To: Climate Action Committee

From: Morgan Braglewicz, Air Quality Planner, Air Quality and Climate Action Services

Date: September 19, 2023 Meeting Date: October 5, 2023

Subject: **Regional Electric Vehicle Charging Analysis and Guidance Report**

RECOMMENDATION

That the Climate Action Committee receive for information the report dated September 19, 2023 titled "Regional Electric Vehicle Charging Analysis and Guidance Report".

EXECUTIVE SUMMARY

Metro Vancouver, with partners BC Hydro and TransLink, has produced the Regional EV Charging Guidance as a resource to guide and align deployment of public and multifamily residential building EV charging in the region, supporting progress towards greenhouse gas reduction targets.

Meeting the targets outlined in the *Transportation Roadmap* requires shifting to sustainable modes and vehicle electrification. There has been strong uptake of electric vehicles (EVs) in the Metro Vancouver region, and momentum in EV sales is expected to grow. Consequently, there will be a need for the rapid deployment of EV charging infrastructure across the region over the next 30 years. Between 4,600 to 7,700 public direct current fast charging ports and 54,700 to 97,600 public Level 2 ports will be needed to meet demand. Significant capital investment is needed in both public charging and multifamily building retrofits, estimated to total $2.1 billion to $2.9 billion by the year 2050. Responsibilities for the planning, investment, and operation of EV charging are shared among multiple orders of government, as well as BC Hydro and the private sector.

PURPOSE

To provide a summary of the analysis, results, and key guidance from the Regional Electric Vehicle Charging Analysis and Guidance project.

BACKGROUND

To meet the *Climate 2050 Transportation Roadmap* target that by 2050, "All passenger vehicles on the road are zero emission, powered by clean, renewable electricity or hydrogen by 2050", it is critical to accelerate the transition from fossil fuel to electric powered vehicles. The *Regional EV Charging Analysis and Guidance* (Attachment 1) responds to action 2.4 in the *Transportation Roadmap* to develop a regional EV charging strategy by providing guidance for coordinated deployment of EV charging at a regional scale in Metro Vancouver.

REGIONAL TRANSITION TO ELECTRIC VEHICLES

Light-duty vehicles (cars, light trucks, and SUVs) or "LDVs" are the Metro Vancouver region's largest source of greenhouse gas (GHG) emissions, accounting for about one-third of regional emissions. LDVs also represent one of the best opportunities to start reducing emissions through intentional

land use planning that supports walking, cycling, transit, and other shared mobility modes, alongside vehicle electrification.

EV sales in the Metro Vancouver region are growing quickly, accounting for over 20% of all new vehicle sales in 2022, the highest numbers in BC. This growth has been supported by the BC *Zero-Emission Vehicles Act* (ZEV Act), which requires an increasing proportion of new vehicles sales to be battery electric or plug in hybrid electric (reaching 90% of sales by 2030 and 100% of sales by 2035), and meeting near term climate objectives will require an even faster transition to EVs. EV charging infrastructure must be well planned and expanded to meet growing demand to avoid slowing down the transition to EVs.

Rapid and coordinated expansion of EV charging at a regional scale will provide numerous benefits to the region in addition to climate action, including cleaner air, lower transportation costs, job creation, and revenue generation for utilities and charging network operators, all of which contribute to a prosperous regional economy.

REGIONAL EV CHARGING ANALYSIS AND GUIDANCE

The objective of the Regional EV Charging Analysis and Guidance project is to estimate the amount and types of EV charging infrastructure needed to support the rapid uptake of light duty EVs over the next 30 years across the region, and to recommend actions for Metro Vancouver member jurisdictions and other key actors to plan for and deploy public and multifamily building EV charging. Metro Vancouver, BC Hydro, and TransLink partnered together to deliver this project.

The project analysis includes EV adoption and charging needs forecasts, an equity assessment, and business case, culminating in a regional EV charging guidance document. This guidance will support planning and investment in the regional EV charging network by regional actors, local governments, utilities, private companies, as well as other governments and public sector organizations.

Regional EV Adoption Forecast

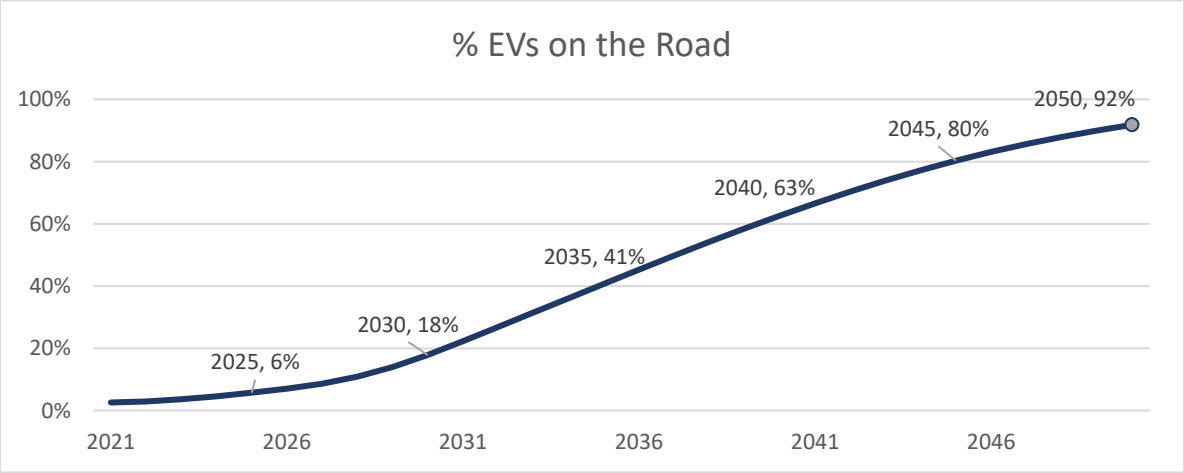
The foundation of the analysis for this project is an EV adoption forecast for the region. The forecast includes the anticipated impacts of the *ZEV Act* sales mandate as well as an assumption that Metro Vancouver will continue to lead in EV sales BC in the coming years. By 2035, 100% of sales will be EVs, resulting in near complete transition to EVs by 2050 or earlier (Figure 1). Additional climate policy can further accelerate EV uptake.

Regional Charging Needs Assessment

Charging at home will play the largest role to support the EV transition. Installing EV charging is relatively simple and low cost for most single family homes, duplexes, triplexes and row houses. Most new multifamily residential buildings in the region will be constructed to be ready for EV charger installation. However, this will be more challenging for existing multifamily residential buildings due to legal, financial, technical, and logistical barriers. Charging in locations outside the home, such as in the workplace, in the public realm, and at privately owned retail locations will be the only choice for residents who do not have access to home charging, making public charging a critical part of the regional EV charging system. A complete overview of charging technologies and

their characteristics is available in the *Primer on EV Charging Infrastructure* developed for this project (Attachment 2).

Figure 1: Forecasted EVs on the road in Metro Vancouver, as a % of all Light Duty Vehicles



This project produced an EV charging needs assessment to forecast demand for EV charging. The results of the study suggest that by 2035, 2,200 to 2,900 public direct current fast charging (DCFC) ports and 32,000 to 47,000 public Level 2 ports (approximately two-thirds of which could be work place charging) will be needed. By 2050, the region will need between 4,600 to 7,700 public DCFC ports and 54,700 to 97,600 public Level 2 ports. Currently, there are approximately 1,660 Level 2 ports and 270 DCFC ports in Metro Vancouver. Rapid and widespread expansion of the EV charging network will be needed to keep pace with the expected rapid uptake of EVs, and is critical to avoid slowing the transition to EVs if people do not feel confident in their ability to access charging.

The level of public charging needed will depend on the degree of access to home charging. Comprehensive retrofits to make parking spots in multifamily residential buildings ready for EV charger installation will be needed to support access to home charging. The wide range in anticipated public charging resulting from this analysis reflects high and low retrofit scenarios, and represent bookends to the expected need for public charging. The best solution for Metro Vancouver jurisdictions will likely lie somewhere in between.

The results point to a need for significant capital investment in both public charging and multifamily building retrofits, totaling approximately $1.2 billion by 2035 and $2.1 billion to $2.9 billion in cumulative capital costs by 2050. This does not include electrical service upgrade costs, which vary widely and can be significant. Total costs of deploying EV charging infrastructure can be reduced with widespread access to charging at home, particularly in multifamily residential buildings.

Recommendations for Local Governments and Other Actors

Deploying EV charging infrastructure at the scale necessary requires big, coordinated actions from governments, utilities and others. The purpose of the guide developed through this project is to help local governments and other key actors collaboratively plan and deploy public and multifamily building EV charging infrastructure for LDVs.

The guidance includes the following recommendations and actions for key actors:

- **Local governments** can **streamline permitting,** ensure **timely project approvals,** adopt **EV-ready building requirements**, and **provide charging** on strategically located and municipally owned sites, either directly or in partnership with BC Hydro.

- **BC Hydro** can continue to **deploy EV charging** across the region. On July 28, 2023, the utility filed an application to the BC Utilities Commission for a 10-year levelized public charging rate along with a 10-year deployment plan to increase investment in both DCFC and public Level 2 charging (Reference 1). Additionally, BC Hydro has an important role to play in facilitating other public and private deployment of charging, including timely **electrical service extensions**. Further, expanded EV charging will lead to increase in electricity use. Fortunately, this demand for electricity is flexible and offers significant opportunities for load management to minimize impacts on peak demand.

- **The BC and Canadian governments** should **increase funding** for the deployment of EV charging. Both orders of government currently provide funding, but many existing programs have become fully subscribed very quickly and are insufficient to meet growing demand. Additional funding will be needed to support the significant level of investment needed over the coming years. Additionally, the BC Government can take policy action to **support EV ready parking** in new and existing buildings across the province.

The recommended principles and actions in this guide were developed to provide a starting point for coordinated deployment of EV charging in the region. Many of the recommendations involve multiple organizations, such as establishing targets, investing in infrastructure, and educating the public. Clear roles and mechanisms for coordination among actors in the Metro Vancouver region will be critical to avoid duplication and align efforts.

ALTERNATIVES
This is an information report. No alternatives are presented.

FINANCIAL IMPLICATIONS
There are no financial implications for this report.

CONCLUSION
By the year 2050, almost all of the light duty vehicles in the region will be electric. This will require significant investment and rapid deployment of both home and public EV charging to ensure that EV uptake is not delayed due to a lack of access to charging. Local governments, BC Hydro, the BC and Canadian governments, and the private sector all have important roles to play in this transition. The Regional EV Charging Guidance is a resource for these groups to guide and align deployment of public and multifamily EV charging in the region, supporting progress towards GHG reduction targets. The guidance in this document is a starting point for coordinated regional action, and staff will work with key partners to advance actions in the guide.

ATTACHMENTS

1. "Keeping it Current: Guidance for Collaborative Deployment of EV Charging in Metro Vancouver", dated August 2023
2. "Keeping it Current: Primer on EV Charging Infrastructure", dated August 2023
3. Presentation re: "Regional Electric Vehicle Charging Analysis and Guidance", dated October 5, 2023

REFERENCE

1. BC Hydro Public EV Charging Service Rates

ATTACHMENT 1

Keeping it Current

Guidance for Collaborative Deployment of EV Charging in Metro Vancouver

metrovancouver
SERVICES AND SOLUTIONS FOR A LIVABLE REGION

TRANSLINK

BC Hydro
Power smart

August 2023

dunsky
Energy + Climate

Submitted to:

metrovancouver
SERVICES AND SOLUTIONS FOR A LIVABLE REGION

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BC Hydro
Power smart

This report has been reviewed by representatives of Metro Vancouver and TransLink, who commissioned the study, but the interpretation of the results of this study, as expressed in the report, is entirely the responsibility of the consultant authors and does not imply endorsement of specific points of view by Metro Vancouver or TransLink. The findings and conclusions expressed in the report are the opinion of the authors of the study and may not necessarily be supported by Metro Vancouver or TransLink.

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List of Abbreviations and Terms

BC: British Columbia

BCUC: British Columbia Utilities Commission

CCS: Combined Charging System

CSA: Canadian Standards Association

DCFC: Direct Current Fast Charging

EV: Electric Vehicle

EVEMS: Electric Vehicle Energy Management System

LCFS: Low Carbon Fuel Standard

LDV: Light-duty Vehicles

MHDV: Medium- and Heavy-duty Vehicles

OCPP: Open Charge Point Protocol

1. About this Document

1.1 Purpose of the Guide

The purpose of this guide is to help Metro Vancouver local governments and other key actors plan public and multifamily building EV charging infrastructure for light-duty vehicles (LDVs).

Metro Vancouver has the highest EV adoption rate of any region in Canada: in Q4 2022, 25% of new vehicles registered in Metro Vancouver were EVs.[1] EVs now comprise approximately 5% of all vehicles in Metro Vancouver.[2]

This progress is the result of leadership by many actors. Significant progress on charging infrastructure has been made to date. For example, many Metro Vancouver municipalities have adopted best-in-class rules requiring new construction to be EV ready. Meanwhile, BC Hydro and other actors have invested in a foundational network public EV charging stations. To keep up with continued EV adoption—and ensure equitable access to electric mobility—continued expansion of EV charging infrastructure is necessary.

The recommended principles and actions in this guide are based on the latest information about EV adoption and infrastructure and can be implemented in the near to medium term (two to five years). Implementation practices should continue to be re-evaluated over time as policy, technology and the region itself change.

It takes an ecosystem to deploy and operate a charging network. **This guide was developed with Metro Vancouver municipalities and First Nations anticipated as the primary audience, along with the project sponsors (Metro Vancouver, TransLink and BC Hydro).** Other key actors that can use this guidance include building owners, landowners, charging network companies, and other orders of government.

1.2 Navigating the Guide

This guide covers the following questions:

- **What are the basics EV charging infrastructure?** See Section 1
- **What should be our guiding principles for EV charging infrastructure planning and deployment?** See Section 3
- **Who should do what?** See Section 4
- **What actions should local and regional governments take in the near to medium term?** See Section 5
- **How much infrastructure do we need?** See Section 6
- **How do we make our strategies equitable?** See Section 6.2
- **What are the operational considerations?** See Section 7

[1] https://electricautonomy.ca/2023/02/13/canada-zev-sales-q4-2022/
[2] Derived from the Province of BC's Zero-Emissions Vehicle Update 2022 and Statistics Canada's Table 23-10-0308-01 Vehicle registrations, by type of vehicle and fuel type

2. EV Charging Basics

For light-duty vehicles (LDVs - cars, vans, SUVs and light trucks) there are three main charging levels: Level 1, Level 2, and direct current fast charging (DCFC), sometimes referred to as Level 3 or, simply, fast charging. The main characteristics of these charging types for LDVs are provided in Table 2-1.

Table 2-1. Main characteristics of different charging types for LDVs

Charging Type	Charging Power	Approx. charging time for 300 km of range[3]		Charging Location					Type of light-duty EV that can use
		Typical car	Typical SUV/ light truck	Other resid-ential	Multi-fam. bldg	Pub-lic	Dep-ot	Shared comm-ercial	
Level 1	1.3-2.4 kW	46-25 h	69-37.5 h						BEV and PHEV
Level 2	3 kW	20 h	30 h						BEV and PHEV
	7 kW	8.5 h	13 h						
	9.6 kW	6 h	9.5 h						
	19.2 kW	3.25 h	4.75 h						
DCFC	25 kW[4]	2.5 h	3.5 h						BEV
	50 kW[5]	1.25 h	1.75 h						
	100 kW	36 min	54 min						
	150 kW	24 min	36 min						
	350 kW	10 min	15 min						

[3] Many vehicles do not require a full 300 km charge on a typical day.

[4] While 25 kW chargers use direct current, they are not considered "fast" chargers. As seen in the charging times, they are only appropriate where vehicles are staying for over two hours.

[5] While 50 kW chargers use direct current, they are increasingly not considered sufficiently "fast" to provide on-the-go charging. Deployment organizations are increasingly focusing on charging speeds of 75kW and above.

Charging at home (whether in ground-oriented homes or in multifamily buildings) plays the largest role in the charging ecosystem in terms of the number of ports and the overall amount of energy dispensed at those locations. According to a survey of BC EV drivers conducted by BC Hydro in late 2022 of their public EV charging network members, 86% of EV drivers respondents use home charging. Meanwhile, most of these drivers also use public charging at least some of the time; 88% and 77% of EV drivers respondents use BC Hydro and other public charging stations, respectively.[6]

Despite the importance of home charging, **public charging** plays a critical role in the ecosystem for three principal reasons:

1. It is the only choice for residents who do not have access to home charging, which includes:
   - **"Garage orphans":** a term sometimes used for people without any access to private home parking. This group includes people in all housing types. They will always rely on public charging.
   - **People living in multifamily buildings** who have access to parking, but where that parking space has not had the electrical upgrades required to support the installation of EV charging. This second group can use public charging, or their parking space can be retrofitted to become EV ready. As more multifamily buildings are retrofitted, fewer members of this group will rely exclusively on public charging.
2. The presence and visibility of **public charging** is crucial to helping consumers overcome range anxiety and feel confident purchasing an EV.
3. Providing opportunities for mid-day charging may become increasingly important to the electrical system to **balance loads** as more low-cost solar energy comes onto the grid.

We consider four categories of charging in this Guide:

1. **Ground-oriented home charging.** People living in ground-oriented housing (single family homes, duplexes, triplexes and row houses) are more likely to have access to, and ownership of, a parking space attached to their living space (e.g. a private garage or parking pad). Installation of EV charging in these settings can be relatively simple, although panel and/or service upgrades or other electrical works are sometimes required and implementing appropriate EV energy management systems in these building types can be complicated.
2. **Multifamily building charging.** Multifamily building apartments feature shared parking areas. It is more challenging for multifamily building residents to install EV charging, even when they do have access to a parking spot, due to legal, financial, technical and logistical barriers inherent in both condominiums and rental apartments.
3. **Public charging,** which includes:
   - **Community charging,** which can be on-street (curbside) or off-street (for example, in publicly accessible parking lots or garages).
   - **Highway charging,** which is provided on major corridors, mostly serving people making long trips.

[6] BC Hydro, 2023. Public EV Charging Service Rates Application submitted to BCUC. Exhibit B-1.

- **Workplace charging,** which is mainly used by employees but could be publicly accessible, and can be provided on- or off-street.

4. **Shared commercial charging.** This type of charging is shared among fleets but is exclusively dedicated to commercial vehicles. It is placed in strategic locations for fleets like taxi stands and downtown delivery zones.

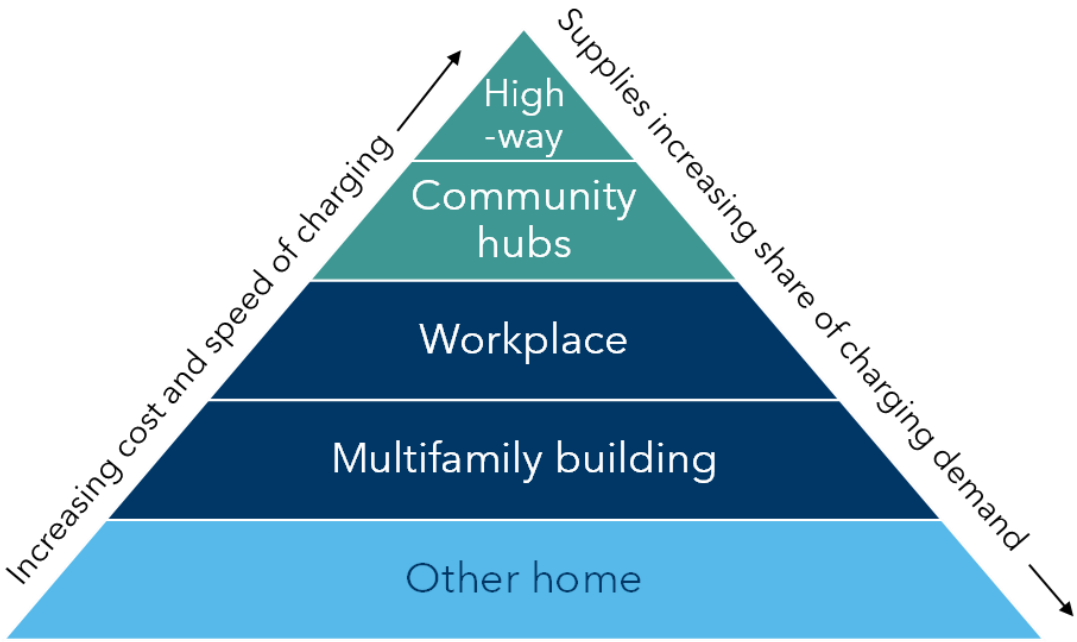

Figure 2-1. Relative importance of different charging categories, by total energy dispensed[7]

[7] Figure adapted from: U.S Department of Energy, *A Guide to the Lessons Learned from the Clean Cities Community Electric Vehicle Readiness Projects*, 2014.

2.1 Potential Revenues from EV Charging

Potential revenues from operating public charging infrastructure include the following:

- **User fees.** User fees can be applied for parking and/or for use of charging infrastructure. Fees for charging are usually structured on a time basis ($/minute); however, regulations introduced by Measurement Canada in February 2023 now allow site hosts to charge on a volumetric basis ($/kWh, $/kW).
- **BC Low Carbon Fuel Standard and Canada Clean Fuel Regulations.** BC's Renewable and Low Carbon Fuel Requirements currently provide a robust market for carbon credits. These credits are generated by providing EV charging; wholesalers of polluting gasoline and diesel must procure these credits in increasing quantities. This provides an exceptional opportunity for revenue that can make offering many forms of EV charging profitable. However, the value of these credits in the future is uncertain; it is possible their value will reduce and providing EV charging will accordingly become less lucrative.
  Utility services, such as demand response. Utilities are increasingly offering voluntary rates and/or programs that provide financial rewards to customers operating equipment (e.g. EV chargers) that can be controlled in such a way to provide benefits to the electricity grid. For example, EV chargers can provide demand response services, reducing power consumption when wholesale electricity prices are high and/or the grid is congested. This provides revenue opportunities for network operators.
- **Advertising.** Charging infrastructure, screens and apps can feature advertising, presenting revenue opportunities for networks.

3. Strategic Principles

Local and regional governments should adopt the following strategic principles in their efforts to support EV charging infrastructure deployment in their communities:

STRATEGIC PRINCIPLES FOR LOCAL GOVERNMENTS

1. Embrace the **critical role of local governments** in providing public EV charging infrastructure
2. Continue to prioritize **active and shared modes**
3. Ensure **equitable access** to EV charging
4. Take a **futureproofing** approach
5. Focus on convenient EV charging located **where vehicles already park**
6. Enable **private-sector and utility investment**
7. Advocate for **senior government and utility policies** that support EV charging

Below, we briefly describe the rationale for each of these principles. The principles inform the recommended Deployment Actions that follow in Section 5.

Principle 1. Embrace the critical role of local governments in providing public EV charging infrastructure

Local and regional governments have a critical role to play in the supply of EV charging to residents.

Local governments directly control land use, use of the right-of-way, business licencing, and parking in their communities, while also owning and operating public lands. Local governments therefore **control many of the opportunities to provide public charging**. By deploying, allowing, and/or requiring EV charging to be deployed, local governments can speed the transition to EVs.

Specifically, the key tools at local governments' disposal include:

- **Policy/regulation:** adopting bylaws, business licencing requirements, and land development approaches that require EV charging deployment on private lands.
- **Providing lands:** cities own rights of way, parking facilities, and other public lands that are strategic public charging sites.
- **Engagement, partnerships and education:** bringing together charging service providers, other orders of government, landowners, developers, financial institutions and others to collaborate on EV charging deployment. Likewise, local governments can inform their residents about opportunities to implement EV charging.
- **Planning and target setting:** local governments have intimate knowledge of their residents needs, travel patterns, use of public space, and future infrastructure and land development plans. As such, municipalities should be involved in setting deployment strategies to ensure alignment with other policy objectives.

- **Investment:** procuring or otherwise funding the deployment of public, multifamily, and shared commercial charging. Further discussion of deployment and operation models is provided in the next paragraph.

