vehicle?

None - I am comfortable operating electric vehicles.	19
Opportunity to test drive	9
Training	3
Other	0



17. Would you support the use of an electric vehicle to conduct your job duties?

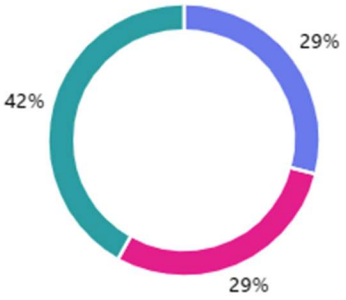


Table 1 ***Responses to question 18: Please share any additional comments or concerns regarding your use of the fleet and your position on electric fleet vehicles.***

Department	Response
Corporate Services	We use a vehicle every day and all day long. I feel we are well suited for an electric vehicle as more fleet vehicles are needed for the staff. We have 2 vehicles for 5 staff members. We are driving all day long. The savings on fuel would benefit the department. EV's are an ideal tool for the delivery of our services especially due to the small geographic area we work in - no issues with range or charging time.
Finance	Concerns about job security for the Fleet Shop Mechanic workers, or tools/equipment/training that might need to be purchased so our Fleet Shop workers can still work on the vehicles.
Fire Department	I don't think they fit well in the fire service for emergency response but would be useful for fire prevention.
Infrastructure and Environmental Engineering	We currently don't have the infrastructure internally or externally to support the use of an electric fleet vehicle which we should have before even considering the use of an electric fleet vehicle(s).
Operations	Utilities/Operations Standby Truck (unit #214) is taken home by a rotating group of 8 staff who do not have the ability to charge from home, if no options are available, should that unit remain gas powered?

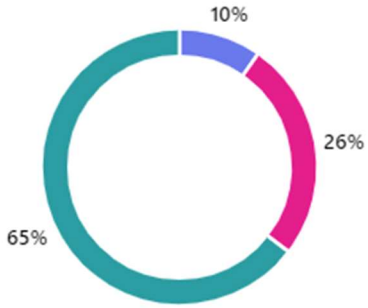
19. Have you ever operated an electric bicycle (e-bike)?

Yes, often	9
Yes, once or twice	9
No	13



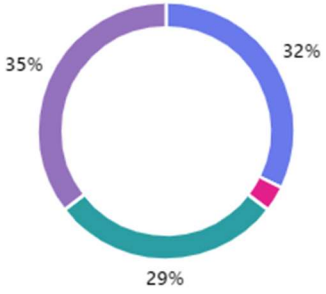
20. Is it feasible to complete your job duties with an e-bike rather than a vehicle?

Yes	3
In some instances	8
No	20



21. What is your level of comfort travelling by e-bike for your job duties?

I would be comfortable riding an e-bike to my job duty locations.	10
With some additional support, I could be comfortable riding an e-bike to my job duty...	1
I would not be comfortable riding an e-bike to my job duty locations.	9
My job duties are incompatible with the use of e-bikes.	11



22. What kind of support/training would you need to feel comfortable operating an e-bike?



The 'Other' response in question 22 captured the following descriptions:

– Physical barriers separating roads from bike lanes.
– Low traffic routes that feel safe to cyclists

Table 2 ***Responses to question 23: Please share any additional comments or concerns regarding the use of e-bikes for your job duties.***

Department	Response
Corporate Services	I currently use an e-bike for some of my job duties and find it to be very effective and efficient use of time.
Finance	Insurance for e-bikes is not good in the insurance industry yet. Determine if WorkSafe supports the use of E-bikes. Road safety, Sun exposure, getting too tired to perform work duties
Fire Department	Bikes for be a tough one for the fire department I think. Maybe for inspections but even then they leave us under equipped when in the field. Many times members are flagged down when out and about and / or are close to a call that requires more equipment then we can carry on a bike.
Infrastructure and Environmental Engineering	I'm not comfortable with the drivers on the road and the lack of physical barrier between road and bike lanes. I would not accept work on an e-bike.
Operations	It doesn't seem possible, since we carry too many tools, and must respond to emergencies promptly
Recreation, Culture and Community Services	If it was feasible to perform my duties with an e-bike, I would be happy to do so Nancy Gothard is a "Ride Right" cycling skills instructor with the cycling coalition and I know she'd be happy to teach courses to staff.

City of Courtenay

Appendix D
Vehicle Implementation Plan



GHD

Inflation Rate	2%

Scenario	Unit	Hierarchy 4 - DCC Category	Classification	Make	Model	Year	Fleet Location	Odometer Type	Fuel Usage in 2024 (L)	Odometer	Annual Mileage (2024)	Consolidation (Y/N)
Scenario 3	E16003	Truck - Dump Single	Heavy Duty	Ford	F550 Dump Truck	2023	Operations Yard	KILOMETERS	3,291.62	39,118	12,697	
Scenario 3	E17018	Loader	Heavy Duty	Volvo	Loader	2003	Operations Yard	HOURS	1,951.92	5,583	258	
Scenario 3	E17032	Truck - Dump Single	Heavy Duty	GMC	Dump	2003	Operations Yard	KILOMETERS	1,183.03	114,318	1,763	
Scenario 3	E17034	Truck - Dump Single	Heavy Duty	Sterling	Dump	2004	Operations Yard	KILOMETERS	558.11	100,097	1,316	
Scenario 3	E17055	Loader	Heavy Duty	Cat	Loader	1990	Operations Yard	HOURS	176.11	7,429	18	
Scenario 3	E17071	Truck - Flat Deck	Heavy Duty	Freightliner	Crane Truck	1997	Operations Yard	KILOMETERS	449.22	32,525	929	
Scenario 3	E17087	Tractor	Equipment	Kubota	Tractor	1999	Operations Yard	HOURS	1,500.00	5,200	200	
Scenario 3	E17104	Pickup ¾ ton	Light Duty	GMC	Sierra	2005	Operations Yard	KILOMETERS	1,352.68	141,164	4,123	
Scenario 3	E17105	Pickup ¾ ton	Light Duty	GMC	Sierra	2005	Operations Yard	KILOMETERS	2,340.61	112,207	5,875	
Scenario 3	E17113	Mower - medium	Equipment	Kubota	Mower	2006	Operations Yard	HOURS	345.17	4,008	131	
Scenario 3	E17115	Truck - Dump Single	Heavy Duty	Sterling	L8500	2007	Operations Yard	KILOMETERS	1,332.18	86,198	2,357	
Scenario 3	E17116	Grader	Heavy Duty	Champ	720 A	1995	Operations Yard	HOURS	781.01	11,162	60	
Scenario 3	E17124	Pickup ¾ ton	Light Duty	Ford	F250	2008	Operations Yard	KILOMETERS	1,135.90	128,707	3,572	
Scenario 3	E17125	Pickup ¾ ton	Light Duty	Ford	F250	2008	Operations Yard	KILOMETERS	1,723.90	116,793	6,450	
Scenario 3	E17126	Pickup 1 ton	Medium Duty	Chevrolet	SILVR - Cab/Chassis	2008	Operations Yard	KILOMETERS	2,860.15	95,448	7,463	
Scenario 3	E17131	Pickup mid-size	Light Duty	Chevrolet	Colorado LS Extended Cab	2009	City Hall	KILOMETERS	640.79	102,018	3,766	
Scenario 3	E17134	SUV	Light Duty	Pontiac	Vibe	2009	310 10th St - IT Building (to be charged at City Hall)	KILOMETERS	120.57	18,635	1,635	
Scenario 3	E17137	Truck - Dump Single	Heavy Duty	Freightliner	Dump	2009	Operations Yard	KILOMETERS	2,079.56	105,901	3,616	
Scenario 3	E17140	Mower - medium	Equipment	Kubota	F3680	2008	Operations Yard	HOURS	1,037.21	5,611	290	
Scenario 3	E17144	Tractor	Equipment	Kubota	Cab Tractor	2009	Cemetery	HOURS	1,500.00	3,200	200	
Scenario 3	E17145	Van - Cargo large	Light Duty	Dodge	Sprinter Van	2008	Operations Yard	KILOMETERS	205.09	83,153	979	
Scenario 3	E17148	SUV	Light Duty	Dodge	Patriot	2010	City Hall	KILOMETERS	91.03	31,690	595	
Scenario 3	E17149	Forklift	Equipment	Daewooo	D45S-2	2004	Operations Yard	HOURS	267.58	6,070	92	
Scenario 3	E17150	Truck - Service	Medium Duty	Ford	F450	2011	Operations Yard	KILOMETERS	1,970.55	70,332	5,316	