There can be significant benefits to municipally-led charging networks, including a greater ability to match location, charging type and pricing in line with local public interests. Municipalities should only seek to establish or expand their own independently managed EV charging networks if they have dedicated sufficient capital, operating and staff resources, and plan to achieve significant economies of scale. Alternately, local governments could partner with BC Hydro with the municipality providing sites to host public charging; BC Hydro has indicated their interest in such partnerships.

Principle 2. Continue to prioritize active and shared modes

The transition to EVs must not come at the expense of more sustainable modes of transportation, including walking, biking, and transit. When planned and designed appropriately, EV charging infrastructure can complement and even **enhance the experience of people using other transportation modes.** For example:

- Public charging stations located on mid-road islands can double as protected bike lanes or curb bulges.
- EV charging can supply power for food trucks or other on-street amenities, reducing air and noise pollution and enhancing the pedestrian experience.
- Supporting the electrification of carsharing and passenger directed fleets (ridehailing and taxis) can help improve the business case for these modes, reduce emissions from high mileage fleets, and support drivers who are less likely to have home charging access.

Local governments must **coordinate internally to avoid conflicts with active and shared modes**; for example, planning the cycling network and on-street chargers on different corridors. Further, while there is a strong rationale for subsidizing EV charging, local governments should ensure that policies do not inadvertently oversupply or underprice parking in ways that incentivise vehicle use.

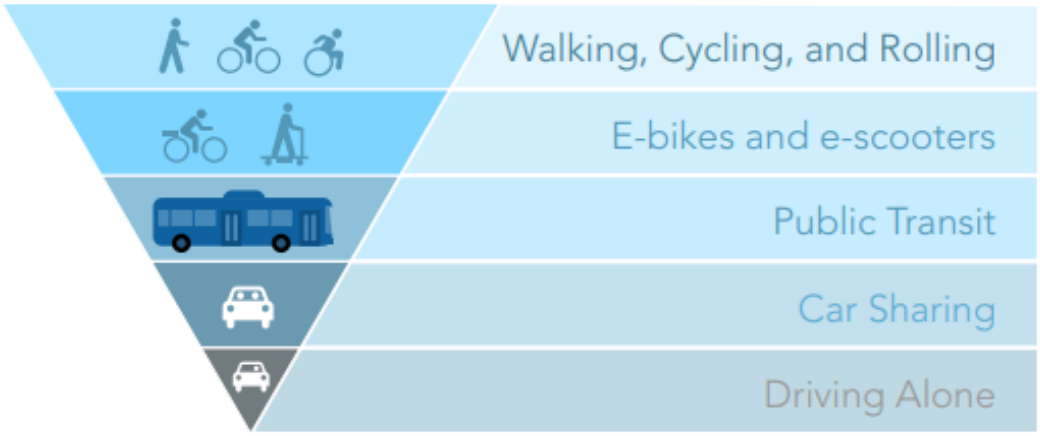

Figure 3-1. Transportation hierarchy[8]

Principle 3. Ensure equitable access to EV charging

It is critical that historically disenfranchised and equity-deserving groups (including low-income households, recent immigrants, disabled people, and renters) **face no additional barriers** to accessing EV charging compared to more privileged members of Metro Vancouver's communities.

Likewise, it critical that EV charging infrastructure is designed to be **safe** (including for women in public spaces) and **designed for accessibility**. Section 6.2 includes further guidance on how to plan and deploy EV charging infrastructure with a focus on social equity.

Principle 4. Take a futureproofing approach

EV adoption is already growing rapidly in Metro Vancouver and it will accelerate over the next decade, driven by increasing consumer interest, decreasing costs, and especially the BC Zero-Emission Vehicle (ZEV) sales mandate. According to forecasting conducted for this project, the number of light-duty EVs on the road in the region will surpass **0.5 million by 2033** and **1 million by 2038**, up from about 90,000 today. While the rate of adoption is somewhat uncertain, the end state is known—by 2035, 100% of sales will be EVs, resulting in near complete fleet turnover by 2050 or earlier.

Accordingly, in the next five to 10 years, **there is little risk of building too much public charging infrastructure**; demand will soon catch up with any temporary oversupply. Rather, there is a risk of under-building, which could slow the transition to EVs if people do not feel confident adopting EVs. An undersupply could even threaten the viability of policies like BC's ZEV sales requirements, which are predicated on all residents being empowered to adopt an EV if they are going to drive a personal vehicle. Accordingly, **local governments must facilitate rapid and widespread deployment of EV charging infrastructure**.

[8] Source: Metro Vancouver Climate 2050 Transportation Roadmap

Principle 5. Focus on convenient EV charging located where vehicles already park

The best place to charge is a place where the vehicle is already parked, whether at home overnight, at work during the day, or at retail establishments or other amenities. Key locations include transit hubs and park and rides (where taxi and ridehailing fleets, as well as individuals) often conduct pickup and drop-offs. Local governments have the best knowledge and data on travel behaviour and use of public space.

Where possible, Metro Vancouver and its members should maximize the potential of EV charging at drivers' **homes, workplaces and regular destinations**, as opposed to new dedicated public charging locations where drivers must make special trips. This approach will be **more convenient for drivers**, while **reducing the space devoted to cars**. Accordingly, public EV charging hubs should be **close to amenities** (such as food and washrooms), with charging speeds aligned with typical vehicle parking dwell times and frequency of visits (**faster charging for shorter stays and slower charging for longer parking times**).

Principle 6. Enable private-sector and utility investment

EV charging infrastructure will be deployed by several organizations in Metro Vancouver, including BC Hydro, the private sector, and local governments. Successful deployments rely upon the timely and low-cost approval of projects by local governments, but in some cases, legacy regulations or inappropriate processes pose barriers. For example, some municipalities unnecessarily apply building permitting to public charging stations or do not count dedicated EV charging parking towards parking minimums. Local governments should **strive to be "open for business" for private sector and utility EV charging networks.** See Action 2.1 for further information.

Principle 7. Advocate for senior government and utility policies that support EV charging

Local governments can also call for and support federal, provincial and utility policies that help improve the business case for charging investment. For example, **Local governments should continue to serve as a strong voice for effective climate and energy policy** that serves their interests as operators of charging infrastructure and more importantly the interests of their communities.

4. Roles for Key Actors

Deploying EV charging infrastructure at the scale necessary requires **big, coordinated actions** across the ecosystem from governments, utilities and third parties. **There are significant benefits to publicly owned charging infrastructure,** including setting locations and charging fees in the public interest. This is particularly important to ensure service to historically and currently underserved communities. **Overall, some level of public sector intervention is required to ensure equitable access to EVs and charging.**

There are some responsibilities that only certain actors can address. For example, municipalities and provinces have **unique regulatory powers** (land use approvals, zoning, right of way permissions) that must be leveraged. Likewise, successful deployment is not possible without timely **electrical service extensions** provided by the utility.

On many other fronts, multiple actors have the opportunity and responsibility to act, including **establishing targets, investing in infrastructure, and educating the public**. This means that setting clear roles and mechanisms for coordination among actors in the Metro Vancouver region will be critical to avoid duplication and align efforts. Table 4-1illustrates the most important roles to be played by these different actors.

Table 4-1. Roles for key actors

Action	Fed. Govt.	Prov. Govt.	MVRD, Trans-Link	Local govts.	BC Hydro	First Nat-ions	Prop-erty owners	Charging service providers
Establish deployment **targets**; monitor and evaluate	■	■	■	■	■	■	■	■
Invest in charging infrastructure	■	■	■	■	■	■	■	■
Ensure **equitable access** for underserved communities	■	■	■	■	■	■	■	■
Provide **public data** that support planning	■	■	■	■	■	■		■
Provide **lands** for infrastructure deployment	■	■	■	■	■	■	■	
Invest in **workforce** training and development	■	■	■	■	■	■		■
Establish a supportive **regulatory framework**	■	■	■	■		■		
Use **regulatory tools** to require private sector deployment		■	■	■		■		
Provide timely **approvals**		■		■	■	■		
Develop **demand response programs** & utility-integrated EV Energy Management Systems (EVEMS)		■			■			■
Develop **electricity supply** to meet future demand	■	■			■			
Provide timely **electrical services**					■			

4.1 Role for Local and Regional Governments

When local and regional governments deploy charging infrastructure, they must choose from **several possible deployment models**, including:

- **Partnering with BC Hydro to deploy infrastructure**. BC Hydro encourages this approach (see Section 4.2);
- **Investing directly,** by:
  - Funding the deployment of infrastructure by third parties through grants or procurement;
  - Owning their own infrastructure but outsourcing operations; or
  - Owning and operating their own infrastructure.

Despite the potential revenues outlined in Section 2.1, the ability to recover the investment costs of public charging infrastructure is uncertain, due especially to uncertainties around the price and future availability of Low Carbon Fuel Standard credits, charging demand, capital costs, maintenance costs, electricity rates and demand charges.

Accordingly, there is a crucial role for the public sector to support deployment of charging infrastructure, to ensure that a lack of charging in not-profitable areas does not present a barrier to EV adoption. In this context, local and regional governments should expect that providing EV charging in the public interest may mean operating these services at a loss in some cases.[9] Further discussion of considerations for municipal-led deployment are explored further in Section 6 Deployment Planning.

[9] While there is a strong rationale for subsidizing EV charging, there is no justification for subsidizing *parking* in general. It is recommended that local governments ensure that policies do not oversupply or underprice parking in ways that incentivise excessive private vehicle use or incur unnecessary construction costs.

MUNICIPAL PRIORITY AREAS FOR EV CHARGING

There are specific strategic charging sites on lands that local and regional governments and authorities control, influence, or understand, including:

- Employment and commercial hubs
- Tourism sites
- Park and rides at transit stations
- Taxi and ridehailing stands
- Concentrations of people without home charging
- Equity-deserving areas

Whether local and regional governments are deploying their own infrastructure or partnering with BC Hydro or third parties for deployment, they can make sure these sites of municipal interest are incorporated into plans. See Section 6 Deployment Planning for further guidance on area prioritization and site selection.

4.2 Role for BC Hydro

At the end of the 2023 fiscal year, BC Hydro had deployed 141 DCFC ports across 83 sites in British Columbia. Of those sites, 31 serve urban populations (greater than 30,000 residents) and the remainder serve non-urban and corridor charging. BC Hydro's network currently represents about 14% of the public DCFC market share and less than 1% of the public Level 2 market share.[10]

BC Hydro's Electrification Plan (2021) established its current plan to have 325 fast chargers (around 450 DC ports) at 145 sites by the end of 2025.

On July 28, 2023 BC Hydro filed an application to the BCUC for a 10-year levelized public charging rate, along with a 10-year reference deployment plan to expand BC Hydro owned and operated public charging stations to 2000+ DC ports and 1200+ Level 2 charging ports by 2033. The plan includes a wide spectrum of public charging power levels from Level 2 through 350kW DCFC.[11]

While the outcome of this regulatory process will not be known until after the completion of this report, this proposed plan by BC Hydro is substantial and indicates to local governments that BC Hydro is ready to provide significantly more public EV charging infrastructure. BC Hydro encourages local governments to start or continue working with BC Hydro to ensure sites in their communities are ready and secured for investment by BC Hydro.

[10] BC Hydro (2023). BC Hydro Public Electric Vehicle Charging Rates Workshop presentation.

[11] Details of the BCUC proceeding (as of August 2023) can be viewed here: https://www.bcuc.com/OurWork/ViewProceeding?applicationid=1139

4.3 Role for First Nations

As shown in Table 4-1, First Nations will generally have a similar role to municipalities when it comes EV charging. Like municipalities, First Nations may set targets for EV charging deployment in their communities and pursue deployment independently or through partnerships. In this regard, the recommended actions for local governments in this guide may also support First Nations in their planning.

Furthermore, local and regional governments must consult First Nations in developing their EV charging infrastructure strategies. The action plan (Section 5) includes recommendations to this effect.

5. EV Charging Deployment Actions

This section presents **policies, procedures, investments and partnerships** that municipal governments, Metro Vancouver and Translink should take to support deployment of EV charging infrastructure, along with actions by other actors that local and regional governments can advocate for. Actions in Table 5-1 are grouped into the following categories:

1.0 Formalize EV charging strategies

2.0 Require and support public charging on private property

3.0 Invest in municipal/regional charging networks

4.0 Adopt design practices that support access and integration

5.0 Require and support EV ready multifamily residential buildings

6.0 Call upon the Province of BC, the BC Utilities Commission, and BC Hydro to continue to adopt a supportive regulatory environment

Table 5-1 also provides information to support implementation, including:

- **The appropriate lead organization**:
  - Local government (LG)
  - Regional entity which includes Metro Vancouver and Translink (Reg.)
  - BC Hydro (BCH)
  - BC Utilities Commission (BCUC)
  - Province of BC (Prov.)
- **The type of action** (policy, procedure, investment, engagement or partnership)
- **Time frame** (indicates a combination of urgency and ease of implementation)
- **Cost to government** ($, $$, or $$$). Regulatory and policy actions are considered low cost while investments and programs entail greater costs.

Table 5-1. Action plan

Action		Lead	Action Type	Time Frame	Cost to Govt.
1.0	**Formalize EV charging strategies** (multifamily, public and shared commercial charging)				
1.1	**Adopt charging infrastructure targets, plans and strategies**	LG & Reg.	Policy	0-2 yrs	$
2.0	**Require and support public charging on private property** (public and shared commercial charging)				
2.1	**Streamline municipal regulatory regimes and provide timely project approvals**	LG	Procedure	0-3 yrs	$
2.2	**Adopt EV ready requirements for parking in new non-residential developments**	LG	Policy	0-2 yrs	$
2.3	**Develop regulatory incentives for installation of EV charging infrastructure on appropriate commercial land uses**	LG	Policy	0-4 yrs	$
2.4	**Secure additions to public fast charging networks in appropriate new development approvals**	LG	Procedure	0-4 yrs	$
3.0	**Invest in municipal/regional charging networks** (multifamily, public and shared commercial charging)				
3.1	**Establish an agreement with BC Hydro to support deployment of public, workplace and residential EV charging; and/or establish or formalize local government EV charging services**	LG & BCH	Investment	0-2 yrs	$ - $$$
3.2	**Explore a regional government EV charging service**	Reg.	Investment, Partnership	0-2 yrs	$$$
3.3	**Engage with First Nations to support the deployment of infrastructure**	Reg.	Engagement, Partnership	0+ yrs	$
3.4	**Support access to parking and charging for carshare**	LG &/or Reg.	Policy, Investment	0-4 yrs	$$
3.5	**Support access to charging for taxis and ridehailing**	LG &/or Reg.	Policy, Investment	0-4 yrs	$$
3.6	**Establish a coordination body to oversee the deployment of public EV charging services**	Reg.	Engagement, Partnership	0-5 yrs	$

Action		Lead	Action Type	Time Frame	Cost to Govt.
4.0	**Adopt design practices that support access and integration** (multifamily, public and shared commercial charging)				
4.1	**Enable curbside EV charging with electricity sourced from an adjacent building or utility connection point**	LG	Procedure	0-4 yrs	$
4.2	**Integrate public EV charging into street design in a way that is compatible with other land uses**	LG	Procedure	0-2 yrs	$
4.3	**Develop procedures and practices for ensuring deployment is universally accessible and safe**	LG	Procedure	0-2 yrs	$
5.0	**Require and support EV ready multifamily residential buildings** (multifamily charging)				
5.1	**Adopt EV ready requirements for new residential developments**	LG	Policy	0-1 yrs	$
5.2	**Provide top-up incentives complementary to the EV ready Incentive Program**	LG	Investment	0-2 yrs	$$$
5.3	**Explore financing mechanisms, "make ready" programs, and other initiatives to support EV ready retrofits of multifamily buildings and workplaces**	LG &/or Reg.	Partnership	0-2 yrs	$-$$$
5.4	**Educate residents, rental building owners and strata corporations on options for providing EV charging infrastructure in multifamily buildings**	LG &/or Reg.	Policy	0-2 yrs	$
6.0	**Call upon the Province of BC, the BC Utilities Commission, and BC Hydro to continue to adopt a supportive regulatory environment** (multifamily, public and shared commercial charging)				
6.1	**Ensure BC Hydro has a comprehensive regulatory mandate to deploy and to facilitate private sector deployment of EV charging infrastructure**	Prov., BCUC, BCH	Policy	0-2 yrs	$
6.2	**Adopt Province-wide EV ready new construction requirements**	Prov.	Policy	0-3 yrs	$
6.3	**Set Province-wide targets and plans for comprehensive EV ready retrofits of existing multifamily buildings**	Prov.	Policy	0-3 yrs	$
6.4	**Ensure the regulations developed under the Strata Property Amendment Act, 2023 appropriately define Electrical Planning Reports and improve standards of practice for EV ready Plans**	Prov.	Policy	0-3 yrs	$

1.0 Formalize EV charging strategies

1.1 Adopt charging infrastructure targets, plans and strategies

Local governments should adopt charging infrastructure targets and actions into municipal/regional policy, plans and strategies, either in a standalone EV charging strategy or within other planning documents (e.g. Official Community Plans; climate, transportation, and neighbourhood plans. These strategies should:

- Establish EV charging deployment targets, particularly for local government charging networks. Include targets for equity-deserving communities.
- Engage the public in policy development, including equity-deserving communities.
- Formally acknowledge the importance of transportation electrification to achieve GHG reduction goals, improved air quality, reduce noise pollution.
- Acknowledge EVs' position in transportation hierarchies (e.g. continue to prioritize active modes, transit, etc.).
- Providing the mandate for all departments and services to facilitate deployment of EV charging.
- Commit to actions. Consider those noted in this document.

2.0 Require and support public charging on private property

2.1 Streamline municipal regulatory regimes and provide timely project approvals

Local regulatory regimes can impose unintended barriers to expanding public, workplace and residential charging. Local governments should review and update regulations, permitting and licensing requirements to remove barriers to investment in EV charging. Priorities include:

- Ensure zoning and parking requirements do not create unnecessary barriers (e.g. excessive minimum drive aisles and parking space dimensions). Dedicated EV charging parking spaces should count toward parking minimums to avoid requiring additional parking in new or retrofitted buildings. Consider clarifying that EV charging in visitor parking may be accessed by residents of a property.
- Do not apply building permits to EV charging infrastructure deployments.
- Clarify that premises collecting EV user fees for EV charging do not require a separate business license for that activity.
- Frontline municipal staff should be educated on relevant regulations and policies.

2.2 Adopt EV ready requirements for parking in new non-residential developments

Local governments should ensure they have EV ready requirements for new non-residential construction requiring that 20 to 40% of parking spaces be EV ready. Alternate compliance mechanisms may also be offered.

Requirements should provide for both workplace (longer-term) and visitor (shorter-term) EV charging applications; consider published best practice resources and local precedents for how to best achieve these policy objectives.[12]

[12] McEwen. 2021. *"EV ready" Requirements for New Buildings: A Best Practice Guide for BC Local Governments.*

Many Metro Vancouver municipalities have been world leaders in establishing these requirements; several have been adopted and more are underway.

See also Action 5.1 for residential EV ready requirements.

2.3 Develop regulatory incentives for installation of EV charging infrastructure on appropriate commercial land uses

Land uses such as service stations, public parking facilities, retail and assembly destinations are excellent opportunities for public EV charging; local governments can compel owners of these types of properties to provide EV charging. Local governments should consider:

- Replicating the City of Vancouver's business licence regime for EV charging. Effective January 2025, gas stations must provide at least 50kW of charging capacity, and public parking lots 26 kW (equivalent to four dedicated Level 2 chargers). Businesses that do not meet these requirements will pay an extra $10,000 on their business license annually.
- Flexible compliance mechanisms as part of the regimes, including allowing businesses to comply by building infrastructure offsite when onsite conditions are overly challenging. A few years' lead time should be provided.

Metro Vancouver should also consider developing requirements for charging as part of its authority to regulate air quality.

2.4 Secure additions to public fast charging networks in appropriate new development approvals

Local governments should develop policies to secure additions to publicly-accessible EV charging networks as a consideration of rezoning and/or development approvals for appropriate new developments. Consider the opportunity for a private property site to convey ownership and operations of the EV charging infrastructure to local government, BC Hydro, or other public charging networks.

3.0 Invest in municipal/regional charging networks

3.1 Establish an agreement with BC Hydro to support deployment of public, workplace and residential EV charging; and/or establish or formalize local government EV charging services

As part of its July 2023 application to the BCUC, BC Hydro filed a 10-year reference deployment plan for EV charging. This plan signals BC Hydro's interest in collaborating with BC local governments to deploy EV charging.

Metro Vancouver municipalities are recommended to engage with BC Hydro to develop agreements (for example, memorandums of understanding) on how to collaborate in deploying public charging infrastructure. Likewise, the agreements can identify respective roles to support home and workplace charging.

Likewise, as discussed in Principle 1, in appropriate circumstances, there are benefits to local governments investing in their own public EV charging assets to supply public, workplace, and potentially multifamily building charging. Local governments that choose to invest and operate EV charging services should establish sufficiently resourced and budgeted local government public EV charging services. Local governments deploying their own EV charging networks should:

- Define the objectives of the public charging service which should include some cost recovery, but not necessarily seek full cost recovery or profitability.
- Formally recognize the environmental and social benefits of charging

infrastructure investments, and explicitly plan for equitable deployment. This may entail operating at a loss, particularly in early years.

- Establish a preliminary target market share. For local governments, it is reasonable to aim to deploy 10% to 30% of the total charging infrastructure demand forecast.[13]
- Include targets for investments in equity-deserving communities.
- Include a commitment to meet all demand for workplace charging at city facilities; workplace charging can support talent retention and demonstrate leading by example.
- Formalize an operational unit to provide EV charging services, with sufficient resources to meet targets.
- Engage consultants and EV charging service providers to support network deployments.
- Plan medium-term (e.g. next 5 years) EV charging deployments, including cost estimates. Incorporate plans into municipal capital and operating budgets.
- Charge user fees to achieve some degree of cost recovery and encourage efficient use of infrastructure by community members.
- Pursue revenue streams from Low Carbon Fuel Standard credits, utility demand response programs, and potentially other sources.
- Periodically evaluate targets and performance.

3.2 Explore a regional EV charging service

As noted in Action 3.1, responsible stewardship of public resources when building EV charging networks requires dedicated professional management of EV charging networks and a sufficient scale of investment to achieve economies of scale. To ensure sufficient resources and scale, there may be a case for regional coordination of certain EV charging services – including building public charging infrastructure, as well as efforts to support workplace and residential charging.

It is recommended that Metro Vancouver and its member municipalities consider the business case for a regional public charging network in partnership with BC Hydro, to achieve appropriate scale and professional network management, particularly amongst smaller Metro Vancouver member municipalities.

3.3 Engage with First Nations to support the deployment of infrastructure in First Nations communities according to First Nations' identified needs

One model that may be of interest is increasing funding available for EV charging in First Nations communities and ensuring community ownership of the infrastructure.

3.4 Support access to charging for carshare, taxis and ridehailing

Carshare services are a critical service to enable households to forgo owning a car. Potentially, viability of carsharing can be bolstered through the transition to EVs.

One of the biggest barriers to the expansion of carsharing services is a lack of access to parking. As a result, local and regional

[13] The recommended 10 to 30% market share is based on estimates of how much BC Hydro and private actors will build, as well as a high-level estimation of the amount of parking controlled by local governments.

governments should use all available tools to expand carshare access to parking, including:

- Providing preferential charging at designated on-street carshare parking spaces.
- Leveraging developments review, business license incentives, grants and other mechanisms to support spaces and charging for carshare in residential and non-residential developments.
- Enabling carshare access in existing private parkades, which will reduce the demand for more parking and improve the business case for charging in existing buildings.

The two main types of carshare service include **round-trip carsharing** (members begin and end their trip at the same location) and **one-way carsharing** (members begin and end their trip at different locations). Each service type requires a different approach to charging: round-trip carsharing requires a permanent parking space with Level 2 charging. One-way carsharing can make use of publicly available charging, both Level 2 and fast charging. Across Canada, some providers are basing their model for EV carsharing on the premise that users will charge the EV (necessitating affordable overnight Level 2 charging) while others have staff that take care of charging the vehicles (necessitating access to fast charging). Local governments should engage further with carsharing providers in their jurisdictions to determine specific needs.