Scenario	Unit	Hierarchy 4 - DCC Category	Classification	Make	Model	Year	Fleet Location	Odometer Type	Fuel Usage in 2024 (L)	Odometer	Annual Mileage (2024)	Consolidation (Y/N)
Scenario 3	E17151	Truck - Service	Medium Duty	Ford	F450	2011	Operations Yard	KILOMETERS	1,313.41	92,160	3,499	
Scenario 3	E17154	Pickup ½ ton	Light Duty	Dodge	Ram 1500	2012	Operations Yard	KILOMETERS	1,245.76	74,306	4,178	
Scenario 3	E17155	Pickup ½ ton	Light Duty	Dodge	Ram 1500	2012	Operations Yard	KILOMETERS	1,774.65	114,656	7,227	
Scenario 3	E17156	Pickup ½ ton	Light Duty	Dodge	Ram 1500	2012	Operations Yard	KILOMETERS	1,319.08	121,250	5,117	
Scenario 3	E17157	Mower - medium	Equipment	Kubota	2D331	2011	Operations Yard	HOURS	653.55	2,407	265	
Scenario 3	E17158	Pickup ½ ton	Light Duty	Ford	F150	2012	Lewis Centre	KILOMETERS	891.11	127,267	3,818	
Scenario 3	E17159	Truck - Garbage small	Medium Duty	Ford	F550 Chassis 1400 Haul All	2012	Operations Yard	KILOMETERS	2,678.74	118,776	8,328	
Scenario 3	E17160	Van - Cargo small	Light Duty	Dodge	Cargo Van	2013	Operations Yard	KILOMETERS	175.45	21,645	928	
Scenario 3	E17164	SUV	Light Duty	Nissan	Rogue S	2015	Operations Yard	KILOMETERS	233.26	72,579	1,924	
Scenario 3	E17165	SUV	Light Duty	Nissan	Rogue S	2015	Operations Yard	KILOMETERS	94.00	48,199	944	
Scenario 3	E17166	Pickup mid-size	Light Duty	Nissan	Frontier 4 WD	2015	Operations Yard	KILOMETERS	1,305.64	69,018	6,524	
Scenario 3	E17167	Pickup mid-size	Light Duty	Nissan	Frontier S 2 WD	2015	Lewis Centre	KILOMETERS	1,370.51	77,452	8,067	
Scenario 3	E17168	Pickup ¾ ton	Light Duty	Ford	F250	2015	Operations Yard	KILOMETERS	2,898.19	73,238	10,296	
Scenario 3	E17169	SUV	Light Duty	Ford	Focus	2015	City Hall	KILOMETERS	147.41	28,067	1,488	
Scenario 3	E17170	Pickup 1 ton	Medium Duty	Ford	F-350 S	2015	Operations Yard	KILOMETERS	3,148.32	81,983	10,402	
Scenario 3	E17171	Pickup 1 ton	Medium Duty	Ford	F-350 SR	2015	Operations Yard	KILOMETERS	1,773.48	68,679	7,021	
Scenario 3	E17173	Backhoe	Heavy Duty	John Deere	410L	2015	Operations Yard	HOURS	3,454.46	5,080	466	
Scenario 3	E17174	Backhoe	Heavy Duty	John Deere	410L	2015	Operations Yard	HOURS	1,804.39	5,435	229	
Scenario 3	E17176	Truck - Dump Tandem	Heavy Duty	Western Star	114SD	2017	Operations Yard	KILOMETERS	5,923.92	89,132	9,551	
Scenario 3	E17178	Truck - Flat Deck	Medium Duty	Dodge	RAM 4500 FLATDECK	2016	Operations Yard	KILOMETERS	936.36	30,438	2,119	
Scenario 3	E17179	Pickup ¾ ton	Light Duty	Ford	F250 4WD	2017	Operations Yard	KILOMETERS	1,498.61	62,889	5,644	
Scenario 3	E17180	Mower - large	Equipment	Toro	Groundmaster 4010D	2016	Operations Yard	HOURS	2,956.80	3,499	443	
Scenario 3	E17181	Truck - Small Dump	Medium Duty	Ford	F550	2017	Operations Yard	KILOMETERS	2,203.64	43,355	5,052	
Scenario 3	E17182	Skidsteer	Equipment	Kubota	SVL75	2017	Operations Yard	HOURS	982.45	1,351	167	
Scenario 3	E17184	Foamstream System	Equipment	MISC	MW Series	2017	Operations Yard	HOURS	20.57	69	6	
Scenario 3	E17185	Pickup ¾ ton	Light Duty	Ford	F250	2017	Operations Yard	KILOMETERS	1,898.91	53,830	6,559	
Scenario 3	E17186	SUV	Light Duty	GMC	Terrain SLE AWD	2017	Operations Yard	KILOMETERS	591.50	51,650	5,349	