Given the regional nature of carsharing use, charging for carsharing is a strong candidate for regional coordination.

3.5 Support access to charging for taxis and ridehailing

Supporting the electrification of taxi and ridehailing services offers an excellent opportunity to reduce emissions, expand EV adoption, and support equity. Drivers can cover upwards of 300 kilometres per day, meaning that the business case for taxi and ridehailing electrification is strong, but drivers need support to overcome (a) the high capital cost of the vehicle and (b) access to charging.

To support charging for taxi and ridehailing drivers, local governments should:

- **Ensure there is a network of very fast charging (e.g. 350kW) at key pickup/dropoff points and taxi stands.** Consider providing this network exclusively to commercial vehicles (at least during peak demand hours) to ensure low wait times. (This model has been pursued in London, UK).
- **Explore opportunities to provide access to home charging for drivers.** (This model is being pursued by the Atmospheric Fund in Toronto).

Given the regional nature of taxi/ridehailing use, charging for carsharing is a strong candidate for regional coordination.

3.6 Establish a coordination body and develop tools for the scaling of public EV charging services

There are a variety of EV charging infrastructure deployment models involving local governments that would benefit from the adoption of replicable design approaches, bulk procurement/deployment, and central administration.

Deployment at scale will benefit from collaboration between BC Hydro, local governments, and EV charging service providers. Such coordination could be facilitated via the Local Government EV Peer Network, the Regional Engineering Advisory Committee, or other fora.

As part of this coordination, regional actors like Metro Vancouver and TransLink could develop the following tools to support rapid and cost-effective local government procurement and deployment:

- **Model Request for Proposal** documents that accelerate the process of establishing performance criteria for the design and operation of charging infrastructure.
- **Joint procurement** processes to help local governments procure infrastructure quickly and cost-effectively.
- **Model bylaws** to expedite the development and adoption of municipal rules including EV ready requirements (Actions 2.2 and 5.1), EV charging requirements within business licencing regimes, and processes to secure public EV charging in new developments.
- **Regular collection and dissemination to local governments of market intelligence about planned charging investments by other actors**. At a minimum, the coordination body would liaise between BC Hydro and EV charging service providers deploying public charging (e.g. Tesla, Electrify Canada, ChargePoint, etc.) to understand their deployment plans.

4.0 Adopt design practices that support access and integration

4.1 Enable curbside EV charging

On-street EV charging can be most cost-effective when it uses power supplied from an adjacent building (as opposed to a new electrical service), and/or when timely electrical and civil works create the opportunity for a utility grid connection to the parking space. Local governments should consider how best to enable curbside EV charging using power supplied from private property, while ensuring other policy goals for the street are realized. As part of this effort, local governments should:

- Formalize processes to designate "EV Only" or "EV Preferred" parking where charging is provided;
- Incorporate accessibility standards;
- Avoid conflicts with current or future municipal infrastructure, including proactively designating acceptable and unacceptable locations for charging;
- Adopt policies to allow for cost-recovery of electricity and charging infrastructure by those providing these amenities (e.g. the adjacent building), while ensuring municipalities retain control over curbside charging pricing;
- Require new developments implementing changes to the right of way to provide power to on-street EV charging. Alternately, require developers to install "make ready" conduits along the curbside when replacing the curb and sidewalk as part of the new development, connection between the parking space and the developments electrical room or a suitable utility connection point. Collaborate with BC Hydro and development stakeholders to establish consistent specifications;
- Enable use of extension cords to provide curbside charging in residential neighbourhoods, with appropriate rules for covers over sidewalks for safety and accessibility. Consider the City of Vancouver's EV Cord Cover License as a model.

4.2 Integrate public EV charging into street design in a way that is compatible with other land uses

EV charging can integrate well into the public realm but when not properly designed, can result in conflicts with other modes, stranded assets or excessive costs (if chargers need to be moved or modified).

Local governments should coordinate EV charging with other relevant plans, including active transportation networks, parking and curb access, food trucks, street engineering, facilities planning and design, and green infrastructure. When major street or facility works are planned, always consider opportunities to integrate EV charging. See Section 6.3 below for further guidance on siting EV charging infrastructure.

4.3 Develop practices and procedures for ensuring EV charging is universally accessible and safe by design

Incorporating accessible and safe design considerations as mandatory criteria at the inception of the project will ensure all EV users have access to barrier-free charging while ensuring regulatory compliance and avoiding costly renovations in the future.

Key accessibility considerations include the **physical accessibility** of the parking stall and the connector, as well as the **accessibility of all related communications interfaces** (apps, payment system, etc.)

While there are currently no regulations or consistent standards for accessibility of EV charging stations in Canada, there are several resources available (see Section 7.1.1).

Incorporating safety by design principles means ensuring groups that experience more harassment and violence in the public realm (women and gender diverse people, racialized people) **feel safe** using the infrastructure. Considerations include **visibility to the site, good maintenance, good lighting, and availability of cell phone reception**.[14]

In all cases, involving and consulting people with lived experience in setting design standards is critical. To ensure consistency across the region, a regional entity may be best suited to support the development and dissemination of best practices.

5.0 Require and support EV ready multifamily residential buildings

5.1 Adopt EV ready requirements for new residential developments

The most cost-effective way to provide charging access in new multifamily buildings is to require the EV ready components to be installed at the time of construction. Without this future-proofing approach, it becomes more costly and complicated to retrofit multifamily buildings to have EV charging.

Local governments should adopt requirements stipulating that 100% of parking in new residential developments be EV ready. Many Metro Vancouver municipalities have already taken this step, which represents the best practice internationally.

5.2 Provide top-up incentives complementary to the EV ready Incentive Program

BC's EV Ready Rebate Program for multifamily buildings provides a funding for building owners to future-proof multifamily buildings with EV charging infrastructure at scale. Local governments should consider providing top-up funding to the program.

Local governments should also explore other opportunities to support EV ready retrofits in collaboration with other regional stakeholders (see Action 5.3).

5.3 Explore financing mechanisms, "make ready" programs, and other

[14] See for example SNC Lavalin and Atkins, 2021. Draft Report: Getting Home Safely.

initiatives to support EV ready retrofits of multifamily buildings and workplaces

Local governments should work with other actors (including private sector finance, federal and provincial governments, and utilities) to assess options for EV ready retrofit project financing. Project financing for EV Ready Retrofits can help condominiums, rental buildings and other multifamily developments pursue comprehensive EV Ready futureproofing strategies that tend to be much more cost-effective on a life cycle basis, without needing to make a one-time major cash outlay. Currently, there are limited private sector financing offerings for this type of retrofit, particularly for the condominium sector. Development of appropriate financing mechanisms could be pursued by the Metro Vancouver Zero Emissions Innovation Centre. Consideration should be given for how best to integrate consideration for other building electrification actions into project delivery of EV ready retrofits.

Likewise, comprehensive EV charging futureproofing of multifamily buildings and workplaces could enabled by directing electrical utilities to pay for and rate-base the cost of EV Ready retrofit projects. Similar "Make Ready" programs have been established by New York and California utilities. Metro Vancouver should engage with the Province, BC Hydro and BCUC to explore opportunities for BC Hydro to rate-base the cost of EV Ready retrofits.

Finally, consider collaborating with BC Hydro and the EV charging industry on a standard specification for EV chargers, EV charging management systems, and EVEMS. Such standards would help ensure multifamily residents receive the best value from the EV charging services that are associated with 100% EV ready buildings.

5.4 Educate residents, rental building owners and strata corporations on options for providing EV charging infrastructure in multifamily buildings

Many multifamily residents and owners do not yet have a good understanding of their options for EV charging infrastructure in their properties. Local governments are often regarded as trusted impartial sources of information. Local governments can facilitate information about different opportunities to implement EV charging infrastructure, including comprehensive future-proofing with EV ready retrofits. This could be coordinated regionally, to achieve economies of scale and consistency. There are many resources already available to support education; see Appendix A for a list.

6.0 Call upon the Province of BC, the BCUC, and BC Hydro to continue to adopt a supportive regulatory environment

6.1 Ensure BC Hydro has a comprehensive regulatory mandate to deploy and to facilitate private sector deployment of EV charging infrastructure

BC Hydro currently operates one of BC's largest public charging networks and is actively planning further expansion. Likewise, BC Hydro tariffs and interconnection processes have a significant influence on the costs of deploying charging infrastructure. Metro Vancouver and its member municipalities should engage with the Province, BCUC and BC Hydro to ensure:

a) **BC Hydro has a strong mandate to invest** in its public charging network, especially in urban locations. This should include announcing targets for public EV charging deployment.
b) **Tariffs are designed to support EV charging**. Metro Vancouver and its municipalities could advocate for (1) predictable service extension fees; (2) EV-friendly rate design and the development of demand response programs. This latter category includes

actions like managing the impacts of demand charges, dynamic pricing and/or demand response programs that reflect the real-time cost of power.

c) **Improved transparency of the capacity of different locations on the distribution grid** (capacity on feeders) to accommodate charging infrastructure. Consider requiring BC Hydro to publish a regularly updated "hosting capacity analysis" map.[15]

6.2 Adopt Province-wide EV ready new construction requirements

Province-wide EV ready requirements for new construction should be adopted via legislation or the BC Building Code. Such rules are necessary to support the Province's adoption targets under the *Zero-Emissions Vehicle Act,* which mandates 90% of car sales to be zero-emissions by 2030 and 100% by 2035.

Such EV ready requirements will increase consistency for the development industry across BC while significantly reducing the time and effort required by local governments to adopt their own requirements. It will also support effective future-proofing and associated cost savings, for residents in municipalities that have not yet adopted requirements.

This action should not be implemented unless the Province matches the best practice EV ready requirements adopted by leading Metro Vancouver municipalities that require 100% EV ready residential parking in new developments, and 20% to 45% EV ready non-residential parking. Local governments should continue to expediently implement EV ready requirements in the absence of provincial action.

6.3 Set Province-wide targets and plans for comprehensive EV ready retrofits of existing multifamily buildings

Based on analysis as part of this project, comprehensive EV ready retrofits of existing multifamily buildings (as well as other buildings, such as workplaces and fleet parking) typically represents a more cost-effective and convenient method of providing EV charging at scale, compared to serving multifamily residents with public charging.

Accordingly, it is recommended that Metro Vancouver advocate for Provincial targets for EV ready retrofits be established. Target that all suitable multifamily buildings be 100% EV Ready by 2030. These targets should be supported by plans, including actions to drive adoption of these retrofits (actions for exploration are noted below).

6.4 Ensure the regulations developed under the *Strata Property Amendment Act, 2023* appropriately define Electrical Planning Reports and improve standards of practice for EV Ready Plans

BC *Bill 22 – 2023 The Strata Property Amendment Act, 2023* received Royal Assent on May 11, 2023. Among other actions, it will require that strata corporations obtain an "Electrical Planning Report". The detailed scope of this report will be determined in subsequent regulations, which will likely be drafted in 2023.

These Reports will help stratas understand their electrical systems' capacity in their buildings to support EV charging and electrify other end uses like space heating, hot water, and cooking. Likewise, the CleanBC EV Ready Rebate Program supports EV Ready Plans (i.e. feasibility

[15] See the Interstate Renewable Energy Council. 2020. "Validation Is Critical to Making Hosting Capacity Analysis a Clean Energy Game-Changer".

studies) with incentives, and defines the standards of practice of eligible Plans.

Metro Vancouver should engage with the Province and BC Hydro to ensure that the Electrical Planning Reports and the EV Ready Plans:

a) Help stratas understand their options to make all parking EV Ready, while also electrifying other building loads like space heat, hot water, cooking, etc. This includes understanding how much spare electrical capacity is available in the building to serve these loads, and the electrical design strategies that can provide power to these loads.

b) Are supported by automated, accurate provision of data from electric utilities wherever possible, to help minimize the costs of these reports.

c) Are performed by suitably qualified people.

d) Cannot be easily deferred, given the importance of stratas having this information to achieve regional transportation and buildings decarbonization goals.

6. Deployment Planning

6.1 Assessing Charging Needs

EV adoption is already growing rapidly in Metro Vancouver and it will accelerate over the next decade, driven by increasing consumer interest, decreasing costs, and especially the BC ZEV sales mandate. The Province's proposed update to this regulation will bring the mandate to 26% of sales by 2026, 90% by 2030, and 100% by 2035.

According to forecasting conducted by Dunsky for Metro Vancouver, TransLink and BC Hydro, the number of light-duty EVs on the road in the region will surpass **0.5 million by 2033** and **1 million by 2038**. While the rate of adoption is somewhat uncertain, the end state is known—by 2035, 100% of sales will be EVs, resulting in near complete fleet turnover by 2050 or earlier.

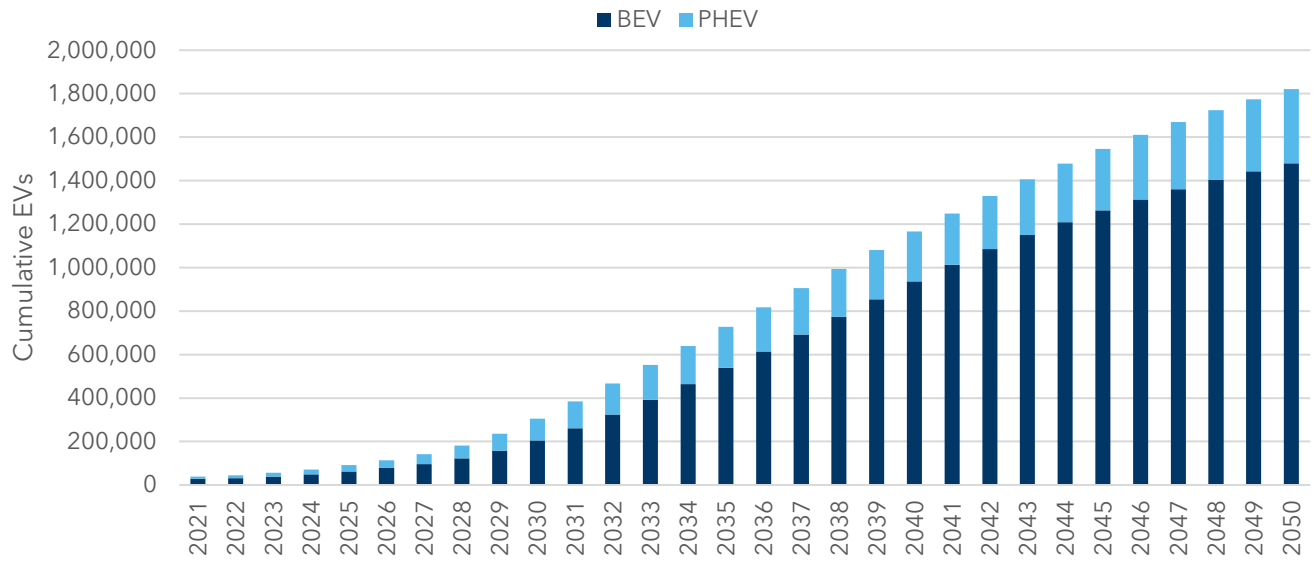

Figure 6-1. Results: Forecasted cumulative EVs on the road, by BEV and PHEV

This growth in adoption must be met with an increase in charging infrastructure.[16] The number and type of public ports required depends especially on the degree of access to home charging among adopters or potential adopters. Many Metro Vancouver residents do not have access to parking at home. These users will always rely on public charging.

Other residents have access to parking but due to the additional challenges related to installation in multifamily buildings, they do not currently have access to charging. Thirteen of 24 Metro Vancouver members, covering most of Metro Vancouver's population, have adopted parking design requirements in parking or zoning bylaws requiring EV ready

[16] Dunsky's charging needs assessment is based on nominal ratios of EVs on the road to EV charging infrastructure required, developed by the National Renewable Energy Laboratory (NREL) and adapted for Canadian communities. This method takes into account key factors such as the relative share of battery electric vehicles (BEVs) and plug-in hybrid electric vehicles (PHEVs); local urban density, climate and driving distances; and assumptions about average charging power.

parking for 100% or near-100% of residential parking in new developments. These rules ensure that charging equipment can be easily installed in any parking provided in new developments.

For existing buildings, parking space retrofits allow for installation of charging equipment. The charging needs assessment that follows is provided under two distinct scenarios to demonstrate the impact that multifamily retrofits can have on (a) the overall demand for public charging and (b) the total infrastructure costs. They are:

1. **High multifamily building retrofit scenario**: 90% (about 350,000) of existing multifamily building units' parking spaces are made EV ready by 2035.
2. **Low multifamily building retrofit scenario:** no additional EV ready retrofits of existing multifamily buildings are carried out; these users rely exclusively on public charging.

Cumulatively, **by 2035,** Metro Vancouver will need:

- **2,200 to 2,900 public DCFC ports** (on corridors, community hubs and for taxi and ridehailing vehicles), and
- **32,000 to 47,000 public L2 ports** (of which about two-thirds would be workplace charging).

Table 6-1 shows the total number of ports and installed power that needs to be added across the region, cumulatively, along with other key outputs include EV to charger ratios. Table 6-2 shows the total number of ports and installed power that needs to be added in five-year increments. Each five-year number should be added to the previous one.

These scenarios represent bookends: the highest and lowest possible approaches to multifamily retrofits. The best solution for Metro Vancouver jurisdictions will likely lie somewhere in between, and local governments can play a role in striking the right balance.

In Appendix B, we provide the disaggregated forecasts for each Metro Vancouver member (municipalities and First Nations). Please refer to the **Modelling Results Report** for further details, assumptions and sensitivities behind the modelling.

Table 6-1. Results: Summary of charging needs (cumulative)

Metric	Scenario	Current	2025	2030	2035	2040	2045	2050
Vehicles on the road								
Total number of LDV on the road (millions)	**All**	**1.5**	**1.6**	**1.7**	**1.8**	**1.9**	**1.9**	**2.0**
Light-duty EVs (thousands)	All	44	91	304	728	1,166	1,547	1,821
Charging needs (cumulative)								
Total public DCFC	**High retro.**	**270**	**931**	**1,196**	**2,152**	**3,362**	**4,203**	**4,627**
	Low retro.	**270**	**937**	**1,417**	**2,926**	**4,911**	**6,574**	**7,707**
Corridor DCFC	All		51	91	211	347	410	410
Community DCFC	High retrofit		840	1,030	1,801	2,859	3,622	4,029

Metric	Scenario	Current	2025	2030	2035	2040	2045	2050
	Low retrofit	270[17] in total	846	1,253	2,575	4,408	5,993	7,109
Shared commercial DCFC	All	0	40	75	140	156	171	188
Total public L2 (including workplace)	**High retro.**	**1,660**	**6,857**	**19,401**	**32,460**	**40,027**	**47,857**	**54,781**
	Low retro.	**1,660**	**6,907**	**23,696**	**46,729**	**62,228**	**79,906**	**97,622**
Workplace L2	High retrofit	1,660 in total	4,526	12,804	21,424	26,418	31,586	36,156
	Low retrofit		4,559	15,639	30,841	41,071	52,738	64,431
Other public L2	High retrofit		2,332	6,596	11,036	13,609	16,272	18,626
	Low retrofit		2,349	8,057	15,888	21,158	27,168	33,191
Total multifamily parking spaces retrofit (cumulative)	**High retro.**	**22,396[18]**	**34,769**	**278,350**	**353,754**	**353,754**	**353,754**	**353,754**
	Low retro.	**22,396**	**0**	**0**	**0**	**0**	**0**	**0**
Other outputs								
BEV/DCFC port ratio	High retrofit	106	68	171	250	278	301	320
	Low retrofit	106	67	144	184	191	192	192
EV/L2 port ratio	High retrofit	27	13	16	22	29	32	33
	Low retrofit	27	13	13	16	19	19	19
EV/total public port ratio	High retrofit	23	12	15	21	27	30	31
	Low retrofit	23	12	12	15	17	18	17
DCFC MW installed[19]	High retrofit	14	78	145	549	1,008	1,261	1,388
	Low retrofit	14	79	167	742	1,473	1,972	2,312
L2 MW installed	High retrofit	10	43	120	201	248	297	340
	Low retrofit	10	43	147	290	386	495	605

[17] We did not assign current ports to any of the sub-categories

[18] The current number of electrified stalls is estimated at 5% of the multifamily building stock. There is no available data to confirm.

[19] The total kW installed is calculated as the number of ports multiplied by the assumed average charging power level of those ports. For higher-power DCFC, the average charging power is lower than the nominal power of the charger most of the time. The ability of vehicles to take a high-power charge will increase over time. If the average power level in the future is different than the forecasts, the revised number of ports can be obtained by dividing the total installed power by the average charging power. The total installed power is **not** equivalent to the load impact; the load impact is much smaller because not all ports will be used at any given time. See the load impacts section for more information.

Table 6-2. Results: Summary of charging needs (in five-year increments)

Metric	Scenario	Current	2025	2030	2035	2040	2045	2050
Charging needs (five-year)								
Annual public DCFC	**High retro.**	**270**	**661**	**265**	**956**	**1,210**	**841**	**424**
	Low retro.	**270**	**667**	**480**	**1,509**	**1,985**	**1,663**	**1,133**
Corridor DCFC	All	270[20] in total	51	40	120	136	63	0
Community DCFC	High retrofit		840	190	771	1,058	763	407
	Low retrofit		846	407	1,322	1,833	1,585	1,116
Shared commercial DCFC	All	0	40	35	65	16	15	17
Total public L2 (including workplace)	**High retro.**	**1,660**	**5,197**	**12,544**	**13,059**	**7,567**	**7,830**	**6,924**
	Low retro.	**1,660**	**5,247**	**16,789**	**23,033**	**15,499**	**17,678**	**17,716**
Workplace L2	High retrofit	1,660 in total	4,526	8,278	8,620	4,994	5,168	4,570
	Low retrofit		4,559	11,080	15,202	10,230	11,667	11,693
Other public L2	High retrofit		2,332	4,264	4,440	2,573	2,663	2,354
	Low retrofit		2,349	5,708	7,831	5,270	6,010	6,023
Total multifamily parking spaces retrofit	**High retro.**	**22,396[21]**	**12,373**	**243,581**	**75,404**	**0**	**0**	**0**
	Low retro.	**22,396**	**0**	**0**	**0**	**0**	**0**	**0**
Installed power (five-year)								
DCFC MW installed[22]	High retrofit	14	65	81	469	540	722	667
	Low retrofit	14	66	102	641	833	1140	1173
L2 MW installed	High retrofit	10	33	87	114	134	163	177
	Low retrofit	10	33	114	176	210	285	320

[20] We did not assign current ports to any of the sub-categories

[21] The current number of electrified stalls is estimated at 5% of the multifamily building stock. There is no available data to confirm.

[22] The total kW installed is calculated as the number of ports multiplied by the assumed average charging power level of those ports. For higher-power DCFC, the average charging power is lower than the nominal power of the charger most of the time. The ability of vehicles to take a high-power charge will increase over time. This value is provided to support planning; if the average power level changes, the revised necessary number of ports can be obtained by dividing the total MW installed by the average charging power. However, it is important to note that the total installed power is **not** equivalent to the load impact; the load impact is much smaller because not all ports will be used at any given time. See the load impacts section for more information.

6.1.1 Futureproofing

Local governments should consider future-proofing charging investment plans; that is, deploying (or supporting the deployment of) infrastructure at a rate that stays ahead of demand to not artificially constrain EV adoption. There is little risk of overbuilding when considering the long-term outlook. While charging equipment technologies may change, the basic electrical and civil infrastructure needed to facilitate the installation of charging equipment will not.

6.1.2 Choosing charging types

The recommended share of community DCFC and L2 charging in the needs assessment is determined using the methodology laid out by the National Renewable Energy Laboratories which has been calibrated for North American communities. However, the right mix of fast-charging hubs and community L2 charging (at workplaces, along residential streets, etc.) will ultimately be a strategic choice that can be made by municipalities and other EV charging deployers according to community input and urban form. In choosing between charging types for specific sites, local governments should consider the following:

- **Past financial performance/utilization** of similar infrastructure in the area and pro forma analysis.
- **Use profile of the candidate sites.** Sites with relatively high turnover (30- to 90-minute typical parking times) make good candidates for DC fast charging. Longer parking times (four or more hours) are best suited to Level 2. See Table 2-1 for further information on charging times.

For planning the EV charging network, a broader set of considerations includes:

- **Needs of the potential users.** Level 2 is most appropriate for charging in most employment and residential areas due to the longer parking times. Much of what may be considered "workplace charging" will be in publicly accessible parking spaces where workers tend to park. Meanwhile, very fast charging is most appropriate for high pickup and drop-off areas, including those used by taxi and ridehailing drivers, who need to top up on the go.
- **Public input.** Public engagement on EV strategies and deployment plans may reveal charging type preferences or insights from specific neighbourhoods or charging sites. See the results of a recent BC Hydro customer survey for an example.[23]
- **Presence of BEV versus PHEV.** PHEVs cannot generally use DCFC charging.

In the results above, the relative importance of L2 charging peaks in the 2030-2035 period when a maximum of PHEVs is expected to be on the road and declines beyond that point as BEV become the dominant technology. As a high-level rule of thumb, **the ratio of L2 to DCFC ports ranges from approximately eight to 12** over our 30-year planning horizon. If a municipality or other user of this guidance chooses to further prioritize DCFC charging hubs over L2 deployment, this rule of thumb could be used to shift some of the anticipated public L2 demand to DCFC ports. It would be most appropriate to make this shift from the pool of "other public L2," since workplace charging is a good use case for L2.

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[23] BC Hydro (2023). BC Hydro Public Electric Vehicle Charging Rates Workshop presentation.

6.2 Equitable Deployment

6.2.1 Equity in EV Charging

Incorporating **equity** into government decision-making requires going beyond the notion of "equality" to recognize the root causes (historic and current) of oppression,[24] and being alert to the circumstances of specific groups. Moreover, equity includes both *outcomes* ("who gets what resources?") and *process* ("who is involved in making the decisions?"), as shown in Figure 6-2.

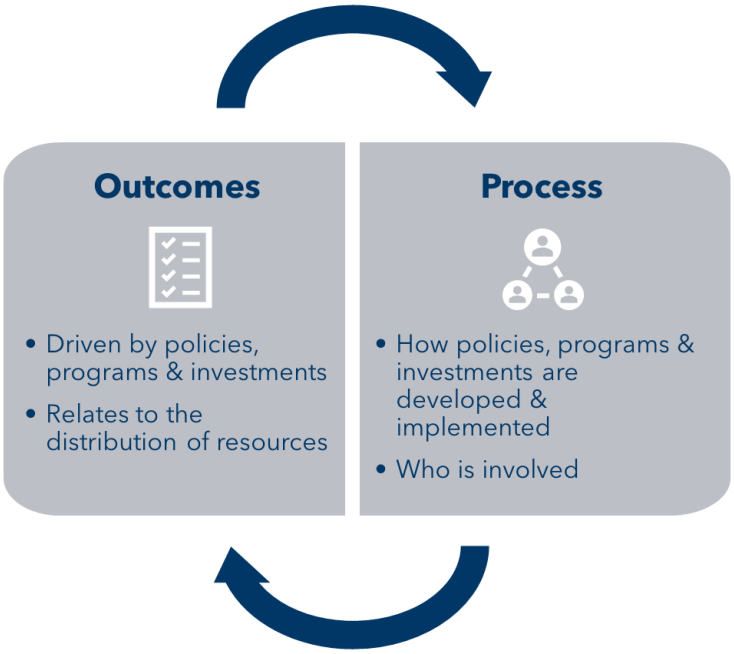

Figure 6-2. The key elements of an equity approach

Equity considerations can and should be applied to the transportation system, including transportation electrification infrastructure. Communities, organizations and advocates are increasingly recognizing the following elements as being a fundamental part of **transportation equity**:

- **Accessibility:** how many opportunities (jobs, services, amenities) can an individual access in a reasonable time and at an accessible cost, by the transportation means they have available?[25]
- **Safe and dignified mobility as a human right:** moving away from the focus on "choice" to a focus on dignity.[26]

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[24] City of Vancouver (2021). Equity Framework. Report to Council. RTS No.: 14507. VanRIMS No.: 08-2000-20. Also informative are the four lenses that the City of Vancouver incorporated within its Equity Framework. They are: Indigenous Rights, racial justice, intersectionality, and systems orientation.
[25] Grisé, Boisjoly, Maguire and El-Geneidy (article in press). Elevating access: Comparing accessibility to jobs by public transport for individuals with and without a physical disability. *Transportation Research Part A*.
[26] Sarah Brown (2021). Study: How We Talk About Racism in Transportation – And Why it Matters. Blog published on StreetsBlog USA. Also informed by a presentation from Charles T. Brown.

- Ensuring that the **benefits and burdens** of a program are **fairly distributed.**[27]
- **Engaging the communities** that a program is designed to serve, **meeting their needs, and building their capacity** to participate in decisions about transportation programs.[28]

Notable commitments to transportation (and land use) equity by governments and agencies in Metro Vancouver include:

- **2015:** Metro Vancouver Board adopts resolution endorsing the Truth and Reconciliation Commission of Canada Report.
- **2019:** Metro Vancouver released *A Review of Social Equity in Regional Growth Management*. Identifies equity-deserving groups in the region and where they live spatially.
- **2021:** Metro Vancouver Board recommitted to reconciliation and adopted a Strategic Plan identifying "strengthening relationships with First Nations" as a primary objective.
- **2022:** TransLink adopts *Transport 2050*, which includes equity and reconciliation as key strategic lenses through which all the actions of the Strategy are considered.
- **2022:** TransLink applied an Equity Evaluation Framework as part of its 10-year priorities, which identifies disadvantaged groups of interest and key metrics/barriers facing these groups.[29]
- **2023:** Metro Vancouver commissioned an annotated bibliography of social equity tools and resources in support of its Clean Air Plan.

6.2.2 Criteria for equitable access to EV charging infrastructure

Cost and access to charging are two of the predominant barriers to EV adoption facing people in poverty and recent immigrants (who are all more likely to be renters and live in multifamily buildings[30],[31]). When examining access to charging specifically, there are several additional barriers facing these and other groups, as shown in Table 6-3. This analysis of barriers faced by specific groups supports the identification of **priority communities** that Metro Vancouver, local governments and their partners should focus on when evaluating equity in charging deployment plans.

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[27] Smart Electric Power Alliance (SEPA) (2022). Benchmarking Equitable Transportation Electrification. Toolkit and Modules referenced throughout this report. This citation is from the Insight Brief, p. 8.
[28] Ibid.
[29] In this document, Translink puts forward the following definition of social equity: *The promotion of justice and fairness and the removal of systemic barriers that may cause or aggravate disparities experienced by different groups of people. This can include the many dimensions of identity, such as socioeconomic status, ethnicity, sex, age, disability, gender, sexuality, religion, indigeneity, class, and other equity-related issues.*
[30] Low-income people are about twice as likely as other people to be renters (Source: Statistics Canada, Housing Experiences in Canada: People in poverty, 2016).
[31] In Vancouver, 77% of renters lived in apartments in multiunit structures compared to 44% of owner households (Source: City of Vancouver, 2022, Housing Needs Report.(

Table 6-3. Barriers to EV charging[32]

Barrier	Description	Groups disadvantaged
Ability to install home charging	• More difficult in multifamily buildings • Split incentives between renters/landlords (including small businesses that rent their storefront)	• Multifamily building residents • Renters • Low-income people • Racialized people
Ability to use charging	• Many chargers cannot be used by people without banking, credit cards, smart phone applications, English or tech proficiency, etc. • Lack of accessible design standards for stations and application interfaces	• Unbanked people • People with disabilities • Non-English speakers
Greater cost & time burden	• At-home charging is cheaper, but multifamily building residents and renters more often have to rely on more expensive public charging • Private sector is less interested in investing in areas where current EV adoption is low • The price of public charging will likely increase over time • There is a greater time burden associated with public charging (home charging is more convenient) • Charging costs represent a greater share of household spending • Without careful futureproofing, the limited electrical capacity in existing buildings for EV charging can be exhausted by early adopters, making subsequent additions of EV charging for later adopters (who will be lower income on average) much more expensive	• Multifamily building residents • Renters • Low-income people • Racialized people
Lower access to programs	• Managed load programs may be limited to homeowners • Multifamily building residents or people that rely on on-street parking can be barred from accessing managed load programs	• Multifamily building residents • People without parking at their home • Renters

[32] Key sources for this table are: ACEEE (2021). Siting Electric Vehicle Supply Equipment (EVSE) With Equity In Mind; SEPA (2022). Benchmarking Equitable Transportation Toolkit - Report and Modules.

Spatial analysis can be used to evaluate the extent to which current infrastructure and future plans serve priority communities, in cases where those communities tend to be concentrated spatially (Table 6-4).

In many cases, **spatial equity** priority areas also align with areas of high **anticipated public EV charging demand** (e.g. dense urban areas with a high proportion of the population living in apartments). However, governments should apply caution when conducting data-driven equity analysis because:

- Frameworks and decisions must be informed by direct engagement with members of the priority communities.
- Aggregated data can mask nuances at the local level or among members of a given community (e.g. certain newcomer communities may face more barriers than others).
- Spatial analysis only reveals the presence of certain priority communities. Disabled people, for example, face barriers to accessing EV charging that must be eliminated through other actions.

Table 6-4. Priority communities who potentially face greater barriers to EV charging in Metro Vancouver

Priority Community	For spatial equity analysis	For outreach and involvement
First Nations		
Racialized people		
Recent immigrants		
Low-income people		
Multifamily building residents		
Renters		
Taxi and ridehailing drivers		
People with disabilities		
Unbanked people		
Non-English speakers		
Women and gender non-conforming people		

6.3 Planning and Site Selection

Local and regional governments should establish their priority areas for public and workplace deployment so they are prepared to prioritize sites, whether as part of funding or deploying their own networks, when partnering with or advising BC Hydro or other third parties on site selection, or when seeking to secure charging as part of private development (for example, as a consideration of rezoning).

Local and regional governments should:

- **Consider demand for charging and equity when prioritizing areas for EV charging**. Locating EV charging can often be opportunistic, depending on circumstances such as the occurrence of other street civil works; construction or renovation of municipal

buildings; enthusiastic neighbours or partners at a particular site; and other factors. There will be rapidly growing demand, and EV charging will be required widely across our communities. Accordingly, local governments need not necessarily engage in extensive mapping exercises to identify candidate locations.

- Nevertheless, some local governments will benefit from using spatial analysis to identify priority sites. Key factors to consider include the immediate demand for EV charging; equity between neighbourhoods; and the extent of EV charging infrastructure already serving particular communities, and whether it is at capacity. Table 6-5 below summarizes the types of areas to prioritize to meet EV charging demand as well as equity, and spatial indicators that can be used in analysis. Note that equity indicators and demand are often correlated. These areas represent "no regrets" opportunities for investment in public EV charging.

Table 6-5. Priority areas for public EV charging investment

Areas to prioritize	Rationale		Spatial indicators
	Demand	Equity	
High multifamily residential buildings			• Dwelling type (StatsCan)
High renters			• Housing tenure (StatsCan)
High vehicle use			• High vehicle trip origin/destination & mode (Trip Diary Survey)
High population density			• Population density (StatsCan)
High car-based employment density			• Employment density and trip mode (Trip Diary Survey)
Low public charging access			• NRCan Station locator • PlugShare
High taxi/ridehailing activity			• Major origins & destinations (transportation network service data)
Low income/wealth			• Low Income Measure (StatsCan) • Index of Multiple Deprivation (StatsCan) • Household spending data (e.g. Environics)
High recent immigrants			• Recent immigrants (Census)
First Nations communities			• Community/reserve locations
Indigenous identity			• Indigenous identity (Census)

- **Seek alignment, synergies and integration with other municipal infrastructure**. Inventory the parking at local government facilities, parks, and on-street locations. Engage with other local government departments to determine the key opportunities for synergies with EV charging infrastructure, as well as to identify challenges and risks of stranded assets. Explore options for maximizing the utility of EV charging infrastructure. For example, consider whether the same parking can provide workplace charging during the day and public or fleet parking during the evenings.
  - Consider plans for active transportation networks; parking and curb access; food trucks; street engineering; facilities planning and design; green infrastructure; and

other potential synergies and conflicts with EV charging infrastructure. Determine at what existing streets or facilities could EV charging be implemented with low risk of stranded assets or conflicts. When street or facility works are planned, always consider of opportunities to integrate EV charging.

- **Minimize costs by taking advantage of pre-existing electrical services with available capacity.** A new electrical service can significantly increase the costs of providing EV charging infrastructure, particularly public Level 2 charging. Local governments and other stakeholders should optimize opportunities to take advantage of existing electrical services when deploying EV charging infrastructure. This includes:
  - Prioritize deployment of EV charging at municipal facilities where it is possible to take advantage of existing electrical services.
  - Consider opportunities for street-light and power-pole EV charging. The City of New Westminster, in partnership with BCIT, have piloted such opportunities. While street-light circuits generally cannot provide fast charging, in some circumstances they can be useful for longer duration day-time or overnight charging. Seek to comprehensively inventory the potential for streetlight charging in any locations with on-street parking and streetlights. Consider especially such opportunities during LED retrofits.
  - Consider sites adjacent to utility infrastructure (e.g. low profile transformers - LPTs) that *may* (not always) result in lower utility extension fees. Inventory neighbourhood LPTs.
- **Engage with utilities early regarding candidate sites.** Seek guidance on locations where extension fees will be lower. As BC Hydro processes may evolve, continue to actively coordinate with BC Hydro and note the importance of timely guidance on where service extensions are likely to be more cost effective in advance of detailed electrical design.
- **Minimize costs through economies of scale and futureproofing infrastructure.** Seek opportunities to deploy multiple chargers at sites to achieve economies of scale by reducing the per-unit capital cost of "bulky" infrastructure (e.g. electrical services and equipment). When deploying EV charging infrastructure, always include consideration of subsequent expansion in the design process.

7. Managing Local Government Owned Public Charging Infrastructure

If local governments elect to manage their own charging infrastructure, they should ensure that it provides great customer service and is well managed. This section summarises recommended practices for administering, siting, designing and operating local government owned public EV charging infrastructure. Local governments should also follow guidance included in BC Hydro's *EV Fast Charging Design and Operational Guidelines for Public DCFC Stations in BC* and the *Level 2 Public Sector Charging Stations Best Practices Guideline*.

7.1 Designing systems

Local and regional government EV charging network operators should:

- **Follow best practice design and operations guidance.** Detailed design and operational guidelines are beyond the scope of this project. BC Hydro has published two key guides[33]. These resources (which are also linked in Appendix A) provide extensive design guidance (station placement on sites, lighting, surveillance, signage, landscaping, and civil works), as well as operating guidance (best practices for selecting vendors and contractors, maintenance, repairs, customer service, emergency response plan, and monitoring and dashboards). It is recommended that all public charging operators carefully consider these guidelines and adhere to all relevant guidance. Note that these guidelines are undergoing an update in consultation with the Local Government EV Peer Network.
- **Consider appropriate connector standards.** All installations going forward should include CCS, with a planned path to NACS (formerly the Tesla connector). It is currently recommended to have one CHAdeMO connector for the next two or three years to accommodate older EVs that require this connector type. Level 2 charging should always feature the J1772 connector in the short term, but should also consider the possibility of migrating to NACS in the future.
- **Seek scale and futureproofing for expansion.** Always consider opportunities to include multiple chargers and connectors at a site. This will often reduce costs, as some infrastructure costs are relatively fixed and not completely proportional to the number of chargers at a site. Likewise, explore opportunities to futureproof the infrastructure to accommodate later expansion. While the number of parking spaces that can be devoted exclusively to EV charging may be limited currently, futureproofing infrastructure can provide options for when more vehicles are EVs and devoting more parking to be exclusively for EVs becomes more acceptable.

[33] BC Hydro: EV Fast Charging Design and Operational Guidelines for Public DCFC Stations in BC and Level 2 Public Sector Charging Stations Best Practices Guideline.

7.1.1 Ensuring accessible charging station design

Organizations deploying or procuring EV charging must ensure that all drivers can use the infrastructure. Unfortunately, as the Canadian Standards Association (CSA) has noted, there are currently no regulations or consistent standards for accessibility of EV charging infrastructure at federal nor provincial levels.[34] Unfortunately, many stations to date are not barrier-free.

Incorporating accessible design considerations as mandatory criteria at the inception of the project will ensure all EV users have access to barrier-free charging while ensuring regulatory compliance and avoiding costly renovations in the future.

High-level accessibility considerations are listed here, but users of this guide should consult the key resources listed below and in Appendix A and seek input from users with lived experience with disabilities. Considerations include:

- **Ensuring physical accessibility of the infrastructure**:
  - Ensuring a person using a wheelchair or mobility device can physically access the charging interface, connector, and connect it to her/his vehicle. This means removing curbs, slopes and bollards, choosing a level parking stall, and ensuring sufficient parking stall width. Cable management systems should be designed such that all users are able to easily access and lift the cables (which are sometimes heavy) to and from their vehicles.
  - Assigning an appropriate number of chargers to designated accessible parking stalls.
  - Ensuring proper location relative to pedestrian entrances to the parking area.
- **Ensuring accessibility of communication features** such as display screens, apps, and card readers:
  - These components must be compatible with the needs of all EV users including those who are deaf or hard of hearing, visually impaired, have dexterity limitations or other disabilities.
  - Some features that increase accessibility include user interfaces or display screens (including apps) that are compatible with screen readers, the use of tactile and braille controls, and audio descriptions or speech output.

As a starting place, system and site designers should adhere to all accessibility requirements for parking in the BC Building Code[35] and to all relevant requirements and standards under the Accessible British Columbia Act, either currently enacted or forthcoming.

These resources provide guidance on **accessible parking**, which is an important component of **accessible EV charging**. The only design guidance in North America specifically related to EV charging to date has been released by the U.S. Access Board, in its resource called Design Recommendations for Accessible EV Charging Stations.[36] This document is an important resource. In Canada, the CSA Group is moving to consider appropriate standards.

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[34] Thirgood, J. (2022) *Charging Ahead: Ensuring Equity and Reliability in Canada's Electric Vehicle Network*. Canadian Standards Association.

[35] See the BC Building Accessibility Handbook 2020.

[36]

7.2 Administering EV charging services

7.2.1 Appropriate resourcing and priority-setting

Local and regional government EV charging network operators should **establish stable, well-resourced administration of EV charging services**. Local governments should ensure that their public charging networks are positioned for success. As noted in Section 3.1, local governments should consider formally establishing EV charging services to provide public charging as well as workplace charging for their employees. It is recommended to:

- Ensure sufficient human resources, capital and operating funds, and full-time staff to plan, design and deploy EV charging services and to sustain an excellent quality of service. This will require dedicated staff time and could well require new staff position(s). Staff roles should be formalized in work plans and job descriptions, and made less *ad hoc*. Likewise, it may require funding consultants to assist with planning, design and operations.
- Explicitly define the triple bottom line objectives of public charging services. Staff and network operators should have a mandate and structural incentives to optimize financial performance; however, local governments should formally recognize that EV charging services may not achieve full cost-recovery nor profitability.
    - There is much uncertainty influencing the operations of EV charging networks, notably regarding the price of credits that can be made through provincial and federal low carbon fuel requirements; depending on these credit prices (which are difficult to predict) EV charging may be quite profitable or conversely operate at a loss.
    - Municipalities should formally recognize the environmental and social benefits of investments in charging infrastructure, and that these benefits justify the risk of losses.
    - However, local governments are also encouraged to consider the opportunity to generate revenues to reinvest in other public services, and pursue all opportunities to profitably operate EV charging, provided these strategies do not impede other EV charging network from operating in their communities or otherwise slow EV adoption.
- Set targets for deployment. It recommended this be on the order of 10% to 30% of the total charging infrastructure demand forecast for communities.
- Commit to meeting demand for workplace charging at City facilities where parking is provided.
- Administer competitively procured relationships with EV charging service providers that will typically operate charging infrastructure on behalf of site hosts (i.e. municipalities).
- Plan to achieve sufficient economies of scale in the next 3-5 years to make investment worthwhile (e.g. a minimum total CAPEX of ~$500k+ over 3-5 years).
- Make a strong commitment to excellent customer service. This includes ensuring stations have very high uptime (e.g. 99%) and that maintenance and emergency repairs will be implemented expediently.

7.2.2 Establishing user fees

Local and regional government EV charging network operators should **establish user fees and capitalize on other revenue streams.** User fees support cost recovery and encourage drivers to use the limited resource of EV charging efficiently. User fees should be set high enough to encourage drivers to charge at home or at work where feasible, thereby reducing how much space must be devoted to public charging, but low enough to offer significant savings compared to fossil fuels. Monitor and consider prices from peer networks in the region (e.g. BC Hydro).

Seek carbon credit revenues under provincial and federal low carbon fuel requirements to the greatest extent possible. Likewise, explore utility demand response and other credit opportunities.

7.2.3 Procuring operators

Even when local and regional governments choose to manage their own infrastructure, they will likely outsource operation. In this case, they should **carefully procure EV charging service network providers to manage EV charging networks**. T

The choice of an EV charging network partner to deploy and manage locally-owned charging infrastructure is probably the most important decision facing local governments when deploying locally-owned charging infrastructure. Local governments should administer competitive procurement processes to select EV charging service provider partners. Key considerations include:

- Customer service. Select charging service providers with evidence of strong local maintenance and servicing capacity, 24/7 troubleshooting services, and other evidence of good customer service.
- Stable market position.
- Open protocols. Drive demand for entities to pursue full certification by the Open Charge Alliance for Open Charge Point Protocol (OCPP, a *de facto* industry protocol) 1.6 or higher for both charging stations and charging management systems. OCPP is intended to ensure compatibility between EV chargers and the charging management systems that charging network operators use to control them. It can help avoid stranded assets should a local government choose to change charging service provider partners. Note, however, that use of OCPP does not necessarily guarantee full interoperability; engage with service providers to seek demonstration of functionality. Likewise, in the future, demand IEC 63110, a forthcoming international standard for interoperable charging station and management system communications. Notwithstanding the value of moving towards open systems, recognize that in the current market there may be trade-offs between use of open systems and other key considerations (e.g. local capacity and customer service) when selecting charging service providers.
- Compatibility with multiple charging connector interfaces, including NACS, CCS, and CHAdeMO.
- Privacy and cybersecurity. The service provider must take appropriate steps to protect user data. They should consider whether data stored in Canada and secure the process for remote firmware updates.
- Capacity to valorize low carbon fuel requirement credits, if not separately being pursued by local governments.

Consider the opportunity for model or joint RFP administered by Metro Vancouver or other entities operating at the regional level.

7.2.4 Rewarding performance

Local and regional governments that choose to manage their own infrastructure should aim to **reward desirable performance** by key players. They should seek to structure compensation and/or contractual reward schemes for charging service providers, and potentially for municipal staff, for achieving key performance indicators, including equipment uptime and customer satisfaction.

8. Conclusions

Metro Vancouver has Canada's highest rate of EV adoption and, in accordance with BC's *Zero Emission Vehicle Act,* the number of EVs on the road will increase exponentially over the next decade. By the 2040s, nearly all passenger vehicles in Metro Vancouver will be EVs. This transition will largely eliminate GHG emissions and tailpipe criteria air contaminants from this sector, and result in significant economic benefits for Metro Vancouver by reducing the spending on gasoline and diesel that leaves the region.

Rapid deployment of EV charging infrastructure is critical to enabling the transition to EVs. Metro Vancouver and its municipalities are crucial to deploying EV charging. Through land use, business licensing, air quality regulation and other powers, local governments can support EV charging infrastructure deployment on private property. Additionally, local governments can partner with BC Hydro to deploy charging infrastructure, as well as invest directly in their own EV charging networks. Further, they can advocate for action by the Federal and Provincial governments, utilities, and BCUC. Local governments must focus on speed, scale and social equity in EV charging infrastructure deployment.

This document provides guidance on the key **principles** that should inform efforts to deploy charging infrastructure; **roles** for different stakeholders; **actions** for Metro Vancouver and its municipalities; deployment **planning**; and **management strategies** for municipal EV charging networks. By supporting rapid, well-considered deployment of charging infrastructure, Metro Vancouver local governments can realize the considerable benefits of EV adoption for the region.