Scenario	Unit	Hierarchy 4 - DCC Category	Classification	Make	Model	Year	Fleet Location	Odometer Type	Fuel Usage in 2024 (L)	Odometer	Annual Mileage (2024)	Consolidation (Y/N)
Scenario 3	E17187	SUV	Light Duty	GMC	Terrain SLE AWD	2017	Operations Yard	KILOMETERS	1,034.10	56,034	8,118	
Scenario 3	E17188	Tandem Roller	Equipment	Volvo	Bomag BW120	2017	Operations Yard	HOURS	34.56	365	13	
Scenario 3	E17189	Truck - Small Dump	Medium Duty	Ford	F550	2017	Operations Yard	KILOMETERS	2,849.12	49,840	7,059	
Scenario 3	E17190	Van - Cargo large	Light Duty	Ford	Transit 250 Van	2017	Operations Yard	KILOMETERS	1,078.72	24,228	3,994	
Scenario 3	E17191	Truck - Dump Single	Heavy Duty	Peterbilt	348	2018	Operations Yard	KILOMETERS	2,766.04	40,331	4,446	
Scenario 3	E17192	Pickup ½ ton	Light Duty	Ford	F150	2018	Operations Yard	KILOMETERS	1,518.84	51,771	7,774	
Scenario 3	E17193	Loader/Brush Cutter	Heavy Duty	Cat	924K	2017	Operations Yard	HOURS	3,547.17	2,345	304	
Scenario 3	E17194	Tractor	Equipment	Kubota	M4900	2017	Operations Yard	HOURS	2,565.32	2,165	356	
Scenario 3	E17196	Chipper	Equipment	Ver-Mac	BC1000XL	2018	Operations Yard	HOURS	85.51	120	14	
Scenario 3	E17197	Sandpro	Equipment	Toro	Sandpro 08705	2018	Operations Yard	HOURS	228.44	495	79	
Scenario 3	E17198	Tractor	Equipment	Kubota	L5460	2018	Operations Yard	HOURS	782.45	1,804	179	
Scenario 3	E17199	Mower - large	Equipment	Toro	Groundmaster 3280D	2018	Operations Yard	HOURS	16.72	525	75	
Scenario 3	E17200	Pickup ½ ton	Light Duty	Ford	F150 Supercab	2018	Operations Yard	KILOMETERS	2,209.13	65,976	11,765	
Scenario 3	E17201	Truck - Bucket	Medium Duty	Ford	Ford F550 Dakota Body Versalif	2018	Operations Yard	KILOMETERS	3,212.17	42,977	7,194	
Scenario 3	E17202	Utility Vehicle	Equipment	Toro	Workman HDX	2018	Operations Yard	HOURS	93.97	551	47	
Scenario 3	E17203	SUV	Light Duty	Chevrolet	Equinox LS AWD	2019	Operations Yard	KILOMETERS	1,214.70	44,964	9,411	
Scenario 3	E17204	Truck - Arborist	Medium Duty	Izuzu	NPRHD	2018	Operations Yard	KILOMETERS	1,806.46	30,097	5,577	
Scenario 3	E17205	Pickup ¾ ton	Light Duty	Ford	F250	2019	Operations Yard	KILOMETERS	2,044.93	45,846	8,699	
Scenario 3	E17207	Compactor	Equipment	Wacker	DPU6555	2019	Operations Yard	HOURS	50.00	200	33	
Scenario 3	E17209	Truck - Service	Medium Duty	Ford	F550	2019	Operations Yard	KILOMETERS	2,481.05	33,906	4,922	
Scenario 3	E17210	Mower - large	Equipment	Ventrac	4500Z	2019	Operations Yard	HOURS	88.75	667	34	
Scenario 3	E17211	Van - Cargo small	Light Duty	Nissan	NV200S	2019	Operations Yard	KILOMETERS	766.03	20,072	6,502	
Scenario 3	E17213	Vacuum Truck	Heavy Duty	Freightliner	Vacall	2020	Operations Yard	KILOMETERS	7,806.38	31,764	5,457	
Scenario 3	E17214	Pickup ½ ton	Light Duty	Ford	F150 Crewcab 4x4	2019	Operations Yard	KILOMETERS	2,717.60	63,234	13,744	
Scenario 3	E17216	Pickup ¾ ton	Light Duty	Ford	F250	2019	Operations Yard	KILOMETERS	1,808.11	37,957	6,143	
Scenario 3	E17217	Pickup ¾ ton	Light Duty	Ford	F250	2019	Operations Yard	KILOMETERS	966.50	26,839	3,509	
Scenario 3	E17218	Street Sweeper	Heavy Duty	ELGIN	Crosswind	2021	Operations Yard	KILOMETERS	14,086.32	40,537	9,540	

Scenario	Unit	Hierarchy 4 - DCC Category	Classification	Make	Model	Year	Fleet Location	Odometer Type	Fuel Usage in 2024 (L)	Odometer	Annual Mileage (2024)	Consolidation (Y/N)
Scenario 3	E17219	Pickup 1 ton	Medium Duty	Ford	F350	2021	Operations Yard	KILOMETERS	2,661.75	32,600	9,131	
Scenario 3	E17220	Pickup ¾ ton	Light Duty	Ford	F205 XL	2021	Operations Yard	KILOMETERS	1,707.11	17,225	5,419	
Scenario 3	E17221	Pickup ¾ ton	Light Duty	Ford	F250 XL	2021	Operations Yard	KILOMETERS	1,547.61	17,389	6,251	
Scenario 3	E17222	Bus	Medium Duty	Chevrolet	Shuttle Bus	2021	Operations Yard	KILOMETERS	726.71	9,685	2,772	
Scenario 3	E17224	Skidsteer	Equipment	Bobcat	S7 Skidsteer	2022	Operations Yard	HOURS	47.69	210	53	
Scenario 3	E17226	SUV	Light Duty	Ford	Escape	2023	City Hall	KILOMETERS	135.55	4,447	2,613	
Scenario 3	E17227	Pickup ¾ ton	Light Duty	Ford	F250	2023	City Hall	KILOMETERS	1,662.54	7,034	5,560	
Scenario 3	E17228	Backhoe/Loader	Heavy Duty	John Deere	410P Backhoe Loader	2023	Operations Yard	HOURS	3,265.38	566	524	
Scenario 3	E17229	Truck - Flat Deck	Heavy Duty	International	HV607	2024	Operations Yard	KILOMETERS	414.57	2,100	1,312	
Scenario 3	E17231	Skidsteer	Equipment	Bobcat	S70	2024	Operations Yard	HOURS	15.64	150	150	
Scenario 3	E65930	Pickup ¾ ton	Light Duty	GMC	Sierra 2500	2021	Operations Yard	KILOMETERS	722.83	4,080	3,190	
Scenario 3	FD10-B	Fire Truck	Heavy Duty	Spartan	Pumper Truck	2015	Courtenay Fire Department	KILOMETERS	4,549.68	61,341	7,910	
Scenario 3	FD11	Fire Truck	Heavy Duty	Superior	Pumper Truck	1995	Courtenay Fire Department	KILOMETERS	363.24	68,741	848	RESERVE
Scenario 3	FD12-A	Fire Truck	Heavy Duty	Spartan	Ladder Truck	2002	Courtenay Fire Department	KILOMETERS	583.69	32,103	1,396	RESERVE
Scenario 3	FD12-B	Fire Truck	Heavy Duty	Sutphen	SPH100 Aerial Platform	2022	Courtenay Fire Department	KILOMETERS	2,103.68	11,614	2,134	
Scenario 3	FD14-A	Fire Truck	Heavy Duty	Freightliner	Freightliner	2007	Courtenay Fire Department	KILOMETERS	780.91	30,206	1,589	
Scenario 3	FD15-A	Fire Truck	Heavy Duty	Spartan	Gladiator	2008	Courtenay Fire Department	KILOMETERS	2,678.27	73,385	5,265	
Scenario 3	FD16C	Fire Department Utility Vehicle	Light Duty	GMC	Silverado 1500	2023	Courtenay Fire Department	KILOMETERS	3,363.77	28,405	16,919	
Scenario 3	FD18-B	Fire Department Utility Vehicle	Light Duty	Chevrolet	Tahoe	2016	Courtenay Fire Department	KILOMETERS	1,901.82	85,114	9,769	
Scenario 3	FD18-C	Fire Department Utility Vehicle	Light Duty	Chevrolet	Tahoe	2023	Courtenay Fire Department	KILOMETERS	1,492.92	10,406	9,760	
Scenario 3	FD19-B	Fire Department Utility Vehicle	Light Duty	Chevrolet	Tahoe	2019	Courtenay Fire Department	KILOMETERS	1,802.08	90,667	8,770	
Scenario 3	FD71-B	Fire Truck	Heavy Duty	Spartan	Pumper Truck	2013	Courtenay Fire Department	KILOMETERS	919.85	28,685	1,274	
Scenario 3	FD72-B	Fire Department Utility Vehicle	Light Duty	Chevrolet	Silverado	2018	Courtenay Fire Department	KILOMETERS	2,557.25	75,048	14,311	
Scenario 3	FD73	Fire Department Utility Vehicle	Light Duty	Nissan	NV3500	2015	Courtenay Fire Department	KILOMETERS	1,982.79	85,598	8,913	