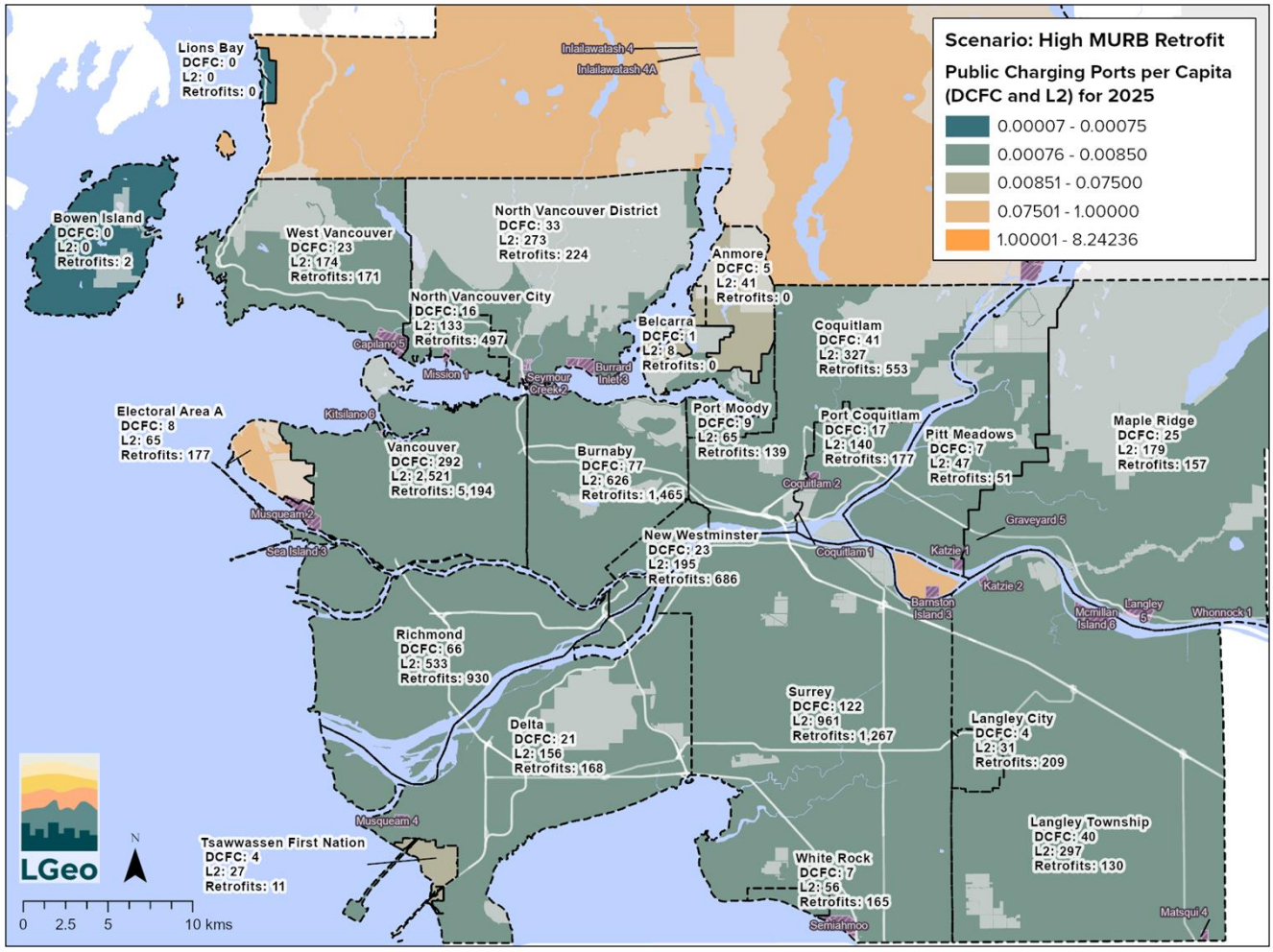
Appendix A: Complementary Resources

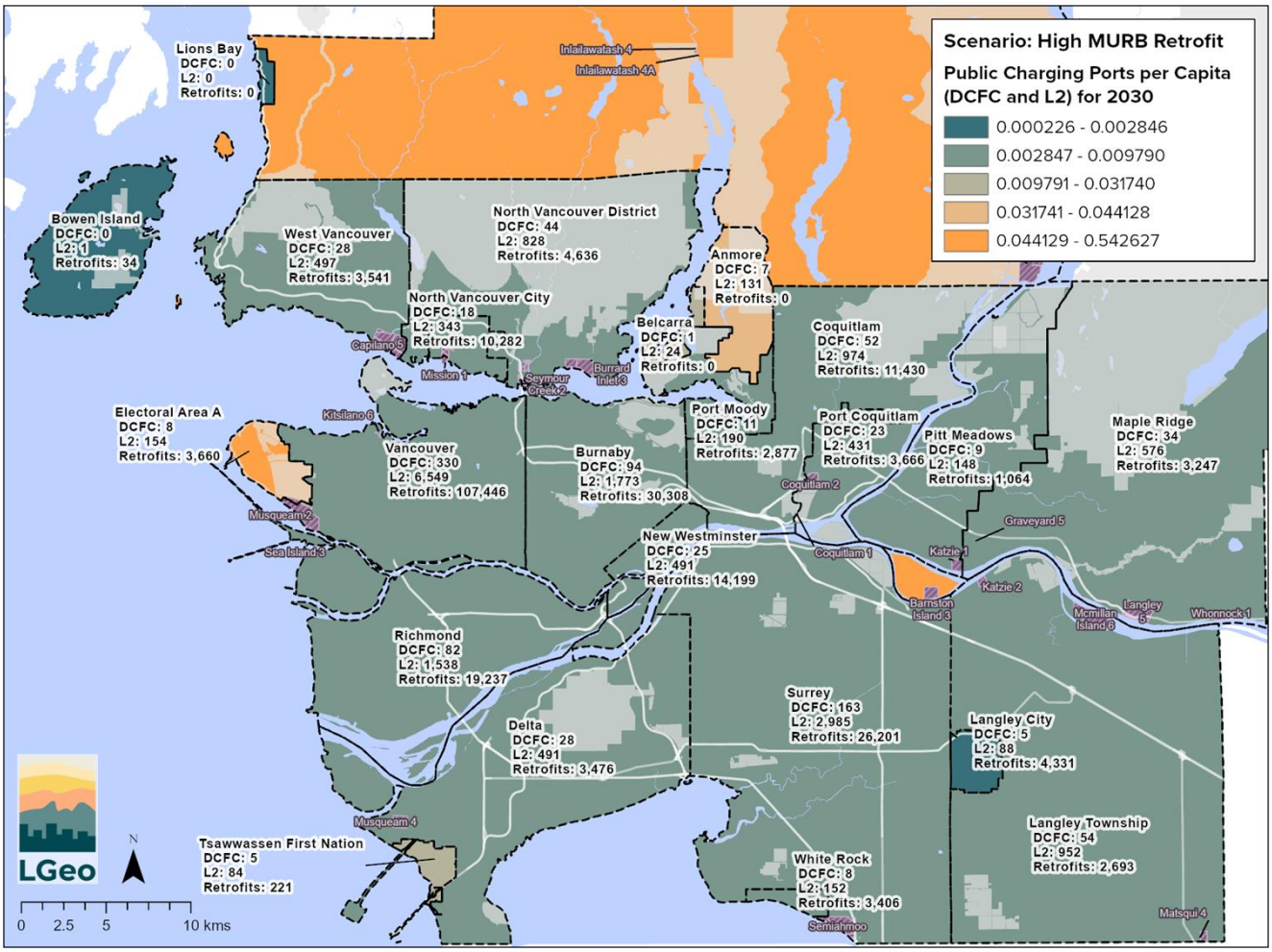
Topic	Author	Title & Link
Public Charging	BC Hydro	EV Fast Charging Design and Operational Guidelines for Public DCFC Stations in BC
	BC Hydro	Level 2 Public Sector Charging Stations Best Practices Guideline
Accessible & Equitable Design	Government of BC	BC Building Accessibility Handbook 2020
	Canadian Standards Association	Charging Ahead: Ensuring Equity and Reliability in Canada's Electric Vehicle Network
	US Department of Transportation	Design Recommendations for Accessible Electric Vehicle Charging Stations
Multifamily Charging	Plug In BC; Government of BC	A Guide to Installing EV Charging in MURBs
		A template survey to explore level of support for EV infrastructure from fellow residents in your building
	District of Saanich for the BC Sustainable Communities Network	A template Request for Proposals (RFP) that can be used by strata corporations to solicit quotes for EV Ready Plans
	Plug In BC	EV ready Plan Vetting Questions – to help strata corporations choose the right contractor for their EV ready Plan

Appendix B: Charging Needs Forecasts by Metro Vancouver Member

See also the Results Dashboard (Excel).

Cumulative EV Charging Needs (Scenario 1: High Multifamily Building Retrofit)

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Public Charging Ports per Capita (DCFC and L2) for 2030
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0.002847 - 0.009790
0.009791 - 0.031740
0.031741 - 0.044128
0.044129 - 0.542627
Lions Bay DCFC: 0 L2: 0 Retrofits: 0
Inlailawatash 4
Inlailawatash 4A
Bowen Island DCFC: 0 L2: 1 Retrofits: 34
West Vancouver DCFC: 28 L2: 497 Retrofits: 3,541
North Vancouver District DCFC: 44 L2: 828 Retrofits: 4,636
Anmore DCFC: 7 L2: 131 Retrofits: 0
North Vancouver City DCFC: 18 L2: 343 Retrofits: 10,282
Capilano 5
Mission 1
Seymour Creek 2
Burrard Inlet 3
Belcarra DCFC: 1 L2: 24 Retrofits: 0
Coquitlam DCFC: 52 L2: 974 Retrofits: 11,430
Electoral Area A DCFC: 8 L2: 154 Retrofits: 3,660
Kitsilano 6
Vancouver DCFC: 330 L2: 6,549 Retrofits: 107,446
Port Moody DCFC: 11 L2: 190 Retrofits: 2,877
Port Coquitlam DCFC: 23 L2: 431 Retrofits: 3,666
Pitt Meadows DCFC: 9 L2: 148 Retrofits: 1,064
Maple Ridge DCFC: 34 L2: 576 Retrofits: 3,247
Burnaby DCFC: 94 L2: 1,773 Retrofits: 30,308
Coquitlam 2
Musqueam 2
Sea Island 3
New Westminster DCFC: 25 L2: 491 Retrofits: 14,199
Graveyard 5
Coquitlam 1
Katzie 1
Katzie 2
Barnston Island 3
Mcmillan Island 6
Langley 5
Whonnock 1
Richmond DCFC: 82 L2: 1,538 Retrofits: 19,237
Surrey DCFC: 163 L2: 2,985 Retrofits: 26,201
Delta DCFC: 28 L2: 491 Retrofits: 3,476
Langley City DCFC: 5 L2: 88 Retrofits: 4,331
Musqueam 4
Tsawwassen First Nation DCFC: 5 L2: 84 Retrofits: 221
Langley Township DCFC: 54 L2: 952 Retrofits: 2,693
White Rock DCFC: 8 L2: 152 Retrofits: 3,406
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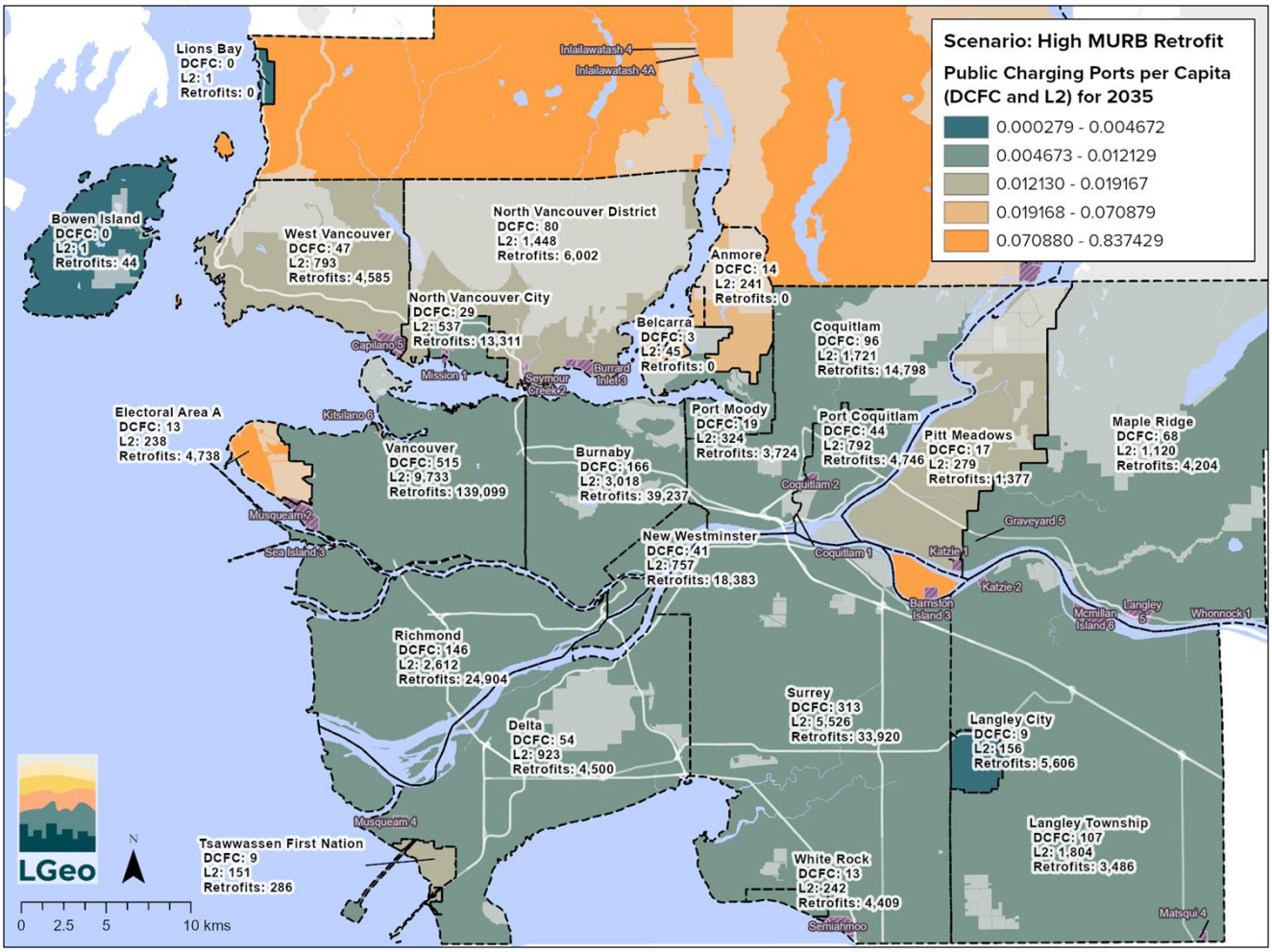
Matsqui 4
LGeo
N
0 2.5 5 10 kms


Scenario: High MURB Retrofit
Public Charging Ports per Capita (DCFC and L2) for 2035
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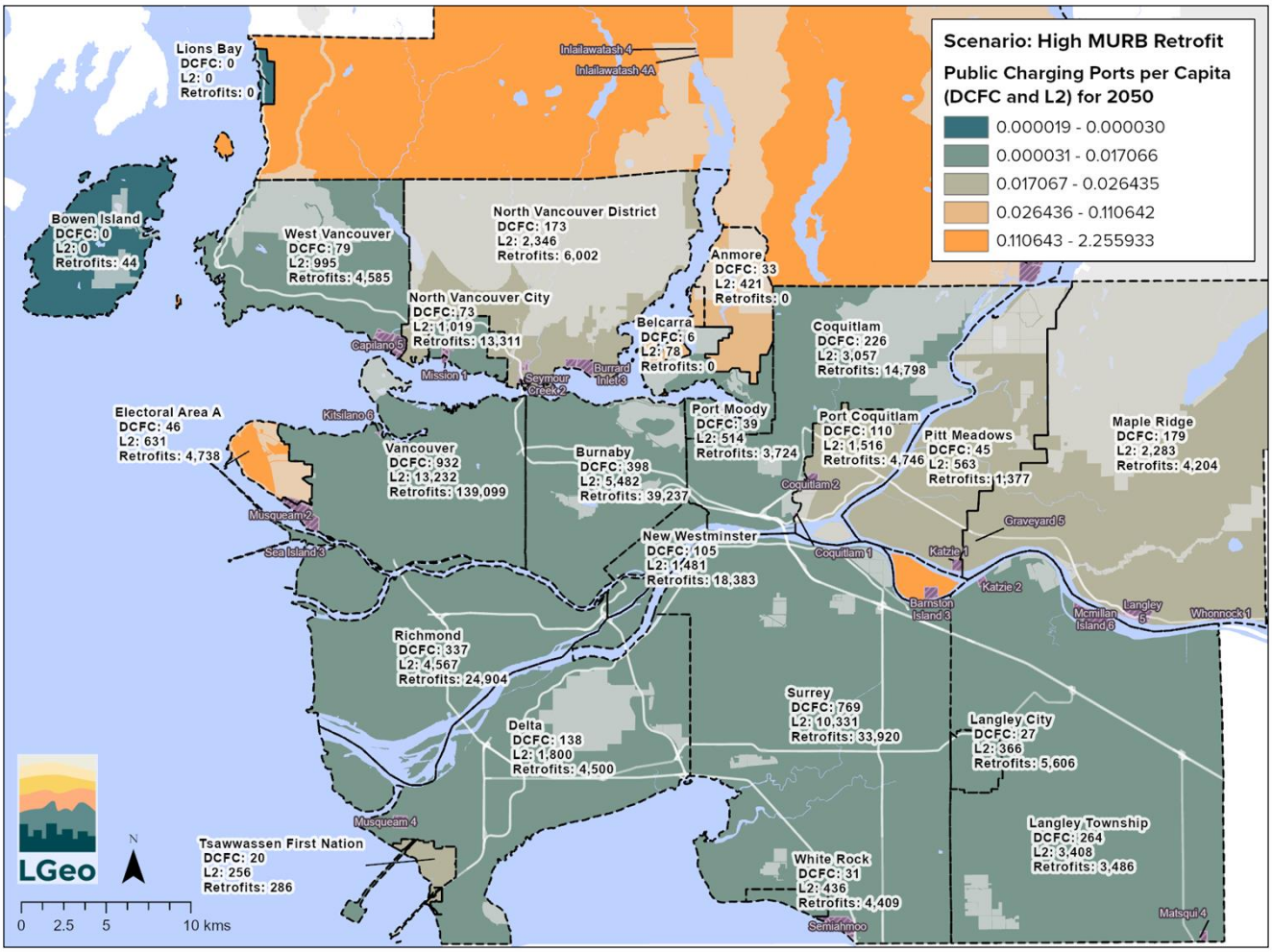
0.004673 - 0.012129
0.012130 - 0.019167
0.019168 - 0.070879
0.070880 - 0.837429
Lions Bay DCFC: 0 L2: 1 Retrofits: 0
Inlailawatash 4
Inlailawatash 4A
Bowen Island DCFC: 0 L2: 1 Retrofits: 44
West Vancouver DCFC: 47 L2: 793 Retrofits: 4,585
North Vancouver District DCFC: 80 L2: 1,448 Retrofits: 6,002
Anmore DCFC: 14 L2: 241 Retrofits: 0
North Vancouver City DCFC: 29 L2: 537 Retrofits: 13,311
Capilano 5
Mission 1
Seymour Creek 2
Burrard Inlet 3
Belcarra DCFC: 3 L2: 45 Retrofits: 0
Coquitlam DCFC: 96 L2: 1,721 Retrofits: 14,798
Electoral Area A DCFC: 13 L2: 238 Retrofits: 4,738
Kitsilano 6
Vancouver DCFC: 515 L2: 9,733 Retrofits: 139,099
Burnaby DCFC: 166 L2: 3,018 Retrofits: 39,237
Port Moody DCFC: 19 L2: 324 Retrofits: 3,724
Port Coquitlam DCFC: 44 L2: 792 Retrofits: 4,746
Pitt Meadows DCFC: 17 L2: 279 Retrofits: 1,377
Maple Ridge DCFC: 68 L2: 1,120 Retrofits: 4,204
Coquitlam 2
Musqueam 2
Sea Island 3
New Westminster DCFC: 41 L2: 757 Retrofits: 18,383
Graveyard 5
Coquitlam 1
Katzie 1
Katzie 2
Barnston Island 3
Mcmillan Island 6
Langley 5
Whonnock 1
Richmond DCFC: 146 L2: 2,612 Retrofits: 24,904
Surrey DCFC: 313 L2: 5,526 Retrofits: 33,920
Delta DCFC: 54 L2: 923 Retrofits: 4,500
Langley City DCFC: 9 L2: 156 Retrofits: 5,606
Musqueam 4
Tsawwassen First Nation DCFC: 9 L2: 151 Retrofits: 286
Langley Township DCFC: 107 L2: 1,804 Retrofits: 3,486
White Rock DCFC: 13 L2: 242 Retrofits: 4,409
Semiahmoo
Matsqui 4
LGeo
N
0 2.5 5 10 kms


Scenario: High MURB Retrofit
Public Charging Ports per Capita (DCFC and L2) for 2050
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0.000031 - 0.017066
0.017067 - 0.026435
0.026436 - 0.110642
0.110643 - 2.255933
Lions Bay DCFC: 0 L2: 0 Retrofits: 0
Inlailawatash 4
Inlailawatash 4A
Bowen Island DCFC: 0 L2: 0 Retrofits: 44
West Vancouver DCFC: 79 L2: 995 Retrofits: 4,585
North Vancouver District DCFC: 173 L2: 2,346 Retrofits: 6,002
Anmore DCFC: 33 L2: 421 Retrofits: 0
North Vancouver City DCFC: 73 L2: 1,019 Retrofits: 13,311
Capilano 5
Mission 1
Seymour Creek 2
Burrard Inlet 3
Belcarra DCFC: 6 L2: 78 Retrofits: 0
Coquitlam DCFC: 226 L2: 3,057 Retrofits: 14,798
Electoral Area A DCFC: 46 L2: 631 Retrofits: 4,738
Kitsilano 6
Vancouver DCFC: 932 L2: 13,232 Retrofits: 139,099
Burnaby DCFC: 398 L2: 5,482 Retrofits: 39,237
Port Moody DCFC: 39 L2: 514 Retrofits: 3,724
Port Coquitlam DCFC: 110 L2: 1,516 Retrofits: 4,746
Pitt Meadows DCFC: 45 L2: 563 Retrofits: 1,377
Maple Ridge DCFC: 179 L2: 2,283 Retrofits: 4,204
Coquitlam 2
Musqueam 2
Sea Island 3
New Westminster DCFC: 105 L2: 1,481 Retrofits: 18,383
Graveyard 5
Coquitlam 1
Katzie 1
Katzie 2
Barnston Island 3
Langley 5
Whonnock 1
Mcmillan Island 6
Richmond DCFC: 337 L2: 4,567 Retrofits: 24,904
Surrey DCFC: 769 L2: 10,331 Retrofits: 33,920
Delta DCFC: 138 L2: 1,800 Retrofits: 4,500
Langley City DCFC: 27 L2: 366 Retrofits: 5,606
Musqueam 4
Tsawwassen First Nation DCFC: 20 L2: 256 Retrofits: 286
Langley Township DCFC: 264 L2: 3,408 Retrofits: 3,486
White Rock DCFC: 31 L2: 436 Retrofits: 4,409
Semiahmoo
Matsqui 4
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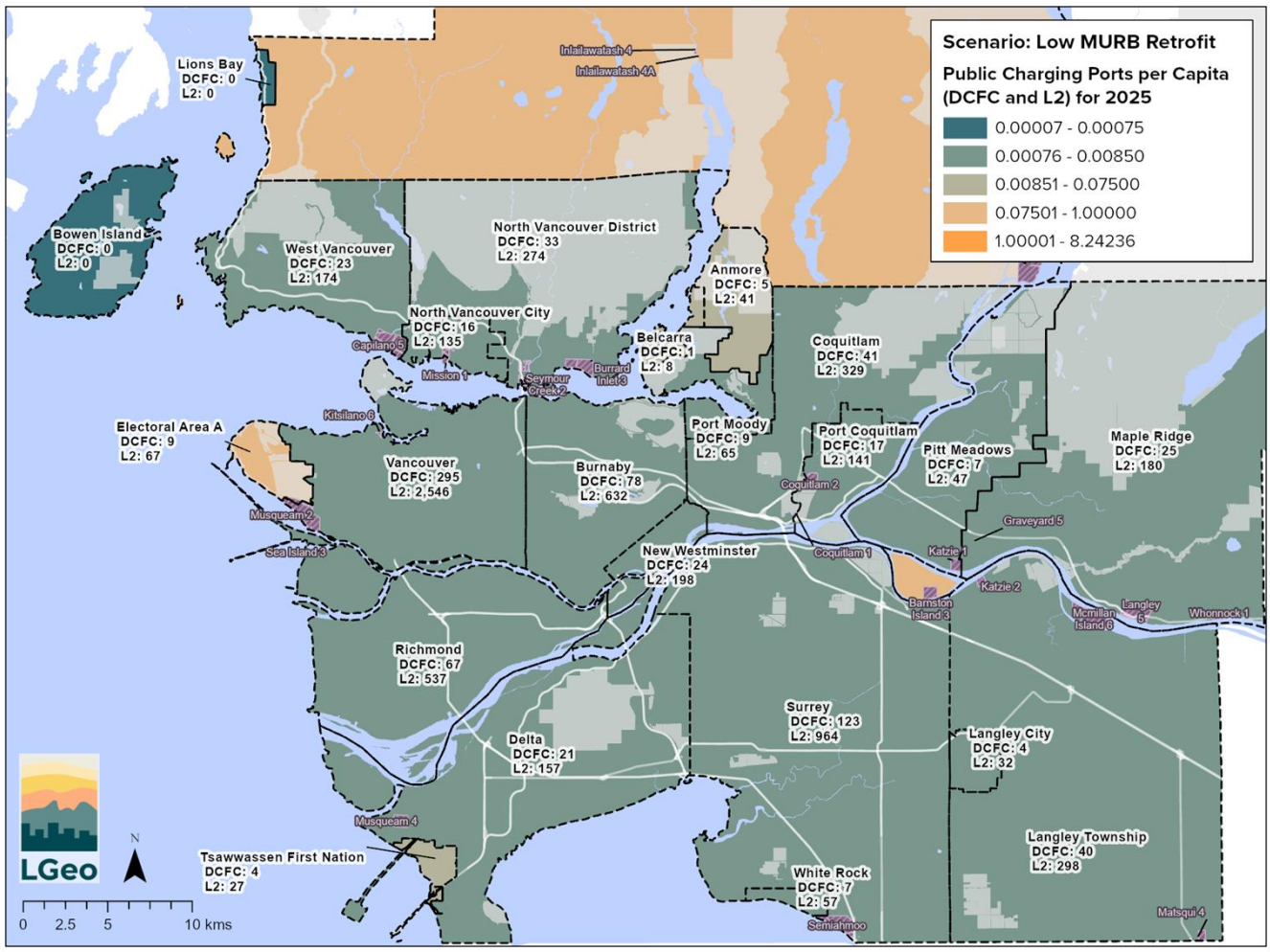
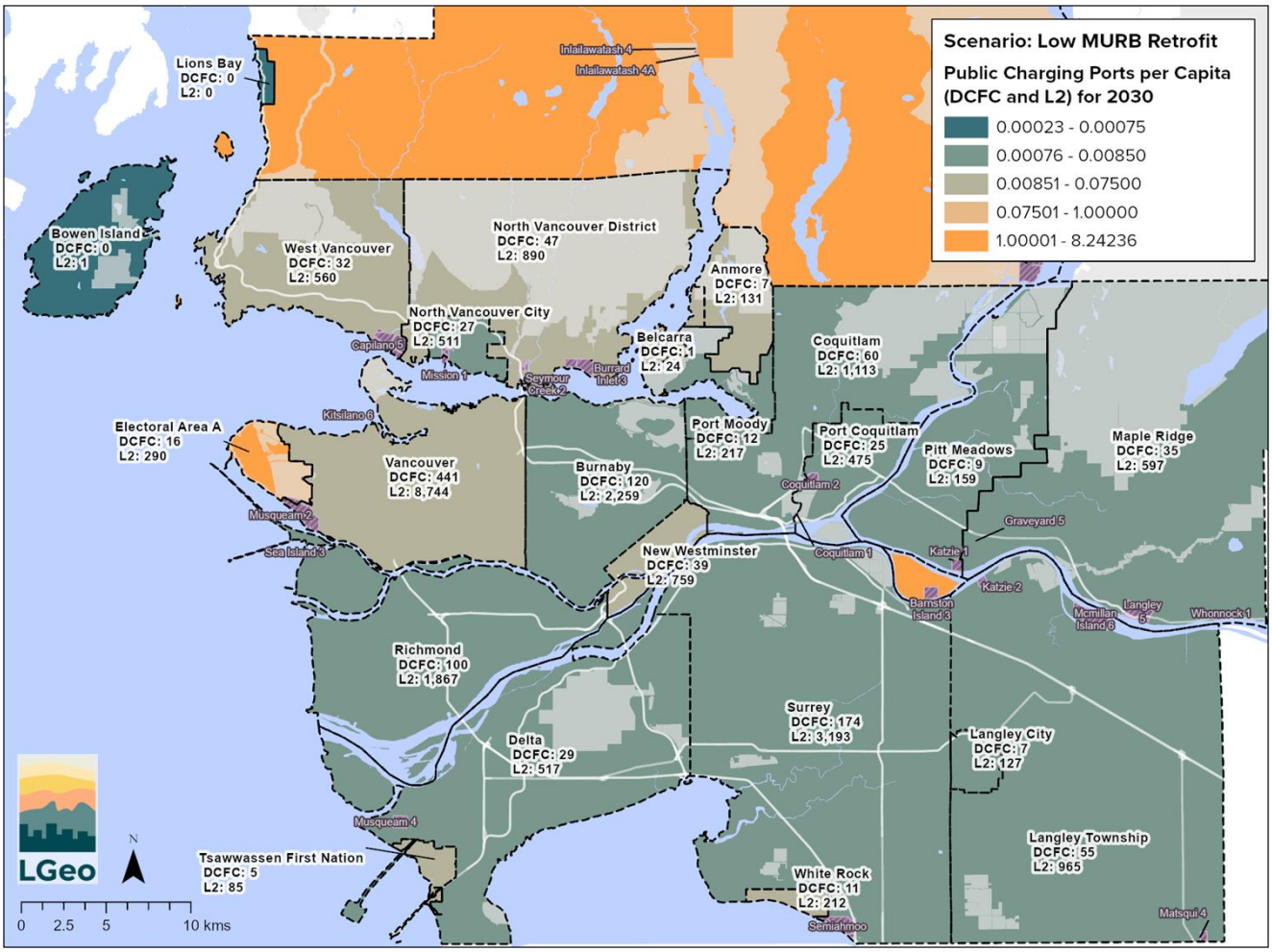
0 2.5 5 10 kms

Cumulative EV Charging Needs (Scenario 2: Low Multifamily Building Retrofit)

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Public Charging Ports per Capita (DCFC and L2) for 2030
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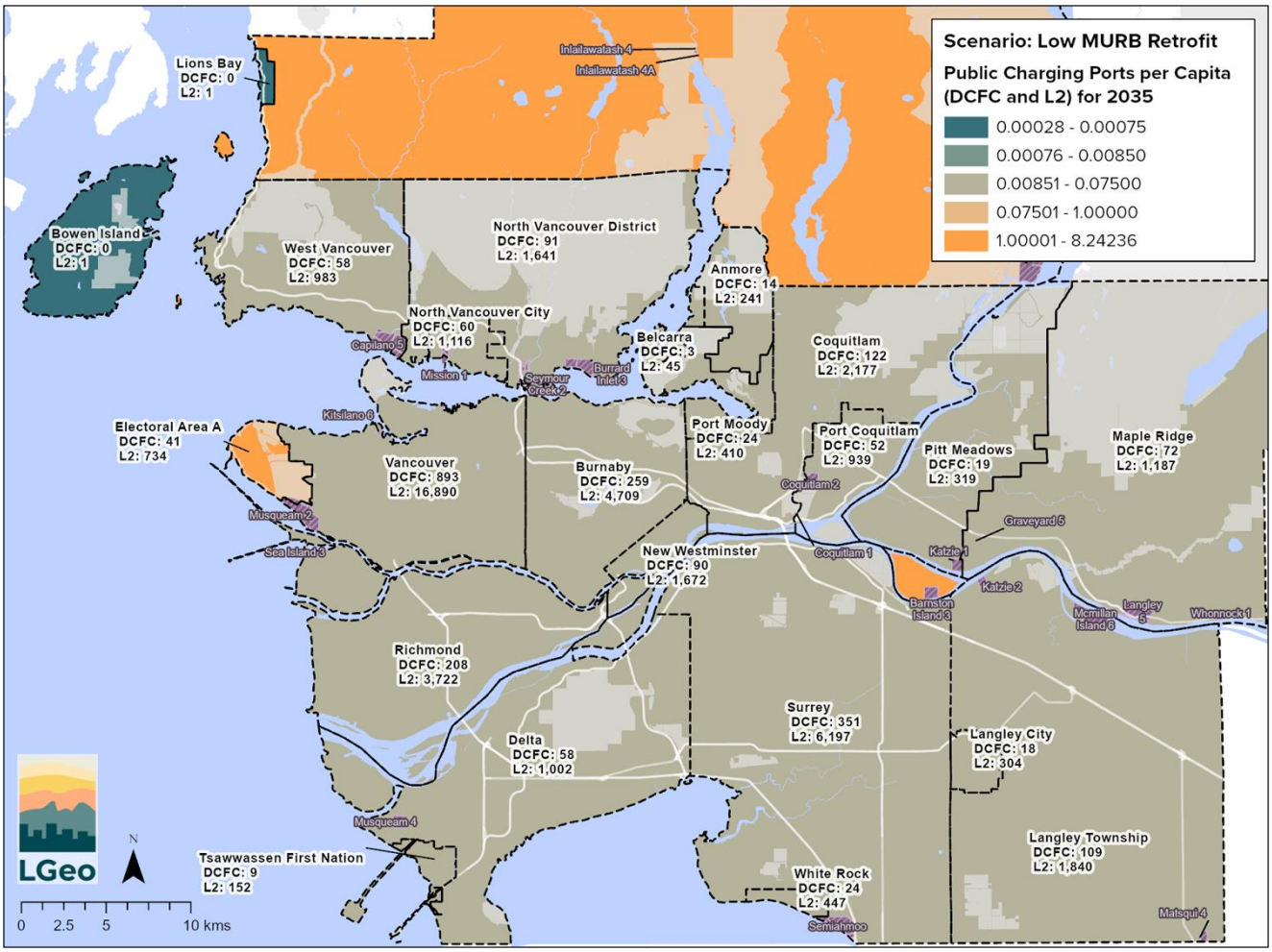
0.00076 - 0.00850
0.00851 - 0.07500
0.07501 - 1.00000
1.00001 - 8.24236
Lions Bay DCFC: 0 L2: 0
Inlailawatash 4
Inlailawatash 4A
Bowen Island DCFC: 0 L2: 1
West Vancouver DCFC: 32 L2: 560
North Vancouver District DCFC: 47 L2: 890
Anmore DCFC: 7 L2: 131
North Vancouver City DCFC: 27 L2: 511
Capilano 5
Mission 1
Belcarra DCFC: 1 L2: 24
Burrard Inlet 3
Seymour Creek 2
Coquitlam DCFC: 60 L2: 1,113
Kitsilano 6
Electoral Area A DCFC: 16 L2: 290
Vancouver DCFC: 441 L2: 8,744
Port Moody DCFC: 12 L2: 217
Port Coquitlam DCFC: 25 L2: 475
Pitt Meadows DCFC: 9 L2: 159
Maple Ridge DCFC: 35 L2: 597
Burnaby DCFC: 120 L2: 2,259
Coquitlam 2
Musqueam 2
Sea Island 3
Graveyard 5
Coquitlam 1
Katzie 1
New Westminster DCFC: 39 L2: 759
Katzie 2
Barnston Island 3
Langley 5
Whonnock 1
Mcmillan Island 6
Richmond DCFC: 100 L2: 1,867
Surrey DCFC: 174 L2: 3,193
Delta DCFC: 29 L2: 517
Langley City DCFC: 7 L2: 127
Musqueam 4
Tsawwassen First Nation DCFC: 5 L2: 85
Langley Township DCFC: 55 L2: 965
White Rock DCFC: 11 L2: 212
Semiahmoo
Matsqui 4
LGeo
N
0 2.5 5 10 kms


Scenario: Low MURB Retrofit
Public Charging Ports per Capita (DCFC and L2) for 2035
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0.00076 - 0.00850
0.00851 - 0.07500
0.07501 - 1.00000
1.00001 - 8.24236
Lions Bay DCFC: 0 L2: 1
Inlailawatash 4
Inlailawatash 4A
Bowen Island DCFC: 0 L2: 1
West Vancouver DCFC: 58 L2: 983
North Vancouver District DCFC: 91 L2: 1,641
Anmore DCFC: 14 L2: 241
North Vancouver City DCFC: 60 L2: 1,116
Capilano 5
Mission 1
Belcarra DCFC: 3 L2: 45
Burrard Inlet 3
Seymour Creek 2
Coquitlam DCFC: 122 L2: 2,177
Kitsilano 6
Electoral Area A DCFC: 41 L2: 734
Port Moody DCFC: 24 L2: 410
Port Coquitlam DCFC: 52 L2: 939
Pitt Meadows DCFC: 19 L2: 319
Maple Ridge DCFC: 72 L2: 1,187
Vancouver DCFC: 893 L2: 16,890
Burnaby DCFC: 259 L2: 4,709
Coquitlam 2
Musqueam 2
Sea Island 3
Graveyard 5
Coquitlam 1
Katzie 1
New Westminster DCFC: 90 L2: 1,672
Katzie 2
Barnston Island 3
Langley 5
Whonnock 1
Merritt Island 6
Richmond DCFC: 208 L2: 3,722
Surrey DCFC: 351 L2: 6,197
Delta DCFC: 58 L2: 1,002
Langley City DCFC: 18 L2: 304
Musqueam 4
Tsawwassen First Nation DCFC: 9 L2: 152
Langley Township DCFC: 109 L2: 1,840
White Rock DCFC: 24 L2: 447
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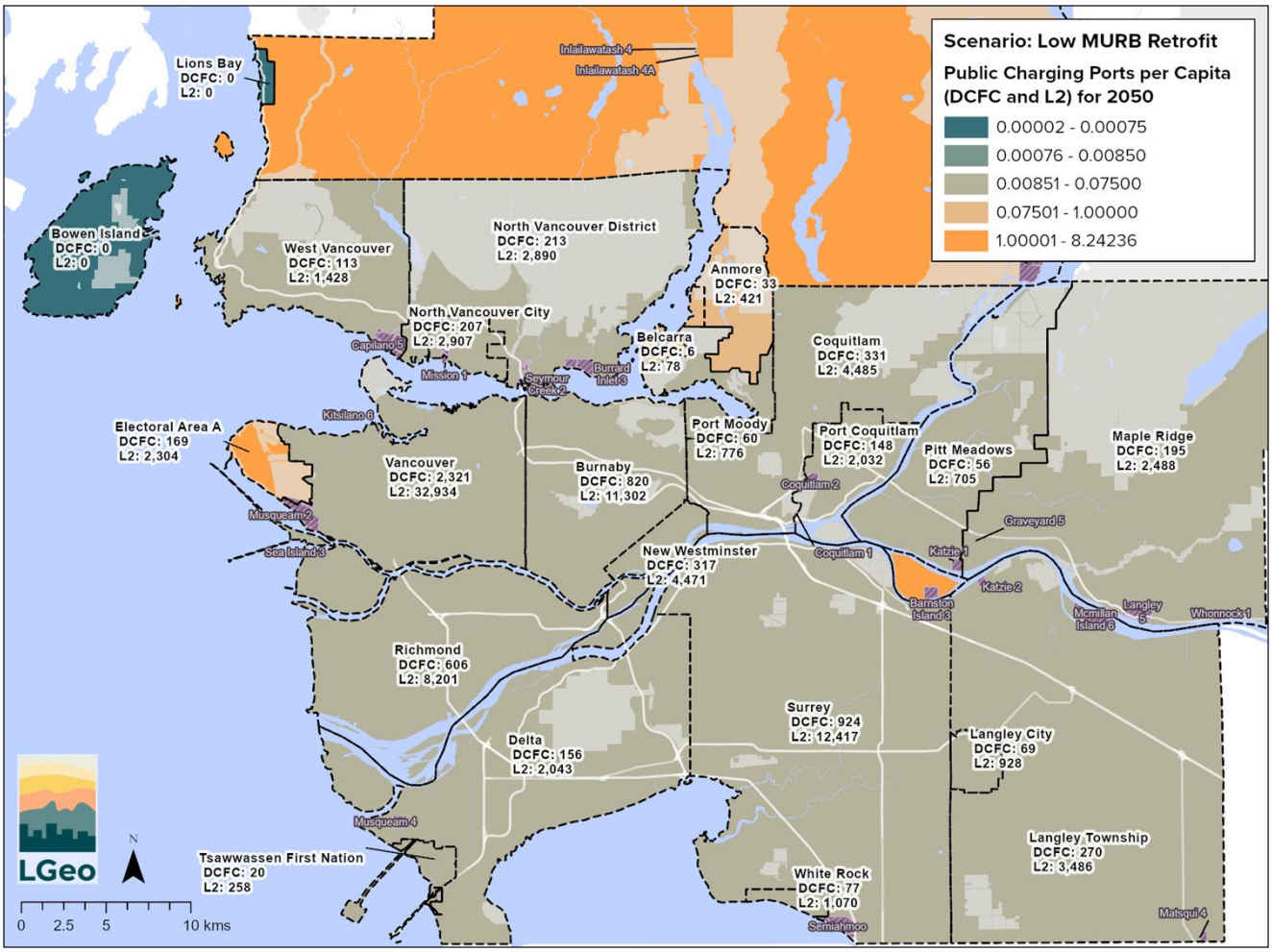
0 2.5 5 10 kms


Scenario: Low MURB Retrofit
Public Charging Ports per Capita (DCFC and L2) for 2050
0.00002 - 0.00075
0.00076 - 0.00850
0.00851 - 0.07500
0.07501 - 1.00000
1.00001 - 8.24236
Lions Bay DCFC: 0 L2: 0
Inlailawatash 4
Inlailawatash 4A
Bowen Island DCFC: 0 L2: 0
West Vancouver DCFC: 113 L2: 1,428
North Vancouver District DCFC: 213 L2: 2,890
Anmore DCFC: 33 L2: 421
North Vancouver City DCFC: 207 L2: 2,907
Capilano 5
Mission 1
Belcarra DCFC: 6 L2: 78
Burrard Inlet 3
Seymour Creek 2
Coquitlam DCFC: 331 L2: 4,485
Kitsilano 6
Electoral Area A DCFC: 169 L2: 2,304
Port Moody DCFC: 60 L2: 776
Port Coquitlam DCFC: 148 L2: 2,032
Pitt Meadows DCFC: 56 L2: 705
Maple Ridge DCFC: 195 L2: 2,488
Vancouver DCFC: 2,321 L2: 32,934
Burnaby DCFC: 820 L2: 11,302
Coquitlam 2
Musqueam 2
Sea Island 3
Graveyard 5
Coquitlam 1
Katzie 1
New Westminster DCFC: 317 L2: 4,471
Katzie 2
Barnston Island 3
Langley 5
Whonnock 1
Mcmillan Island 6
Richmond DCFC: 606 L2: 8,201
Surrey DCFC: 924 L2: 12,417
Delta DCFC: 156 L2: 2,043
Langley City DCFC: 69 L2: 928
Musqueam 4
Tsawwassen First Nation DCFC: 20 L2: 258
Langley Township DCFC: 270 L2: 3,486
White Rock DCFC: 77 L2: 1,070
Semiahmoo
Matsqui 4
LGeo
N
0 2.5 5 10 kms

"NO DISCLAIMERS" POLICY

This report was prepared by Dunsky Energy + Climate Advisors, an independent firm focused on the clean energy transition and committed to quality, integrity and unbiased analysis and counsel. Our findings and recommendations are based on the best information available at the time the work was conducted as well as our experts' professional judgment.
Dunsky is proud to stand by our work.

ATTACHMENT 2

Keeping it Current

Primer on EV Charging Infrastructure

metrovancouver
SERVICES AND SOLUTIONS FOR A LIVABLE REGION

TRANSLINK

BC Hydro
Power smart

August 2023

dunsky
Energy + Climate

Submitted to:

Metro Vancouver

Morgan Braglewicz
Air Quality Planner, Air Quality and Climate Change
Parks and Environment
metrovancouver.org

This report has been reviewed by representatives of Metro Vancouver and TransLink, who commissioned the study, but the interpretation of the results of this study, as expressed in the report, is entirely the responsibility of the consultant authors and does not imply endorsement of specific points of view by Metro Vancouver or TransLink. The findings and conclusions expressed in the report are the opinion of the authors of the study and may not necessarily be supported by Metro Vancouver or TransLink.

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Montreal, QC, H2X 3V4

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ABOUT THIS REPORT

Well-planned EV charging infrastructure is a core component of supporting continued EV adoption. As a federation of 21 municipalities, one electoral area, and one treaty First Nation representing nearly 2.5 million people, Metro Vancouver is well placed to develop a long-term regional strategy for EV charging infrastructure investment, in line with its commitments in its *Climate 2050 Transportation Roadmap* and *Clean Air Plan*.

Metro Vancouver and its partners, TransLink and BC Hydro, have retained Dunsky Energy + Climate Advisors to develop guidance for the development of EV infrastructure that will support local governments, utilities, and companies in the region by suggesting where charging infrastructure of different types should be located, outlining the estimated costs and business case for building and operating this charging infrastructure, and identifying policies that governments can implement to enable construction.

This Charging Technology Brief, which represents Task 1 of this project, summarizes information regarding EV charging technologies relevant for this project, including:

- **Charging users and locations** (Section 1), including the categorization of charging that will be used in our modelling and analysis;
- **Charging technologies** (Section 2), including networked chargers and load management practices;
- **Charging installation approaches** (Section 3), including EV-ready parking and buildings and considerations for planning and installing public charging infrastructure;
- **Charging networks and operations** (Section 4), including how to work with EV charging service providers and options for ownership models and payment structures; and
- **Indicative EV infrastructure costs** (Section 5).

While the EV charging guidance will be focused on infrastructure for light-duty vehicles, this document includes information on charging for medium- and heavy-duty vehicles as well.

The concepts and prevailing understandings outlined here will underpin the assumptions and principles used to develop the subsequent EV charging guidance. This report can also be used as a tool for internal and stakeholder education on key EV and charging concepts.