Inflation Rate	2%

Scenario	Unit	Accessory Cost	Hybrid First? (pre-2030)	Recommended Year for Hybrid Replacement	Hybrid Cost (2025) including accessories	Hybrid Cost in Replacement Year (incl. inflation)
Scenario 3	E16003	$ -	No		$ -	
Scenario 3	E17018	$ -	No		$ -	
Scenario 3	E17032	$ -	No		$ -	
Scenario 3	E17034	$ -	No		$ -	
Scenario 3	E17055	$ -	No		$ -	
Scenario 3	E17071	$ -	No		$ -	
Scenario 3	E17087	$ -	No		$ -	
Scenario 3	E17104	$ 15,000.00	No		$ -	
Scenario 3	E17105	$ 15,000.00	No		$ -	
Scenario 3	E17113	$ -	No		$ -	
Scenario 3	E17115	$ -	No		$ -	
Scenario 3	E17116	$ -	No		$ -	
Scenario 3	E17124	$ 15,000.00	No		$ -	
Scenario 3	E17125	$ 15,000.00	No		$ -	
Scenario 3	E17126	$ 15,000.00	No		$ -	
Scenario 3	E17131	$ -	No		$ -	
Scenario 3	E17134	$ -	No		$ -	
Scenario 3	E17137	$ -	No		$ -	
Scenario 3	E17140	$ -	No		$ -	

Scenario	Unit	Accessory Cost	Hybrid First? (pre-2030)	Recommended Year for Hybrid Replacement	Hybrid Cost (2025) including accessories	Hybrid Cost in Replacement Year (incl. inflation)
Scenario 3	E17144	$ -	No		$ -	
Scenario 3	E17145	$ -	No		$ -	
Scenario 3	E17148	$ -	No		$ -	
Scenario 3	E17149	$ -	No		$ -	
Scenario 3	E17150	$ -	No		$ -	
Scenario 3	E17151	$ -	No		$ -	
Scenario 3	E17154	$ -	Yes	2027	$ 45,000.00	$ 46,818
Scenario 3	E17155	$ 15,000.00	Yes	2026	$ 60,000.00	$ 61,200
Scenario 3	E17156	$ 15,000.00	No		$ -	
Scenario 3	E17157	$ -	No		$ -	
Scenario 3	E17158	$ -	No		$ -	
Scenario 3	E17159	$ -	No		$ -	
Scenario 3	E17160	$ -	No		$ -	
Scenario 3	E17164	$ -	No		$ -	
Scenario 3	E17165	$ -	No		$ -	
Scenario 3	E17166	$ 15,000.00	No		$ -	
Scenario 3	E17167	$ -	No		$ -	
Scenario 3	E17168	$ -	No		$ -	
Scenario 3	E17169	$ -	No		$ -	
Scenario 3	E17170	$ -	No		$ -	
Scenario 3	E17171	$ 15,000.00	No		$ -	
Scenario 3	E17173	$ -	No		$ -	

Scenario	Unit	Accessory Cost	Hybrid First? (pre-2030)	Recommended Year for Hybrid Replacement	Hybrid Cost (2025) including accessories	Hybrid Cost in Replacement Year (incl. inflation)
Scenario 3	E17174	$ -	No		$ -	
Scenario 3	E17176	$ -	No		$ -	
Scenario 3	E17178	$ -	No		$ -	
Scenario 3	E17179	$ -	Yes	2028	$ 45,000.00	$ 47,754
Scenario 3	E17180	$ -	No		$ -	
Scenario 3	E17181	$ -	No		$ -	
Scenario 3	E17182	$ -	No		$ -	
Scenario 3	E17184	$ -	No		$ -	
Scenario 3	E17185	$ -	No		$ -	
Scenario 3	E17186	$ -	No		$ -	
Scenario 3	E17187	$ -	No		$ -	
Scenario 3	E17188	$ -	No		$ -	
Scenario 3	E17189	$ -	No		$ -	
Scenario 3	E17190	$ -	No		$ -	
Scenario 3	E17191	$ -	No		$ -	
Scenario 3	E17192	$ -	No		$ -	
Scenario 3	E17193	$ -	No		$ -	
Scenario 3	E17194	$ -	No		$ -	
Scenario 3	E17196	$ -	No		$ -	
Scenario 3	E17197	$ -	No		$ -	
Scenario 3	E17198	$ -	No		$ -	
Scenario 3	E17199	$ -	No		$ -	

Scenario	Unit	Accessory Cost	Hybrid First? (pre-2030)	Recommended Year for Hybrid Replacement	Hybrid Cost (2025) including accessories	Hybrid Cost in Replacement Year (incl. inflation)
Scenario 3	E17200	$ 15,000.00	No		$ -	
Scenario 3	E17201	$ -	No		$ -	
Scenario 3	E17202	$ -	No		$ -	
Scenario 3	E17203	$ -	No		$ -	
Scenario 3	E17204	$ -	No		$ -	
Scenario 3	E17205	$ 15,000.00	No		$ -	
Scenario 3	E17207	$ -	No		$ -	
Scenario 3	E17209	$ -	No		$ -	
Scenario 3	E17210	$ -	No		$ -	
Scenario 3	E17211	$ -	No		$ -	
Scenario 3	E17213	$ -	No		$ -	
Scenario 3	E17214	$ -	No		$ -	
Scenario 3	E17216	$ 15,000.00	Yes	2029	$ 60,000.00	$ 64,946
Scenario 3	E17217	$ -	Yes	2029	$ 45,000.00	$ 48,709
Scenario 3	E17218	$ -	No		$ -	
Scenario 3	E17219	$ -	No		$ -	
Scenario 3	E17220	$ 15,000.00	No		$ -	
Scenario 3	E17221	$ 15,000.00	No		$ -	
Scenario 3	E17222	$ -	No		$ -	
Scenario 3	E17224	$ -	No		$ -	
Scenario 3	E17226	$ -	No		$ -	
Scenario 3	E17227	$ -	No		$ -	

Scenario	Unit	Accessory Cost	Hybrid First? (pre-2030)	Recommended Year for Hybrid Replacement	Hybrid Cost (2025) including accessories	Hybrid Cost in Replacement Year (incl. inflation)
Scenario 3	E17228	$ -	No		$ -	
Scenario 3	E17229	$ -	No		$ -	
Scenario 3	E17231	$ -	No		$ -	
Scenario 3	E65930	$ -	No		$ -	
Scenario 3	FD10-B	$ -	No		$ -	
Scenario 3	FD11	n/a	n/a	n/a	n/a	
Scenario 3	FD12-A	n/a	n/a	n/a	n/a	
Scenario 3	FD12-B	$ -	No		$ -	
Scenario 3	FD14-A	$ -	No		$ -	
Scenario 3	FD15-A	$ -	No		$ -	
Scenario 3	FD16C	$ 20,000.00	No		$ -	
Scenario 3	FD18-B	$ 20,000.00	Yes	2026	$ 60,000.00	$ 61,200
Scenario 3	FD18-C	$ 20,000.00	No		$ -	
Scenario 3	FD19-B	$ 20,000.00	Yes	2026	$ 60,000.00	$ 61,200
Scenario 3	FD71-B	$ -	No		$ -	
Scenario 3	FD72-B	$ 20,000.00	Yes	2026	$ 65,000.00	$ 66,300
Scenario 3	FD73	$ 20,000.00	No		$ -	

Inflation Rate	2%

Scenario	Unit	Equivalent ZEV Replacement	Recommended Electrification Year	ZEV Cost (2025) incl. accessories	ZEV Cost in Transition Year (incl. inflation)	Total Inflated ZEV Cost (Hybrid + BEV)	Notes
Scenario 3	E16003	Concept Ford F550 EV	2038	$ 200,000.00	$ 258,721	$ 258,721	
Scenario 3	E17018	L25 Electric - Electric compact wheel loader	2032	$ 190,000.00	$ 218,250	$ 218,250	
Scenario 3	E17032	Concept Ford F550 EV	2033	$ 200,000.00	$ 234,332	$ 234,332	
Scenario 3	E17034	Concept Ford F550 EV	2038	$ 200,000.00	$ 258,721	$ 258,721	
Scenario 3	E17055	L25 Electric - Electric compact wheel loader	2031	$ 190,000.00	$ 213,971	$ 213,971	
Scenario 3	E17071	Concept Ford F550 EV	2036	$ 200,000.00	$ 248,675	$ 248,675	
Scenario 3	E17087	Solectrac eUtility	2029	$ 45,000.00	$ 48,709	$ 48,709	Financial analysis aggregated all Equipment classes into one representative ZEV option (mower). Examples of non-mower ZEV models are provided, noting that costs may vary.
Scenario 3	E17104	Ford F-150 Lightning Pro	2026	$ 95,000.00	$ 96,900	$ 96,900	
Scenario 3	E17105	Ford F-150 Lightning Pro	2026	$ 95,000.00	$ 96,900	$ 96,900	
Scenario 3	E17113	STIHL RZA	2030	$ 45,000.00	$ 49,684	$ 49,684	Financial analysis aggregated all Equipment classes into one representative ZEV option (mower). Examples of non-mower ZEV models are provided, noting that costs may vary.
Scenario 3	E17115	Concept Ford F550 EV	2036	$ 200,000.00	$ 248,675	$ 248,675	
Scenario 3	E17116	L25 Electric - Electric compact wheel loader	2036	$ 190,000.00	$ 236,241	$ 236,241	
Scenario 3	E17124	Ford F-150 Lightning Pro	2027	$ 95,000.00	$ 98,838	$ 98,838	
Scenario 3	E17125	Ford F-150 Lightning Pro	2026	$ 95,000.00	$ 96,900	$ 96,900	
Scenario 3	E17126	Concept Ford 350 EV	2030	$ 130,000.00	$ 143,531	$ 143,531	
Scenario 3	E17131	Ford F-150 Lightning Pro	2026	$ 80,000.00	$ 81,600	$ 81,600	
Scenario 3	E17134	Chevrolet Bolt EUV	2028	$ 60,000.00	$ 63,672	$ 63,672	
Scenario 3	E17137	Concept Ford F550 EV	2030	$ 200,000.00	$ 220,816	$ 220,816	
Scenario 3	E17140	STIHL RZA	2027	$ 45,000.00	$ 46,818	$ 46,818	Financial analysis aggregated all Equipment classes into one representative ZEV option (mower). Examples of non-mower ZEV models are provided, noting that costs may vary.
Scenario 3	E17144	Solectrac eUtility	2030	$ 45,000.00	$ 49,684	$ 49,684	Financial analysis aggregated all Equipment classes into one representative ZEV option (mower). Examples of non-mower ZEV models are provided, noting that costs may vary.
Scenario 3	E17145	Ford E-Transit	2028	$ 84,000.00	$ 89,141	$ 89,141	
Scenario 3	E17148	Chevrolet Bolt EUV	2030	$ 60,000.00	$ 66,245	$ 66,245	
Scenario 3	E17149	Linde X25 Forklift	2030	$ 45,000.00	$ 49,684	$ 49,684	Financial analysis aggregated all Equipment classes into one representative ZEV option (mower). Examples of non-mower ZEV models are provided, noting that costs may vary.
Scenario 3	E17150	Concept Ford 350 EV	2028	$ 115,000.00	$ 122,039	$ 122,039	Transition to electric medium truck, assuming market availability in 2028. Otherwise will be replaced with Ford F150 Lightning to meet fuel goals.
Scenario 3	E17151	Concept Ford 350 EV	2028	$ 115,000.00	$ 122,039	$ 122,039	Transition to electric medium truck, assuming market availability in 2028. Otherwise will be replaced with Ford F150 Lightning to meet fuel goals.
Scenario 3	E17154	Ford F-150 Lightning Pro	2037	$ 80,000.00	$ 101,459	$ 148,277	
Scenario 3	E17155	Ford F-150 Lightning Pro	2036	$ 95,000.00	$ 118,121	$ 179,321	
Scenario 3	E17156	Ford F-150 Lightning Pro	2028	$ 95,000.00	$ 100,815	$ 100,815	
Scenario 3	E17157	STIHL RZA	2031	$ 45,000.00	$ 50,677	$ 50,677	Financial analysis aggregated all Equipment classes into one representative ZEV option (mower). Examples of non-mower ZEV models are provided, noting that costs may vary.
Scenario 3	E17158	Ford F-150 Lightning Pro	2028	$ 80,000.00	$ 84,897	$ 84,897	
Scenario 3	E17159	Concept Ford 350 EV	2030	$ 115,000.00	$ 126,969	$ 126,969	
Scenario 3	E17160	Ford E-Transit	2028	$ 84,000.00	$ 89,141	$ 89,141	
Scenario 3	E17164	Chevrolet Bolt EUV	2028	$ 60,000.00	$ 63,672	$ 63,672	
Scenario 3	E17165	Chevrolet Bolt EUV	2028	$ 60,000.00	$ 63,672	$ 63,672	
Scenario 3	E17166	Ford F-150 Lightning Pro	2027	$ 95,000.00	$ 98,838	$ 98,838	
Scenario 3	E17167	Ford F-150 Lightning Pro	2026	$ 80,000.00	$ 81,600	$ 81,600	
Scenario 3	E17168	Ford F-150 Lightning Pro	2026	$ 80,000.00	$ 81,600	$ 81,600	
Scenario 3	E17169	Chevrolet Bolt EUV	2030	$ 60,000.00	$ 66,245	$ 66,245	