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List of Abbreviations and Terms

DCFC: Direct current fast charging
EV: Electric vehicle
EVSE: Electric Vehicle Service Equipment (e.g., “EV chargers”)
EVEMS: EV energy management systems
OCPP: Open Charge Point Protocol
LDV: Light-duty vehicles
MHDV: Medium- and heavy-duty vehicles
Multifamily building: sometimes referred to as multi-unit residential building (MURBs) (e.g., apartment or strata buildings)

1. Charging Users & Locations

1.1 Overview

Electric vehicle (EV) charging users include the **public** (residents, workers, and tourists) and **fleet operators**. Each of these user groups has different needs related to how, when, and how much they charge; as a result, they each use different combinations of charging locations, as shown in Figure 1.[1]

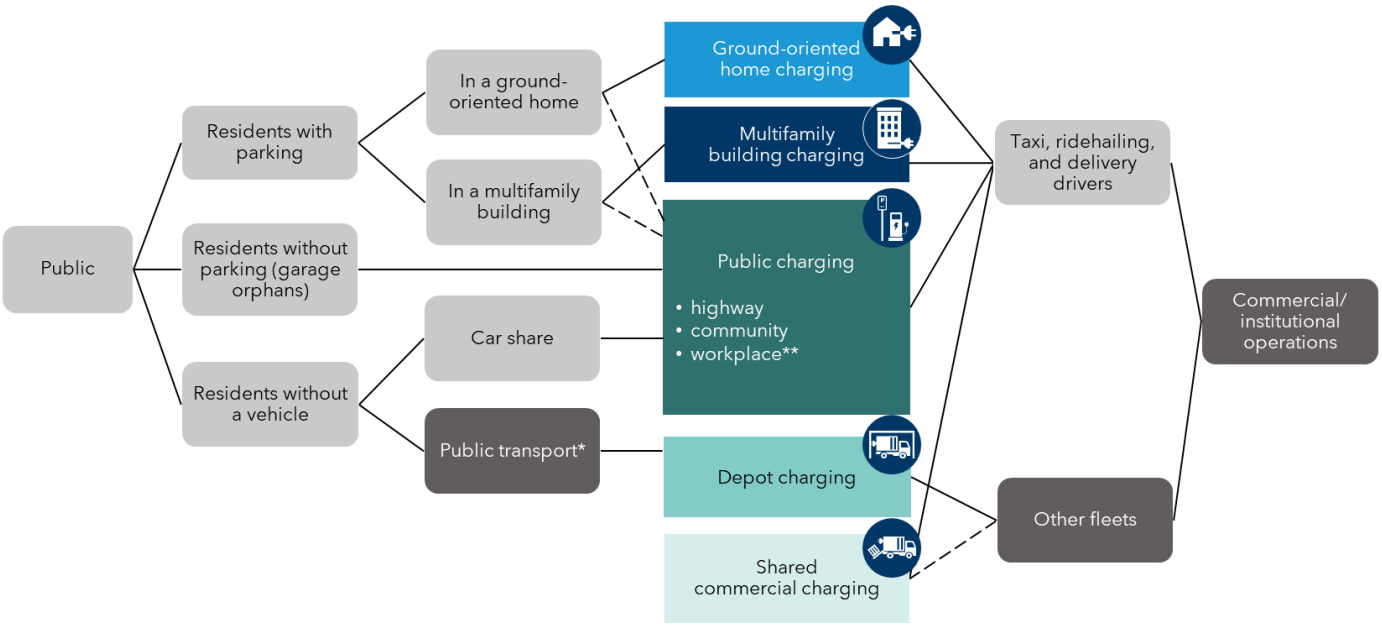

Figure 1. Charging Users and the Charging Categories that Meet their Needs

* Public transport fleets occasionally use on-the-go/overhead charging, but this practice is not yet widespread.

** We consider workplace charging to be a form of public charging because it serves the public, even if sometimes workplace charging is only open to employees.

1.2 People without Home Charging

The group of people without home charging is made up of the following two groups:

1. **Garage orphans:** people without any access to private home parking. For example, many pre-war neighbourhoods in urban centres, many multifamily buildings, as well as secondary suites or apartments within ground-oriented homes, do not have onsite parking. Likewise, some households that have garages use all potential parking spaces for other purposes (storage, etc.). Garage orphans who use EVs must rely fully on public charging.
2. People living in multifamily buildings who have access to parking, but where that parking space has not had the electrical upgrades required to support the installation of EV charging; or, where

[1] The EV Charging Needs Assessment that will be produced as a later step of this work will cover only charging for light-duty vehicles (LDVs); however, this document covers charging for medium- and heavy-duty vehicles (MHDVs) as well.

the resident is otherwise prevented from installing EV charging. This second group can use public charging, or their parking space can be retrofitted to become EV ready (see Section 3.1). As more multifamily buildings are retrofitted, this group will rely less on public charging.

While detailed data about parking access by housing type is unavailable in Canada, a survey of current EV owners showed that only 12% of current EV owners in Canada live in multifamily buildings,[2] whereas 33% of Canadians live in multifamily buildings overall. In Metro Vancouver, this share is even greater. As of 2021, 43% of residents lived in apartments, and this share is growing: since two-thirds of new dwellings that were put on the market between 2016 and 2021 were apartments.[3] This suggests that barriers to EV access are higher for multifamily building residents in general, though variations in urban form exist from one community to the next.

1.3 Characteristics of Different Charging Locations

Charging at home (whether in ground-oriented homes or in multifamily buildings) plays the largest role in the charging ecosystem in terms of the number of ports and the overall amount of energy dispensed at those locations (Figure 2), and this will continue in the future. According to a survey of BC EV drivers conducted by BC Hydro in late 2022 of their public EV charging network members, 86% of EV drivers respondents use home charging. Meanwhile, most of these drivers also use public charging at least some of the time; 88% and 77% of EV drivers respondents use BC Hydro and other public charging stations, respectively.[4]

However, the important role of public charging cannot be overlooked. It is the only choice for residents who do not have access to home charging, as described above. Further, the presence and visibility of public charging is crucial to helping consumers overcome range anxiety and feel confident purchasing an EV.

A similar dynamic plays out for commercial vehicles. Most commercial vehicle charging takes place at the depot (the facility where commercial vehicles park), but shared commercial charging outside of the depot (see definition below) enables electrification of certain fleets who, for a range of reasons, cannot rely on depot charging.

The role of governments and utilities is particularly important in the development of robust public and shared commercial charging infrastructure, since public charging is more costly to develop and requires access to land in key locations.

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[2] Pollution Probe (2022). Assessment of the Consumer EV Charging Experience in Canada. Commissionned by Innovation, Science and Economic Development Canada.
[3] Metro Vancouver (2022). Metro Vancouver Housing Book.
[4] BC Hydro, 2023. Public EV Charging Service Rates Application submitted to BCUC. Exhibit B-1.

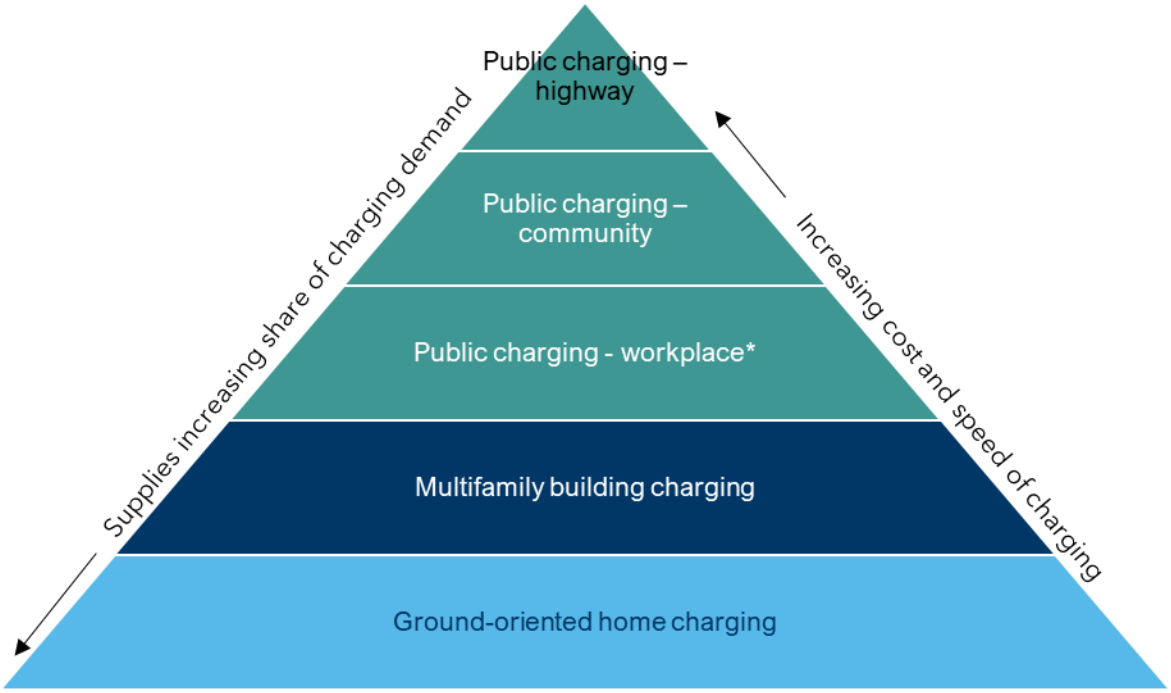


Figure 2. Relative Importance of Different Charging Categories, by Total Energy Dispensed[5]
* We consider workplace charging to be a form of public charging because it serves residents, even if sometimes workplace charging is only open to employees.

For the purposes of this brief and the analysis that will follow, charging locations are divided into the following categories:

- Ground-oriented home charging
- Multifamily building charging
- Public charging, which includes workplace, community and highway charging
- Shared commercial charging
- Depot charging

The following sections describe each of these charging categories in further detail.

[5] Figure adapted from: U.S Department of Energy, *A Guide to the Lessons Learned from the Clean Cities Community Electric Vehicle Readiness Projects*, 2014.

Ground-oriented Home Charging

People living in ground-oriented housing (single family homes, duplexes, triplexes and row houses) are more likely to have access to, and ownership of, a parking space attached to their living space (e.g. a private garage or parking pad). Installation of EV charging in these settings can be relatively simple, although panel and/or service upgrades or other electrical works are sometimes required; indeed, load management in townhomes, duplexes or any building with multiple meters can sometimes be complicated. Generally, these building types are amenable to incremental additions of EV charging infrastructure as households adopt EVs. Many municipalities in BC have adopted requirements to ensure that new residential construction be built with EV-ready parking, meaning that panel and service upgrades will not be required for residents of new homes.

Multifamily Building Charging

Multifamily building apartments feature shared parking areas. It is more challenging for multifamily building residents to install EV charging, even when they do have access to a parking spot, due to legal, financial, technical and logistical barriers inherent in both condominiums and rental apartments. Nonetheless, home charging remains the most attractive, affordable and convenient option for the one-third of Canadians that live in multifamily buildings.[6] Emerging best practice, stemming in particular from leadership in BC, is to provide charging infrastructure in multifamily buildings where parking is available.

Public Charging

Reliable and widespread public charging infrastructure is crucial to:

- Reassure prospective EV adopters that they will be able to charge on long-distance trips,
- Provide charging for people without EV charging at home,
- Provide charging for people with EV charging at home but whose daily trip surpasses their battery's capacity,
- Provide charging for carshare fleets, and
- Provide charging for tourists.

There are three sub-categories of public charging:

- **Community charging,** which can be on-street (curbside) or off-street (for example, in publicly accessible parking lots or garages).

[6] Statistics Canada. (2017). Census in Brief: Dwellings in Canada.

    - Many cities are prioritizing off-street public charging where feasible, to preserve space in the public right-of-way for other uses (cycling, walking, public realm, green infrastructure), avoid accessibility concerns, and save costs (curbside charging is generally more expensive).[7]
    - However, in some neighbourhoods, curbside charging can be accommodated and is the best option to serve residents and workers. The City of New York, which has piloted curbside charging deployment in neighbourhoods surrounding a major employer (hospital), commissioned the report *Curb Enthusiasm*[8] to highlight best practices for on-street EV charging deployment.
- **Workplace charging,** which is designed for employees, can also be provided on- or off-street.
    - Workplace charging can be an excellent option for people without home charging, as it is provided at a place where they are already going.
    - More studies are needed to examine the viability of workplace charging for office workers as many employees are adopting hybrid work policies. If employees are commuting less often, they will be less able to rely on workplace chargers.
- **Highway charging,** which is provided on major corridors, mostly serving people making long trips, such as for vacations or trips.

Depot Charging

For fleet operators with "back-to-base" operations (where vehicles return to the same parking space after each shift), depot charging is expected to meet most charging needs. Examples of fleets with back-to-base operations include delivery vehicles, government fleets and public transit.

Like home charging, depot charging typically takes place in the evening/night.

Shared Commercial Charging

Shared commercial charging is different from public charging in that it is exclusively dedicated to fleets. It is shared among users and placed in strategic locations for fleets. For example, shared commercial charging can be established at taxi stands, downtown delivery zones (where trucks already park), and on trucking routes.

Fleet operators use shared commercial charging in the following circumstances:

- When fleet vehicles do not return to the depot, for example, long distance trucks and intercity buses. These heavy-duty vehicles will need ultra-fast charging (see section 2.2).
- When the vehicles' daily duty cycle exceeds the capacity of the battery.
- When the vehicles do not belong to a depot. This group includes taxi and ridehailing fleets (such as Uber and Lyft) and sometimes telecom fleets. Notably, drivers of these vehicles will also use home charging where the driver has access, as well as general public charging. This

[7] Source: Interviews conducted by Dunsky with the cities of Montreal, San Fransisco, New York. October 2021.
[8] City of New York, 2019. *Curb Enthusiasm*.

group also includes owner-operator drivers, which represent approximately 26% of truck drivers employed in Canada and 35% in BC.[9]

- When the depot does not yet have sufficient EV charging installed.

Modelling suggests that shared commercial charging, specifically charging provided for taxi and ridehailing vehicles, offers a potential profitability that is higher than most fast charging infrastructure due to these vehicles' higher drive cycles (and therefore higher energy demand) and their business need for fast charging. As a result, strategically designed shared commercial charging networks could help finance broader investment in public fast charging.

[9] Source: Statistics Canada, *Statistiques sur l'emploi dans l'industrie du camionnage selon les provinces et territoires,* 2015.

2. Charging Technologies

2.1 Charging for Light-Duty Vehicles

For light-duty vehicles (LDVs) (cars, vans, SUVs and light trucks) there are three main charging levels: Level 1, Level 2, and direct current fast charging (DCFC), sometimes referred to as Level 3 or, simply, fast charging. The main characteristics of these charging types for LDVs are provided in Table 1.

Table 1. Main Characteristics of Different Charging Types for LDVs

Charging Type	Charging Power	Approx. charging time for 300 km of range[10]		Charging Location					Type of light-duty EV that can use
		Typical car	Typical SUV/ light truck	Ground-oriented	Multifamily building	Public	Depot	Shared commercial	
Level 1	1.3-2.4 kW	46-25 h	69-37.5 h						BEV and PHEV
Level 2	3 kW	20 h	30 h						BEV and PHEV?
	7 kW	8.5 h	13 h						
	9.6 kW	6 h	9.5 h						
	19.2 kW	3.25 h	4.75 h						
DCFC	25 kW	2.5 h	3.5 h						BEV
	50 kW[11]	1.25 h	1.75 h						
	100 kW	36 min	54 min						
	150 kW	24 min	36 min						
	350 kW	10 min	15 min						

Although most electrical systems use alternating current, EV batteries use direct current. A converter, which is installed in an EV, converts alternating to direct current. Charging supplied by Level 1 and 2 charging ports passes through the converter, while fast charging supplies the battery directly, bypassing the converter (Figure 3).

[10] Many vehicles do not require a full 300 km charge on a typical day.

[11] While many public DCFC today are 50 kW, it is recommended to install minimum 100 kW DCFC for public charging in most instances, except where users are consistently staying for over two hours.

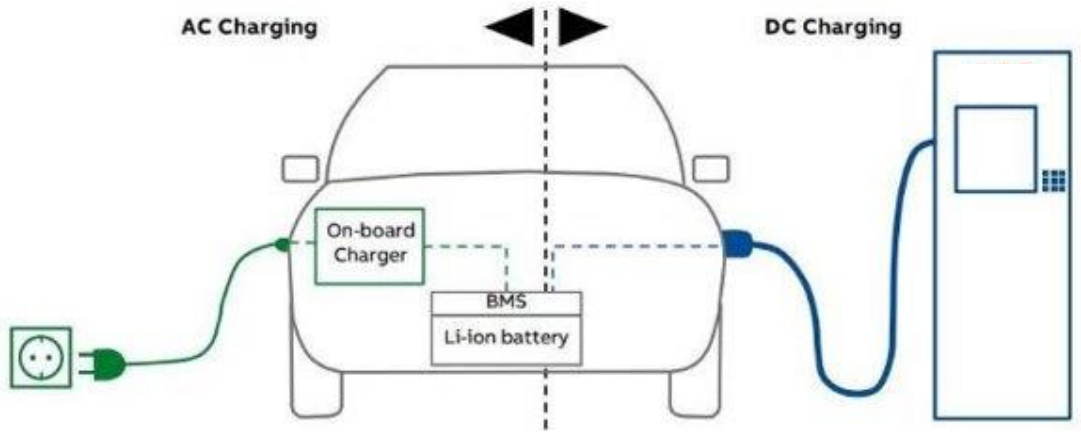


Figure 3. Configuration of direct current and alternating current charging, showing the function of the converter (on-board charger). Source: ABB.com

DCFC

As shown in Table 1, DCFC provide a charge faster than Level 2 and 1 EV charging, but they are much more expensive to install and operate. For LDVs, DCFC is mostly used for public charging. Frequently a new electrical service is required to enable the installation of DCFC at a given site.

DCFC encompass a wide range of charging power from 25 to 350 kW. Not all vehicle models are capable of charging at higher levels; however, market trends show that new models are increasingly designed for higher charging powers, as shown in Figure 4. Indeed, the following models can charge at rates between 250 and 350 kW: Porsche Taycan, Audi e-tron GT, Hyundai IONIQ 5, KIA EV6 and Lucid Air.

As the charging capacity of EVs on the road increases, the need to supply higher power fast charging increases as well. Based on a non-quantitative scan,[12] most non-Tesla public fast charging stations in Metro Vancouver offer 50 kW ports. However, an increasing number of faster ports (100-150 kW) are planned or under construction. Tesla charging ports typically offer a higher power; in Metro Vancouver the Tesla supercharger stations range from 72 to 250 kW.

Notably, most plug-in hybrid EVs (PHEVs) cannot use DCFC charging. For this reason, the share of PHEVs versus BEVs in the total EV population influences the relative share of Level 2 versus DCFC public charging that is needed, alongside other factors. There is significant uncertainty about the role of PHEVs in the vehicle landscape going forward; studies show that they will need to be phased out in the 2030s if Canada is to meet its net-zero targets.[13]

[12] Using PlugShare.com

[13] International Council on Clean Transportation (ICCT), 2022. Canada's Path to 100% Zero-Emission Light-Duty Vehicle Sales: Regulatory Options and Greenhouse Gas Impacts.

Level 2

Level 2 charging is appropriate for instances where the vehicle will be parked for a longer period of time, for example overnight or during a work shift.

Level 2 charging requires a 208V or 240V outlet. Since the charge required can often be achieved in three to five hours (shorter than the full overnight period), Level 2 charging presents opportunities to sync charging time and power draw with the overall needs of the grid or building, by avoiding charging during building or grid peak hours. See Section 2.5 for further discussion of energy management opportunities.

Level 1

Level 1 charging is the simplest form of charging, since it uses a typical household 120V outlet and a single electrical cable. Given the particularly long charging times, Level 1 charging is only used in a residential setting and is not suitable for vehicles with long daily drive cycles. In a survey of current EV owners in Canada, 81% of respondents with home charging use a level 2 charging station, while 13% use a level 1 standard wall electrical outlet.[14]

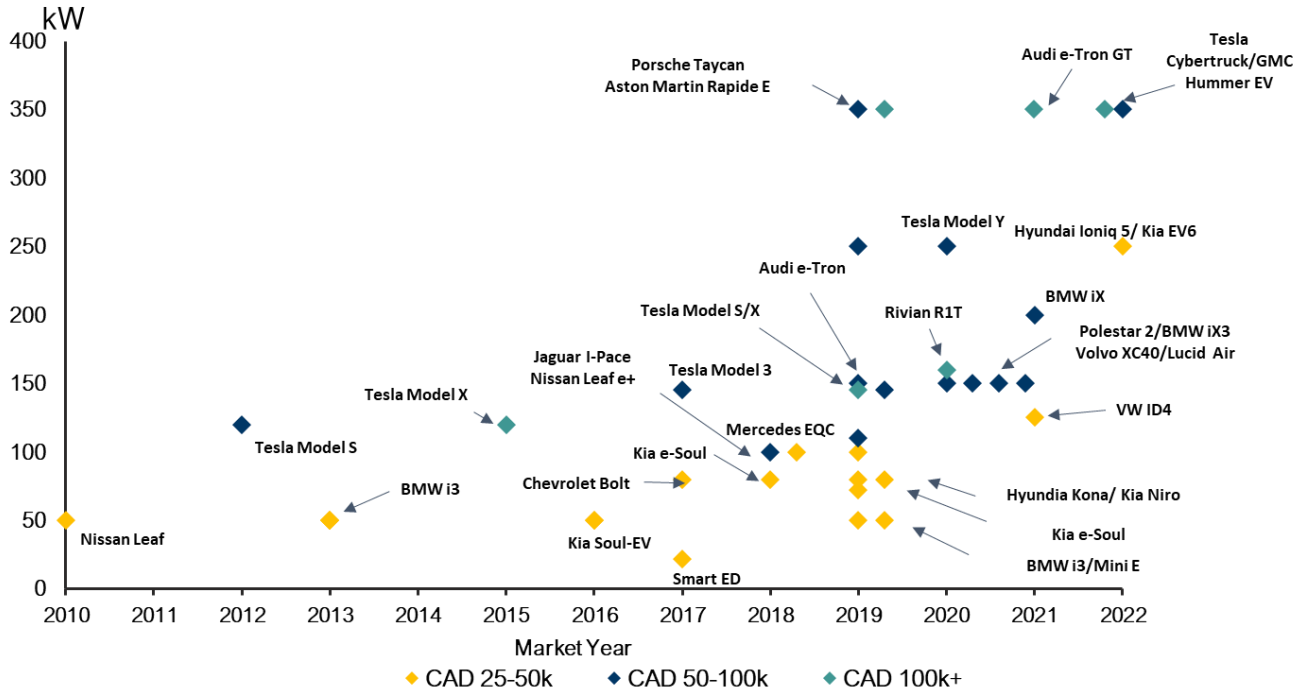


Figure 4. Maximum Fast Charging Power Capabilities for Different EV Models, 2010-2022

[14] Pollution Probe (2022).

2.2 Charging for Medium- and Heavy-duty Vehicles

The main characteristics of the different charging types for medium- and heavy-duty vehicles (MHDVs) are provided in Table 2. As shown in the table, heavy-duty vehicles like garbage trucks and transit buses typically need a DCFC of 50 kW or more for overnight charging in a depot. For long-distance heavy-duty trucks, or other trucks operating with multiple drivers without a long pause overnight, ultra-fast DCFC of 1 MW or more will generally be needed.

Table 2. Main Characteristics of Different Charging Types for MHDVs

Characteristics		Level 2	DCFC	Ultra-fast DCFC / MCS
Typical charging power		3 kW-19 kW	25 kW-350 kW	1 MW plus
Charging time for 300 km of range	Medium truck	~ 9.5-26 h	~ 30 min. – 7h	~ 11 min.
	Heavy truck	~ 19-51 h	~ 1 h – 14h	~ 22 min.
Charging location				
• Depot charging				
• Shared commercial charging				
Type of EV that can use		Medium-duty BEV (too slow for heavy-duty)	Medium- or heavy-duty BEV	Medium- or heavy-duty BEV

Megawatt Charging Standard

The Megawatt Charging Standard (MCS), which allows the supply of charging at 1 MW or more, is currently under development by Daimler Trucks, Tesla, and other manufacturers. Some pilot projects are underway, and commercialization is expected in 2025.

2.3 EV Charging Connectors

Table 3 shows the range of connector types that are available globally, by region and by type of current.

All EVs sold in North America are compatible with J 1772 connectors, which are used for Level 1 and 2 charging (in the case of Tesla vehicles, an adapter is required to use a J 1772 connector).

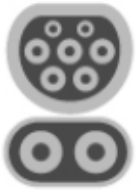
For fast charging, most vehicles in North America use a CCS Combo connector, although some use CHAdeMO connectors (these are vehicles manufactured in Japan, namely the Nissan LEAF and the Mitsubishi Outlander PHEV).

Currently, most fast charging stations in Metro Vancouver (other than Tesla stations) offer both CCS Combo and CHAdeMO connectors, based on a non-quantitative scan.[15] However, manufacturers

[15] Using PlugShare.com

using CHAdeMO connectors have announced that they will move toward CCS Combo connectors only. Moreover, Tesla has recently deployed a CCS Combo adapter in Europe and South Korea.