Scenario	Unit	Equivalent ZEV Replacement	Recommended Electrification Year	ZEV Cost (2025) incl. accessories	ZEV Cost in Transition Year (incl. inflation)	Total Inflated ZEV Cost (Hybrid + BEV)	Notes
Scenario 3	E17170	Concept Ford 350 EV	2027	$ 115,000.00	$ 119,646	$ 119,646	Transition to electric medium truck, assuming market availability in 2027. Otherwise will be replaced with Ford F150 Lightning to meet fuel goals.
Scenario 3	E17171	Concept Ford 350 EV	2027	$ 130,000.00	$ 135,252	$ 135,252	Transition to electric medium truck, assuming market availability in 2027. Otherwise will be replaced with Ford F150 Lightning to meet fuel goals.
Scenario 3	E17173	L25 Electric - Electric compact wheel loader	2035	$ 190,000.00	$ 231,609	$ 231,609	
Scenario 3	E17174	L25 Electric - Electric compact wheel loader	2037	$ 190,000.00	$ 240,966	$ 240,966	
Scenario 3	E17176	Concept Ford F550 EV	2032	$ 200,000.00	$ 229,737	$ 229,737	
Scenario 3	E17178	Concept Ford 350 EV	2033	$ 115,000.00	$ 134,741	$ 134,741	
Scenario 3	E17179	Ford F-150 Lightning Pro	2038	$ 80,000.00	$ 103,489	$ 151,243	
Scenario 3	E17180	STIHL RZA	2026	$ 45,000.00	$ 45,900	$ 45,900	Financial analysis aggregated all Equipment classes into one representative ZEV option (mower). Examples of non-mower ZEV models are provided, noting that costs may vary.
Scenario 3	E17181	Concept Ford 350 EV	2032	$ 115,000.00	$ 132,099	$ 132,099	
Scenario 3	E17182	Elise 900	2033	$ 45,000.00	$ 52,725	$ 52,725	Financial analysis aggregated all Equipment classes into one representative ZEV option (mower). Examples of non-mower ZEV models are provided, noting that costs may vary.
Scenario 3	E17184	Solectrac eUtility	2037	$ 45,000.00	$ 57,071	$ 57,071	Financial analysis aggregated all Equipment classes into one representative ZEV option (mower). Examples of non-mower ZEV models are provided, noting that costs may vary.
Scenario 3	E17185	Ford F-150 Lightning Pro	2027	$ 80,000.00	$ 83,232	$ 83,232	
Scenario 3	E17186	Chevrolet Bolt EUV	2029	$ 60,000.00	$ 64,946	$ 64,946	
Scenario 3	E17187	Chevrolet Bolt EUV	2029	$ 60,000.00	$ 64,946	$ 64,946	
Scenario 3	E17188	BOMAG e-5 Tandem Roller	2035	$ 45,000.00	$ 54,855	$ 54,855	Financial analysis aggregated all Equipment classes into one representative ZEV option (mower). Examples of non-mower ZEV models are provided, noting that costs may vary.
Scenario 3	E17189	Concept Ford 350 EV	2032	$ 115,000.00	$ 132,099	$ 132,099	
Scenario 3	E17190	Ford E-Transit	2027	$ 84,000.00	$ 87,394	$ 87,394	
Scenario 3	E17191	Concept Ford F550 EV	2039	$ 200,000.00	$ 263,896	$ 263,896	
Scenario 3	E17192	Ford F-150 Lightning Pro	2027	$ 80,000.00	$ 83,232	$ 83,232	
Scenario 3	E17193	L25 Electric - Electric compact wheel loader	2037	$ 190,000.00	$ 240,966	$ 240,966	
Scenario 3	E17194	Solectrac eUtility	2027	$ 45,000.00	$ 46,818	$ 46,818	Financial analysis aggregated all Equipment classes into one representative ZEV option (mower). Examples of non-mower ZEV models are provided, noting that costs may vary.
Scenario 3	E17196	STIHL RZA	2037	$ 45,000.00	$ 57,071	$ 57,071	Financial analysis aggregated all Equipment classes into one representative ZEV option (mower). Examples of non-mower ZEV models are provided, noting that costs may vary.
Scenario 3	E17197	Solectrac eUtility	2034	$ 45,000.00	$ 53,779	$ 53,779	Financial analysis aggregated all Equipment classes into one representative ZEV option (mower). Examples of non-mower ZEV models are provided, noting that costs may vary.
Scenario 3	E17198	Solectrac eUtility	2030	$ 45,000.00	$ 49,684	$ 49,684	Financial analysis aggregated all Equipment classes into one representative ZEV option (mower). Examples of non-mower ZEV models are provided, noting that costs may vary.
Scenario 3	E17199	STIHL RZA	2034	$ 45,000.00	$ 53,779	$ 53,779	Financial analysis aggregated all Equipment classes into one representative ZEV option (mower). Examples of non-mower ZEV models are provided, noting that costs may vary.
Scenario 3	E17200	Ford F-150 Lightning Pro	2029	$ 95,000.00	$ 102,831	$ 102,831	
Scenario 3	E17201	Concept Ford 350 EV	2033	$ 115,000.00	$ 134,741	$ 134,741	
Scenario 3	E17202	Solectrac eUtility	2034	$ 45,000.00	$ 53,779	$ 53,779	Financial analysis aggregated all Equipment classes into one representative ZEV option (mower). Examples of non-mower ZEV models are provided, noting that costs may vary.
Scenario 3	E17203	Chevrolet Bolt EUV	2031	$ 60,000.00	$ 67,570	$ 67,570	

Scenario	Unit	Equivalent ZEV Replacement	Recommended Electrification Year	ZEV Cost (2025) incl. accessories	ZEV Cost in Transition Year (incl. inflation)	Total Inflated ZEV Cost (Hybrid + BEV)	Notes
Scenario 3	E17204	Concept Ford 350 EV	2037	$ 115,000.00	$ 145,848	$ 145,848	
Scenario 3	E17205	Ford F-150 Lightning Pro	2029	$ 95,000.00	$ 102,831	$ 102,831	
Scenario 3	E17207	Evolution H320-E	2035	$ 45,000.00	$ 54,855	$ 54,855	Financial analysis aggregated all Equipment classes into one representative ZEV option (mower). Examples of non-mower ZEV models are provided, noting that costs may vary.
Scenario 3	E17209	Concept Ford 350 EV	2035	$ 115,000.00	$ 140,184	$ 140,184	
Scenario 3	E17210	STIHL RZA	2032	$ 45,000.00	$ 51,691	$ 51,691	Financial analysis aggregated all Equipment classes into one representative ZEV option (mower). Examples of non-mower ZEV models are provided, noting that costs may vary.
Scenario 3	E17211	Ford E-Transit	2032	$ 84,000.00	$ 96,490	$ 96,490	
Scenario 3	E17213	Elgin Broom Bear	2034	$ 1,000,000.00	$ 1,195,093	$ 1,195,093	
Scenario 3	E17214	Ford F-150 Lightning Pro	2029	$ 80,000.00	$ 86,595	$ 86,595	
Scenario 3	E17216	Ford F-150 Lightning Pro	2039	$ 95,000.00	$ 125,350	$ 190,296	
Scenario 3	E17217	Ford F-150 Lightning Pro	2039	$ 80,000.00	$ 105,558	$ 154,268	
Scenario 3	E17218	Elgin Broom Bear	2029	$ 1,000,000.00	$ 1,082,432	$ 1,082,432	
Scenario 3	E17219	Concept Ford 350 EV	2038	$ 115,000.00	$ 148,765	$ 148,765	
Scenario 3	E17220	Ford F-150 Lightning Pro	2031	$ 95,000.00	$ 106,985	$ 106,985	
Scenario 3	E17221	Ford F-150 Lightning Pro	2031	$ 95,000.00	$ 106,985	$ 106,985	
Scenario 3	E17222	Ford E-Transit	2033	$ 84,000.00	$ 98,419	$ 98,419	
Scenario 3	E17224	Elise 900	2032	$ 45,000.00	$ 51,691	$ 51,691	Financial analysis aggregated all Equipment classes into one representative ZEV option (mower). Examples of non-mower ZEV models are provided, noting that costs may vary.
Scenario 3	E17226	Chevrolet Bolt EUV	2033	$ 60,000.00	$ 70,300	$ 70,300	
Scenario 3	E17227	Ford F-150 Lightning Pro	2033	$ 80,000.00	$ 93,733	$ 93,733	
Scenario 3	E17228	L25 Electric - Electric compact wheel loader	2039	$ 190,000.00	$ 250,701	$ 250,701	
Scenario 3	E17229	Concept Ford F550 EV	2040	$ 200,000.00	$ 269,174	$ 269,174	
Scenario 3	E17231	Elise 900	2036	$ 45,000.00	$ 55,952	$ 55,952	Financial analysis aggregated all Equipment classes into one representative ZEV option (mower). Examples of non-mower ZEV models are provided, noting that costs may vary.
Scenario 3	E65930	Concept Ford 350 EV	2031	$ 115,000.00	$ 129,509	$ 129,509	
Scenario 3	FD10-B	Rosenbauer Electric Fire Truck	2035	$ 2,750,000.00	$ 3,352,235	$ 3,352,235	Electric platform and pumper fire trucks not available on market as of 2025, and pricing is uncertain. Rosenbauer model used as placeholder pending market availability of plstform and pumper trucks.
Scenario 3	FD11	n/a	n/a	n/a	n/a	n/a	Active as a reserve unit (2025). Will be removed from fleet once XX truck is replaced.
Scenario 3	FD12-A	n/a	n/a	n/a	n/a	n/a	Active as a reserve unit (2025). Will be removed from fleet once XX truck is replaced.
Scenario 3	FD12-B	Rosenbauer Electric Fire Truck	2037	$ 2,750,000.00	$ 3,487,665	$ 3,487,665	Electric platform and pumper fire trucks not available on market as of 2025, and pricing is uncertain. Rosenbauer model used as placeholder pending market availability of plstform and pumper trucks.
Scenario 3	FD14-A	Rosenbauer Electric Fire Truck	2032	$ 2,750,000.00	$ 3,158,886	$ 3,158,886	
Scenario 3	FD15-A	Rosenbauer Electric Fire Truck	2036	$ 2,750,000.00	$ 3,419,279	$ 3,419,279	Replaced with conventional vehicle in 2028, and ZEV 7 years later. Conventional vehicle to be put in reserve following transition.
Scenario 3	FD16C	Ford F-150 Lightning Pro	2030	$ 100,000.00	$ 110,408	$ 110,408	
Scenario 3	FD18-B	Ford F-150 Lightning Pro	2033	$ 100,000.00	$ 117,166	$ 178,366	
Scenario 3	FD18-C	Ford F-150 Lightning Pro	2030	$ 100,000.00	$ 110,408	$ 110,408	
Scenario 3	FD19-B	Ford F-150 Lightning Pro	2033	$ 100,000.00	$ 117,166	$ 178,366	
Scenario 3	FD71-B	Rosenbauer Electric Fire Truck	2038	$ 2,750,000.00	$ 3,557,418	$ 3,557,418	Electric platform and pumper fire trucks not available on market as of 2025, and pricing is uncertain. Rosenbauer model used as placeholder pending market availability of plstform and pumper trucks.
Scenario 3	FD72-B	Ford F-150 Lightning Pro	2033	$ 100,000.00	$ 117,166	$ 183,466	
Scenario 3	FD73	Ford E-Transit	2030	$ 104,000.00	$ 114,824	$ 114,824	

City of Courtenay

Appendix E
Charger and Infrastructure Implementation Plan



GHD

Inflation Rate	2%

Fleet Location	Year	Level 2 Charger (count)	New Level 2 Chargers	Level 3 Charger (count)	New Level 3 Chargers	Capacity Addition (kVA)	Site-wide Capacity (kVA)	Charger Cost	Infrastructure Cost	Total Infrastructure Cost	Total Infrasructure Cost (incl. inflation)
City Hall	2025	1	0	0	0	0	231	$ -	$ -	$ -	$ -
City Hall	**2026**	**2**	1	0	0	0	231	$ 7,500	$ 5,000	$ 12,500	$ 12,750
City Hall	2027	2	0	0	0	0	231	$ -	$ -	$ -	$ -
City Hall	**2028**	**3**	1	0	0	0	231	$ 7,500	$ 5,000	$ 12,500	$ 13,265
City Hall	2029	3	0	0	0	0	231	$ -	$ -	$ -	$ -
City Hall	**2030**	**5**	2	0	0	0	231	$ 15,000	$ 10,000	$ 25,000	$ 27,602
City Hall	2031	5	0	0	0	0	231	$ -	$ -	$ -	$ -
City Hall	2032	5	0	0	0	0	231	$ -	$ -	$ -	$ -
City Hall	**2033**	**7**	2	0	0	0	231	$ 15,000	$ 10,000	$ 25,000	$ 29,291
City Hall	2034	7	0	0	0	0	231	$ -	$ -	$ -	$ -
City Hall	2035	7	0	0	0	0	231	$ -	$ -	$ -	$ -
City Hall	2036	7	0	0	0	0	231	$ -	$ -	$ -	$ -
City Hall	2037	7	0	0	0	0	231	$ -	$ -	$ -	$ -
City Hall	2038	7	0	0	0	0	231	$ -	$ -	$ -	$ -
City Hall	2039	7	0	0	0	0	231	$ -	$ -	$ -	$ -
City Hall	2040	7	0	0	0	0	231	$ -	$ -	$ -	$ -
City Hall	2041	7	0	0	0	0	231	$ -	$ -	$ -	$ -
City Hall	2042	7	0	0	0	0	231	$ -	$ -	$ -	$ -
City Hall	2043	7	0	0	0	0	231	$ -	$ -	$ -	$ -
City Hall	2044	7	0	0	0	0	231	$ -	$ -	$ -	$ -
City Hall	2045	7	0	0	0	0	231	$ -	$ -	$ -	$ -
City Hall	2046	7	0	0	0	0	231	$ -	$ -	$ -	$ -
City Hall	2047	7	0	0	0	0	231	$ -	$ -	$ -	$ -
City Hall	2048	7	0	0	0	0	231	$ -	$ -	$ -	$ -
City Hall	2049	7	0	0	0	0	231	$ -	$ -	$ -	$ -
City Hall	2050	7	0	0	0	0	231	$ -	$ -	$ -	$ -
Courtenay Fire Department	2025	0	0	0	0	0	173	$ -	$ -	$ -	$ -
Courtenay Fire Department	2026	0	0	0	0	0	173	$ -	$ -	$ -	$ -
Courtenay Fire Department	2027	0	0	0	0	0	173	$ -	$ -	$ -	$ -
Courtenay Fire Department	2028	0	0	0	0	0	173	$ -	$ -	$ -	$ -
Courtenay Fire Department	**2029**	0	0	0	0	327	500	$ -	$ 500,000	$ 500,000	$ 541,216
Courtenay Fire Department	**2030**	**3**	3	0	0	0	500	$ 22,500	$ 15,000	$ 37,500	$ 41,403
Courtenay Fire Department	2031	3	0	0	0	0	500	$ -	$ -	$ -	$ -
Courtenay Fire Department	**2032**	3	0	**1**	1	0	500	$ 50,000	$ 50,000	$ 100,000	$ 114,869
Courtenay Fire Department	**2033**	**6**	3	1	0	0	500	$ 22,500	$ 15,000	$ 37,500	$ 43,937
Courtenay Fire Department	2034	6	0	1	0	0	500	$ -	$ -	$ -	$ -
Courtenay Fire Department	**2035**	6	0	**2**	1	0	500	$ 50,000	$ 50,000	$ 100,000	$ 121,899
Courtenay Fire Department	**2036**	6	0	**3**	1	0	500	$ 50,000	$ 50,000	$ 100,000	$ 124,337
Courtenay Fire Department	**2037**	6	0	**4**	1	0	500	$ 50,000	$ 50,000	$ 100,000	$ 126,824
Courtenay Fire Department	**2038**	6	0	**5**	1	0	500	$ 50,000	$ 50,000	$ 100,000	$ 129,361
Courtenay Fire Department	2039	6	0	5	0	0	500	$ -	$ -	$ -	$ -
Courtenay Fire Department	2040	6	0	5	0	0	500	$ -	$ -	$ -	$ -
Courtenay Fire Department	2041	6	0	5	0	0	500	$ -	$ -	$ -	$ -
Courtenay Fire Department	2042	6	0	5	0	0	500	$ -	$ -	$ -	$ -
Courtenay Fire Department	2043	6	0	5	0	0	500	$ -	$ -	$ -	$ -
Courtenay Fire Department	2044	6	0	5	0	0	500	$ -	$ -	$ -	$ -
Courtenay Fire Department	2045	6	0	5	0	0	500	$ -	$ -	$ -	$ -
Courtenay Fire Department	2046	6	0	5	0	0	500	$ -	$ -	$ -	$ -
Courtenay Fire Department	2047	6	0	5	0	0	500	$ -	$ -	$ -	$ -
Courtenay Fire Department	2048	6	0	5	0	0	500	$ -	$ -	$ -	$ -
Courtenay Fire Department	2049	6	0	5	0	0	500	$ -	$ -	$ -	$ -
Courtenay Fire Department	2050	6	0	5	0	0	500	$ -	$ -	$ -	$ -

Inflation Rate	2%

Fleet Location	Year	Level 2 Charger (count)	New Level 2 Chargers	Level 3 Charger (count)	New Level 3 Chargers	Capacity Addition (kVA)	Site-wide Capacity (kVA)	Charger Cost	Infrastructure Cost	Total Infrastructure Cost	Total Infrasructure Cost (incl. inflation)
Operations Yard	2025	10	0	0	0	0	300	$ -		$ -	$ -
Operations Yard	2026	10	0	0	0	0	300	$ -	$ 4,500	$ 4,500	$ 4,590
Operations Yard	**2027**	10	0	**2**	2	0	300	$ 22,000	$ 57,000	$ 79,000	$ 82,192
Operations Yard	**2028**	**14**	4	**4**	2	0	300	$ 52,000	$ 68,000	$ 120,000	$ 127,345
Operations Yard	**2029**	**19**	5	**5**	1	654	1,000	$ 48,500	$ 1,053,500	$ 1,102,000	$ 1,192,840
Operations Yard	**2030**	19	0	**8**	3	0	1,000	$ 33,000	$ 85,500	$ 118,500	$ 130,834
Operations Yard	**2031**	**23**	4	8	0	0	1,000	$ 30,000	$ 29,500	$ 59,500	$ 67,007
Operations Yard	**2032**	**24**	1	**11**	3	0	1,000	$ 40,500	$ 91,000	$ 131,500	$ 151,052
Operations Yard	**2033**	24	0	**15**	4	0	1,000	$ 44,000	$ 100,500	$ 144,500	$ 169,305
Operations Yard	**2034**	24	0	**16**	1	0	1,000	$ 11,000	$ 37,500	$ 48,500	$ 57,962
Operations Yard	**2035**	24	0	**17**	1	0	1,000	$ 11,000	$ 38,000	$ 49,000	$ 59,731
Operations Yard	**2036**	**25**	1	**19**	2	0	1,000	$ 29,500	$ 62,500	$ 92,000	$ 114,390
Operations Yard	**2037**	**26**	1	**20**	1	0	1,000	$ 18,500	$ 48,000	$ 66,500	$ 84,338
Operations Yard	**2038**	**27**	1	**23**	3	0	1,000	$ 40,500	$ 77,000	$ 117,500	$ 151,999
Operations Yard	**2039**	**29**	2	**24**	1	0	1,000	$ 26,000	$ 39,000	$ 65,000	$ 85,766
Operations Yard	**2040**	29	0	**25**	1	0	1,000	$ 11,000	$ 24,000	$ 35,000	$ 47,105
Operations Yard	2041	29	0	25	0	0	1,000	$ -	$ -	$ -	$ -
Operations Yard	2042	29	0	25	0	0	1,000	$ -	$ -	$ -	$ -
Operations Yard	2043	29	0	25	0	0	1,000	$ -	$ -	$ -	$ -
Operations Yard	2044	29	0	25	0	0	1,000	$ -	$ -	$ -	$ -
Operations Yard	2045	29	0	25	0	0	1,000	$ -	$ -	$ -	$ -
Operations Yard	2046	29	0	25	0	0	1,000	$ -	$ -	$ -	$ -
Operations Yard	2047	29	0	25	0	0	1,000	$ -	$ -	$ -	$ -
Operations Yard	2048	29	0	25	0	0	1,000	$ -	$ -	$ -	$ -
Operations Yard	2049	29	0	25	0	0	1,000	$ -	$ -	$ -	$ -
Operations Yard	2050	29	0	25	0	0	1,000	$ -	$ -	$ -	$ -
Lewis Centre	2025	1	0	0	0	0	346	$ -	$ -	$ -	$ -
Lewis Centre	**2026**	**2**	1	0	0	0	346	$ 7,500	$ 5,000	$ 12,500	$ 12,750
Lewis Centre	2027	2	0	0	0	0	346	$ -	$ -	$ -	$ -
Lewis Centre	**2028**	**3**	1	0	0	0	346	$ 7,500	$ 5,000	$ 12,500	$ 13,265
Lewis Centre	2029	3	0	0	0	0	346	$ -	$ -	$ -	$ -
Lewis Centre	2030	3	0	0	0	0	346	$ -	$ -	$ -	$ -
Lewis Centre	2031	3	0	0	0	0	346	$ -	$ -	$ -	$ -
Lewis Centre	2032	3	0	0	0	0	346	$ -	$ -	$ -	$ -
Lewis Centre	2033	3	0	0	0	0	346	$ -	$ -	$ -	$ -
Lewis Centre	2034	3	0	0	0	0	346	$ -	$ -	$ -	$ -
Lewis Centre	2035	3	0	0	0	0	346	$ -	$ -	$ -	$ -
Lewis Centre	2036	3	0	0	0	0	346	$ -	$ -	$ -	$ -
Lewis Centre	2037	3	0	0	0	0	346	$ -	$ -	$ -	$ -
Lewis Centre	2038	3	0	0	0	0	346	$ -	$ -	$ -	$ -
Lewis Centre	2039	3	0	0	0	0	346	$ -	$ -	$ -	$ -
Lewis Centre	2040	3	0	0	0	0	346	$ -	$ -	$ -	$ -
Lewis Centre	2041	3	0	0	0	0	346	$ -	$ -	$ -	$ -
Lewis Centre	2042	3	0	0	0	0	346	$ -	$ -	$ -	$ -
Lewis Centre	2043	3	0	0	0	0	346	$ -	$ -	$ -	$ -
Lewis Centre	2044	3	0	0	0	0	346	$ -	$ -	$ -	$ -
Lewis Centre	2045	3	0	0	0	0	346	$ -	$ -	$ -	$ -
Lewis Centre	2046	3	0	0	0	0	346	$ -	$ -	$ -	$ -
Lewis Centre	2047	3	0	0	0	0	346	$ -	$ -	$ -	$ -
Lewis Centre	2048	3	0	0	0	0	346	$ -	$ -	$ -	$ -
Lewis Centre	2049	3	0	0	0	0	346	$ -	$ -	$ -	$ -
Lewis Centre	2050	3	0	0	0	0	346	$ -	$ -	$ -	$ -

Vehicle/Equipment Type	Charger Power (kW)	Charger Costs	Infrastructure Costs per Charger
Light Duty Vehicles	6.6	$7,500	$5,000
Medium/Heavy Duty Vehicles	24	$11,000	$24,000
Fire Trucks	50	$50,000	$50,000
Light Equipment	3.3	$0	$4,500
Medium/Heavy Equipment	6.6	$0	$5,000