Table 3. Connector Types by Region and Charging Power

	North America	Japan	Europe	China	Others
Alternating current (Level 2, 3 to 19.2 kW)	**J 1772 Type 1** 	**J 1772 Type 1** 	**Mennekes (Level 2)** 	**GB/T** 	**Tesla***  *Tesla offers adapters allowing users to charge with a J1772 charger
Direct current (Fast charging, 25 to 350kW)	**CCS Combo Type 1 / SAE** 	**CHAdeMO** 	**CCS Combo Type 2** 	**GB/T** 	

2.4 Networked Chargers

For the purposes of this report, the term **networked chargers** refers to EV chargers that can communicate over an electronic communications network such as a cellular, wireless, or ethernet network. Such network communications capabilities allow for chargers to accommodate a variety of functions, including:

- EV energy management (see Section 2.5),
- Utility demand response (whereby EV loads are adjusted based on grid operator signals to optimize charging to reduce grid-system costs),
- Remote monitoring and diagnostics,
- Reservation systems for shared chargers, and
- Tracking use and applying time-based or volumetric user fees (e.g. per kilowatt hour).

The term "smart chargers" is often used to refer to what we define as networked chargers above.

Open Protocols

Networked chargers can communicate via either proprietary or open protocols. The benefit of using open communications protocols is that different chargers and charging management systems can communicate with one another, reducing the risks of stranded assets. The Open Charge Point Protocol (OCPP) administered by the Open Charge Alliance is the predominant open protocol. It can facilitate communications between EV chargers, EV energy management systems (see Section 2.5) and charging service providers' management systems (see Section 4).

2.5 Load Management and EV Energy Management Systems

Unlike some electric equipment, EV charging is a flexible load that offers significant opportunities for managing loads to minimize impacts on peak demand at the building or grid level.

EXAMPLE OF LOAD MANAGEMENT OPPORTUNITIES FOR RESIDENTIAL CHARGING

- 89% of Canadian EV drivers travel less than 60 km per day.[16]
- Most home charging takes place using a Level 2 port.[17]
- Therefore, for a typical vehicle energy consumption of 20 kWh/km, the charging time required to top up the battery is approximately **one hour and 45 minutes.**
- Meanwhile, the vehicle is likely parked for **eight** or more hours overnight, illustrating the opportunity to displace or spread out the energy demand to the most beneficial time for the electrical grid, with no negative impact on the consumer.

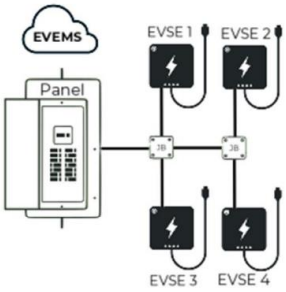
The textbox above illustrates the opportunity for load management for residential charging. Networked charging enables utility grid operators to provide signals specifying when it is most valuable for an EV to charge (for example, when wholesale power prices are low and the distribution grid is not congested).

Similarly, EV energy management systems (EVEMS) monitor and control loads so as not to exceed the capacity of an electrical circuit. They can be used can be accommodate more EV charging at a facility than could otherwise occur without EVEMS. EVEMS make it possible to provide large amounts of parking (e.g., 100% of parking in an apartment building) with EV charging. By controlling the rate and timing of charging, EVEMS charge multiple vehicles while reducing the required circuit capacity.

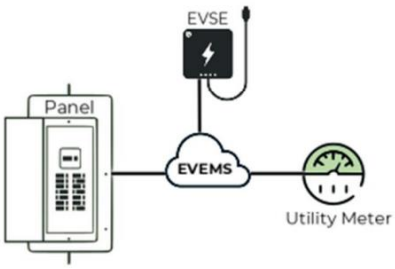
While the speed of charging slows when multiple EVs are charging simultaneously on a shared circuit, using reasonable amounts of load sharing is perfectly appropriate in situations where vehicles are parked for longer periods of time (e.g., overnight in residential parking, or the course of a day at a workplace). Notably, load sharing approaches are appropriate not only in residential and workplace settings, but also in depots for commercial fleet charging.

Most networked chargers are compatible with EVEMS. As shown in Figure 5, there are multiple possible EVEMS configurations.

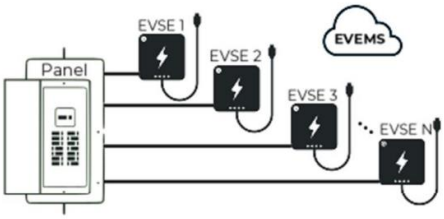
[16] Roulez Électrique (2014). Les distances moyennes de déplacement au Canada : étonnamment courtes!
[17] Pollution Probe (2022).



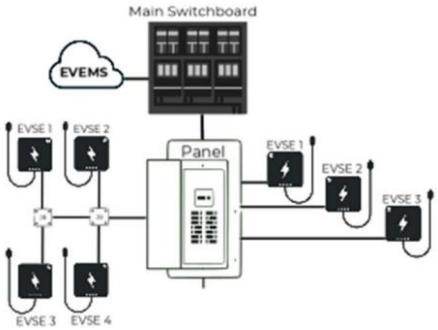
Circuit sharing: Multiple EV chargers on a circuit, with control to ensure capacity is not exceeded.



Feeder sharing (demand control charger): On-off control of EV charging based on available capacity on the supply to an electrical panel.



Panel sharing: EV charging loads in excess of panel, with control to ensure capacity is not exceeded.



Service monitoring: Monitoring of spare capacity on building's main electrical board and control of EV loads accordingly.

Figure 5. Possible EVEMS Configurations. Source: Brendan McEwen and AES Engineering.

2.6 Wireless and Overhead Charging

Wireless Charging

Wireless charging is an emerging technology that is not yet widely commercialized. It can be broken down into two categories: static wireless charging when the vehicle is parked, and dynamic wireless charging while the vehicle is in motion.

Static wireless charging is a direct substitute for traditional conductive charging with a cable. Wireless charging uses electromagnetic induction, similar to what is used for wireless charging of smartphones and other electronic devices. This approach is primarily seen as a convenience feature for personal vehicles but may also be a key enabler for applications that benefit from frequent top-ups, such as taxis in a queue or emergency vehicles that spend considerable amounts of time idling but that may need to leave quickly. Wireless charging may be a necessity to enable fully autonomous vehicles.

There has been limited commercial availability of static wireless charging solutions so far, with aftermarket retrofit options available for certain EV models, but no automaker has yet included static wireless charging as a factory option. SAE International has released the J2954 standard that establishes industry-wide specifications for static wireless charging to ensure safety, performance and interoperability across manufacturers.

If static wireless charging becomes more common in the future, it will be able to use much of the electrical infrastructure implemented for physically connected EV chargers used today. Therefore, static wireless systems do not present a substantial risk of stranded assets.

Dynamic wireless charging relies on inductive charging infrastructure that is integrated into the road surface. This approach is at a much lower level of technology readiness, with a limited number of proof-of-concept trials currently under development. It has yet to be seen whether this technology can be deployed cost effectively. If technical and economic barriers can be addressed, it would likely be at least a decade before this technology can be commercialized and incorporated into production vehicles. Most analysts foresee that dynamic wireless charging, if it ever gains appreciable scale, would be used more for goods movement vehicles and not light-duty passenger vehicles. That said, if dynamic wireless charging becomes viable, it could have a significant impact on the demand for other types of charging – vehicles that can charge while on the highway (or portions thereof) would have no need for fast charging infrastructure to enable longer trips.

Overhead charging

Overhead charging may be used for heavy truck and bus charging at depots or on-route charging facilities. The SAE J3105 standard was established to ensure safety and interoperability of such systems. Results of overhead charging pilots by transit agencies have presented mixed results so far.

Overhead wires could allow pantographs to connect vehicles to a source of power as they move, similar in concept to how trolley buses are used today (catenary charging). Such systems are being piloted on major corridors to support electrification of heavy trucks for goods movement in Norway.

3. Charging Installation Approaches

3.1 EV-Ready Parking and Buildings

As described in Section 1.3, emerging best practice is to provide charging infrastructure in multifamily buildings where parking is available. Multifamily building charging represents a more affordable, convenient, and attractive alternative to public charging for apartment and strata dwellers.

DEFINITIONS

EV ready parking is a parking space that features an adjacent electrical outlet (a junction box or a receptacle) capable of providing at least Level 2 EV charging (as defined by the SAE standard J1772). See Figure 6. This definition is reflected in the requirements for access to the BC Hydro EV charging rebates for apartment and condo buildings.[18]

We define **EV ready buildings** as those buildings where EV ready parking is provided at scale:

- For residential: where **100%** of parking stalls (or at least one stall per dwelling) are EV ready.
- For commercial: where **20%-40%** of parking stalls are EV ready, depending on context.

Fully EV ready residential buildings are the most cost-effective, practical, and fair way to ensure charging access in existing multifamily buildings. This comprehensive approach is reflected in the municipal bylaws for new construction adopted in many BC municipalities, as referenced in Table 4.

[18] BC Hydro. EV charging rebates for apartment and condo buildings.

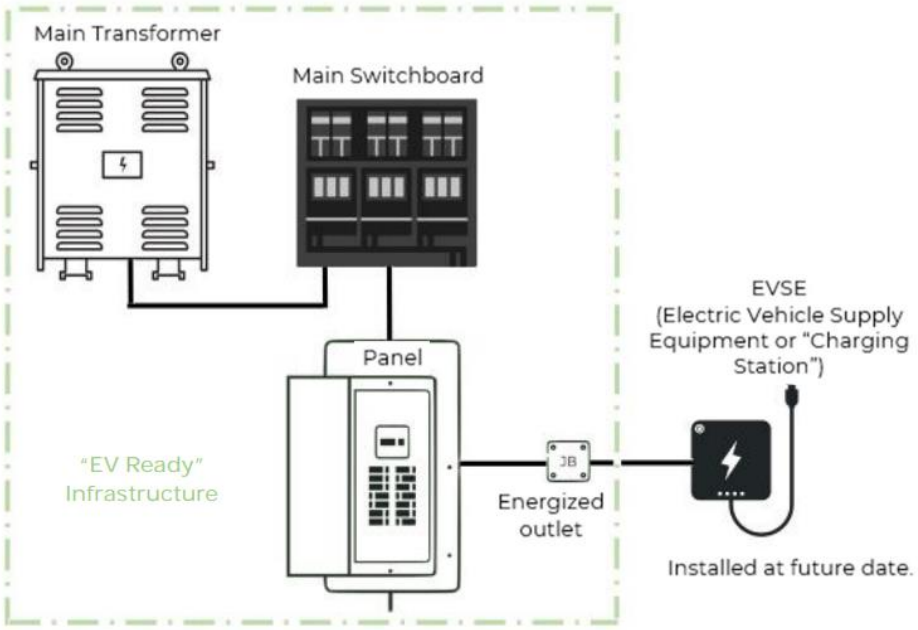


Figure 6. EV Ready Installation Showing All Infrastructure Required up to the Energized Outlet

New Construction

Thirteen of 23 Metro Vancouver members, covering a majority of the Metro Vancouver population, have adopted parking design requirements in parking or zoning bylaws requiring EV Ready parking for 100% or near-100% of residential parking in new developments. Eight members also require significant proportion of new commercial parking to be EV Ready, ranging from five to 45%. The Province of BC has clarified that the BC Building Act does not prohibit local governments from making such requirements.

Table 4. Metro Vancouver Members Having Adopted EV Ready Requirements

Metro Vancouver Member	EV Ready Requirement	
	Residential	Commercial
City of Vancouver	100%	45%
City of North Vancouver	100%	45%
City of Port Moody	100%	20%
City of Surrey	100%	20%
District of North Vancouver	100%	20%
City of Richmond	100%	In development
City of Burnaby	100%	--
City of New Westminster	100%	--
District of West Vancouver	100%	--
City of Coquitlam	1 EV ready/dwelling	--
Township of Langley	1 EV ready/dwelling	--

Metro Vancouver Member	EV Ready Requirement	
	Residential	Commercial
City of Port Coquitlam	1 rough-in/dwelling[19]	--
Village of Anmore	--	--
Village of Belcarra	--	--
Bowen Island Municipality	--	--
City of Delta	--	--
Electoral Area A	--	--
City of Langley	--	--
Village of Lions Bay	--	--
City of Maple Ridge	--	--
City of Pitt Meadows	--	--
Tsawwassen First Nation	--	--
City of White Rock	100%	--

Existing Buildings

For existing buildings, there are unfortunately complex barriers to pursuing EV-ready retrofits, spanning high upfront costs and limited access to capital, the need to foster the appropriate services and approach amongst engineering consultants and contractors, a lack of awareness among rental building owners and strata boards, and complicated strata decision-making processes. EV-ready retrofits involve ensuring there is sufficient electrical capacity to supply EV charging (often via an electrical upgrade) and installing all necessary electrical infrastructure to supply the parking stalls with a wired outlet (which often involves civil works and renovations).

There are different approaches to retrofitting multifamily buildings. A **comprehensive EV ready retrofit** is an approach that can help overcome these barriers, and is particularly valuable for multifamily condominiums, rental housing, workplaces, retail, and many depots. In this approach, a building undertakes an electrical renovation to make a significant proportion of parking EV ready. For example:

- A strata makes all parking EV ready, to accommodate all drivers adopting an EV in the coming decades.
- A workplace implements a 10% EV ready retrofit to accommodate parking for the foreseeable future). As drivers adopt EVs, EV chargers are installed at their assigned parking space.

Comprehensive EV ready retrofits are an alternative to incremental additions of EV chargers, wherein a building implements a few chargers at a time, typically in common parking areas (such as visitor parking) to be shared by multiple residents or building occupants. Over time, as more EVs are

[19] City of Port Coquitlam is unique in Metro Vancouver for requiring "roughed in" electrical circuit breaker on a branch panel and raceway to the parking space. Dunsky recommends EV Ready (i.e. wired outlets) future-proofing. However, such rough-in requirements are better than nothing.

adopted, new electrical renovations are undertaken to implement more charging. Comprehensive EV ready retrofits offer multiple benefits over an incremental approach, as shown in Table 5.

BC Hydro's globally-leading EV charging rebates for apartment and condo buildings programs provides funding for building owners to conduct an EV ready study before proceeding to retrofits, in order to encourage a comprehensive approach.

Table 5. Benefits and Challenges of Comprehensive EV Ready Retrofits versus an Incremental Approach

Benefits		**Comprehensive EV ready retrofits**		**Incremental additions of EV chargers**	
To building owner or investor	Upfront cost		Higher one-time upfront cost		Lower individual project costs (but significantly more expensive in aggregate)
	Project manage-ment		One project		Series of smaller projects
	Total cost		Lower total cost		Higher total cost
	Future proofing		Avoids stranded assets		Initial installations may not be designed for later expansion; some potential for stranded assets
To resident or user	Certainty of access to charging		Typically, can ensure that all drivers get access to charging		Potential to exhaust limited electrical capacity if design for EVEMS not considered, meaning some drivers may not get access
	Charger installation experience		Simple process to install chargers (after initial comprehensive electrical renovation)		Process to implement new chargers is frequently lengthy, and usually complicated
	User experience		Charging can be conveniently located in drivers' assigned parking space		Often, initially in visitor parking; though sometimes in assigned parking

Launched in 2021, the CleanBC GoElectric program provides rebates for the following aspects of EV-ready retrofits:

- EV Ready plan rebate: up to $3,000 for creation of EV Ready plan – strategy for a building to make at least one parking space per residential unit EV Ready.
- EV Ready infrastructure rebate: up to 50% of costs to install electrical infrastructure required to implement EV Ready plan, to a maximum of $600 per parking space, and a project maximum of $120,000.
- EV charger rebate: up to $1,400 per to purchase and install L2 networked EV chargers to implement a building's EV Ready plan, to a maximum of $14,000.

BC communities are at an advantage compared to other jurisdictions in that this program offers building owners the option to implement comprehensive EV ready retrofits, an approach that will, in many circumstances, provide the greatest value over the lifetime of the building and most cost-effectively enable wide-spread EV adoption, optimizing use of public and/or utility ratepayer funds.

3.2 Public EV Charging Siting, Design and Operational Considerations

There are many important considerations relating to the siting, design, and operations of EV charging systems. Key goals for policy makers and charging network operators should include:

- **Cost efficacy.** Minimizing the capital and operating costs of EV charging is important to enabling successful deployment at scale. The electrical upgrade costs associated with implementing DCFC, as well as many Level 2 public charging installations are significant, which means that siting the infrastructure with a view to grid capacity is key.
    - Privately-operated public charging service providers will expect to make a return on charging infrastructure, while public sector or utility operators may consider operating these networks at a loss, since the availability of public charging fosters EV adoption and the associated societal benefits (reduction in greenhouse gas and air contaminant emissions).
    - Likewise, it is important that user fees are set at rates that users can afford and that these fees are competitive compared to gasoline and other fuels.
- **Siting infrastructure proximate to demand.** This project forecasts the demand for EV charging across different geographies in Metro Vancouver.
- **Physical safety**. The station should be Is the station well-lit, and have additional safety features such as security cameras, help buttons, and visibility to passers-by. Further, the equipment should meet applicable technical safety standards.
- **Accessibility.** EV charging infrastructure should be provided in wheelchair accessible spaces and all infrastructure should be designed so that people with a range of disabilities can use the chargers and associated interfaces and mobile applications.
- **Durability**. The equipment should withstand frequent use and seasonality.
- **Comfort and amenities**. Charging stations should be sited in proximity to amenities such as food, drink, washrooms, parks or public attractions within easy walking distance. Stations should be weather-protected and comfortable for users.
- **Site safety**. There should be bollards or other designs to protect the charging equipment.
- **Visibility, signage and branding**. Road users should be able to navigate easily to the charging station.

- **Uptime, reliability and availability.** A very high degree of charger uptime (i.e. time when the charger is not in need of repair) is paramount to ensure drivers have reliable access to EV charging. To ensure that users are confident they can access public charging conveniently when they need it, it is important that enough public charging is available in a given area and that it is priced appropriately to avoid overstays.
- **Effective customer service**. It is important that drivers have a convenient means of troubleshooting issues when they are accessing public charging.
- **Privacy and cybersecurity**. The service provider must take appropriate steps to protect user data. They should consider whether data stored in Canada and secure the process for remote firmware updates.

Detailed design and operational guidelines are beyond the scope of this project. BC Hydro has published *EV Fast Charging Design and Operational Guidelines for Public DCFC Stations in BC* and a *Level 2 Public Sector Charging Stations Best Practices Guideline*. It is recommended that all public charging operators carefully consider these guidelines, and adhere to all relevant guidance.

4. Charging Networks and Operations

4.1 EV Charging Service Providers

There are many actors in the EV charging ecosystem. Some companies focus on selling charging equipment only. In the public charging space, it is more common for the companies that provide the charging equipment to also operate the network as part of a full service offering. These players are referred to as **EV charging service providers.** They manage public charging networks and, in some cases, work with various entities including multifamily buildings (building owners and strata groups), employers, fleet owners, public charging site hosts, to support EV charging. Some examples of EV charging service providers include FLO, Chargepoint, Tesla, GreenLots, SWTCH Energy, Electrify Canada, Petro-Canada, and BC Hydro.

EV charging service providers that operate public networks will often work with **site hosts** that wish to implement public charging at their facilities. Site hosts can include municipalities and businesses.

In addition to supplying charging equipment, EV charging service providers typically also supply management systems with functions that include:

- User apps and administrator dashboards
- Access controls and reservation platforms
- The ability to reconcile electricity costs by applying user fees
- EV energy management services
- Warranties
- Operations and maintenance
- Customers assistance and support
- Management of opportunities to create value for sites through, for example:
  - Utility demand response
  - Valorizing carbon credits through the BC Renewable and Low Carbon Fuel Requirements

EV charging service providers will typically use networked chargers.

4.2 Ownership Models

Public charging infrastructure rarely has an attractive rate of return for private investors. Some exceptions to this rule include charging ports in very high-demand areas, or investors that have a broader financial incentive to offer charging (for example, utilities who will drive more electricity consumption, retail outlets who want to attract customers, or automakers who want to sell more EVs). As a result, there is a crucial role for municipalities and First Nations in deploying infrastructure to meet residents' needs and ensure that a lack of charging does not present a barrier to EV adoption.

In deploying a public charging network, the deploying organization needs to choose from among a range of potential models for owning, operating and maintaining the infrastructure. In a **vertically integrated model**, sometimes referred to as "charging as a service," the EV charging service provider offers a full service, providing the charging equipment and charging management systems while also being responsible for maintenance, reporting, and often price setting.

In a **decoupled** model, the deploying organization takes on and coordinates more of the activities while contracting out one or more aspects of deployment. For example, under a decoupled model, a

municipality might issue an RFP for the design and construction of the EV charging station, and a separate contract for operation.

There are benefits and drawbacks to each model; broadly speaking, a vertically integrated solution requires fewer resources from the deploying organization but also affords less control, whereas a decoupled solution offers more flexibility and control, but at the cost of needing more skilled in-house resources. A full comparison of these models is presented in Table 6.

Table 6. Strengths and Weaknesses of Vertically Integrated versus De-coupled Vendor and Network Solutions

		Vertically integrated (proprietary) solutions ("charging as a service")		**Decoupled solutions**
Complexity		One vendor relationship and packaged sourcing Less complex process for site owner Full service offering		Internal staff needed to coordinate between vendors and handle technical issues
Harmonization		Alignment of infrastructure with payment method		Payment solution between hardware and software may not be aligned Hardware and software may not work perfectly together
Flexibility		Less flexible Software customization features may not be possible		Flexibility in selecting vendors
Resilience		Possibility of stranded assets if proprietary service terminated operations		Offers potentially higher resilience if one network's connection is no longer available
Vendor cost		Potentially higher costs		Potentially lower costs
OCPP compliance		Most solutions moving towards OCPP compatibility		All open standard solutions are OCPP framework compliant

4.3 Payment Systems and User Fees

Although early public charging networks have sometimes offered free charging, networks are now moving away from this model. Though some public charging operators offer free charging as an amenity or to attract visitors, increasingly users are expected to pay for the electricity that their vehicles use.

Regulatory amendments in recent years have clarified the ability of various third parties to charge user fees for EV charging:

- In 2018, BC made a legislative update to *Strata Property Regulation 6.9* to clarify the ability of strata corporations, by bylaw or rule, to create a variable user fee for the use of EV chargers.[20]
- In 2019, BC granted an exemption with respect to the BC Utilities Commission (BCUC)'s regulation of EV charging services, clarifying that third parties can charge fees for EV charging use without being subject to regulation by BCUC, based on a recommendation and inquiry by the BCUC. [21]
- In 2023, Measurement Canada granted a temporary dispensation to allow charging site operators to set fees on a volumetric basis for fast chargers (it is so far unclear whether this dispensation applies to Level 2 charging). [22] This means that operators can set fees on a per kilowatt hour basis, rather than a per minute basis.

EV charging user fees can be set in the following ways:

1. By the amount of time the charger is in use, with per minute rates set according to charging power (ports with load sharing can offer reduced rates),
2. By the amount of power used on a volumetric basis (see Measurement Canada update above),
3. Through other network subscription fee models (e.g. flat rate for unlimited charging in a month; etc).

In terms of the mechanism by which the user pays for the electricity, charging equipment can support a variety of payment options, including:

- For EV drivers with existing user accounts (customer registers with the charging network and maintains an account balance to pay for charging):
  - Payment by RFID card (customer receives a physical RFID card that can be swiped to enable charging and the account deducted according to the usage fee structure).
  - Payment by mobile application (customer downloads an app on their mobile phone that enables user login and payment authentication).
- For EV drivers without a user account:
  - Payment by direct credit card transaction (charging equipment includes a credit card reader that enables charging)
  - Payment by credit card via a toll-free phone number provided on site (customer calls a toll-free number and provides credit card information to customer support to remotely authenticate charging).

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[20] Government of British Columbia. "Changes to strata legislation since 2011."
[21] BCUC (2018). BCUC Regulation of Electric Vehicle Charging Service Inquiry (Project No. 1598941).
[22] Government of Canada (2023). "Temporary dispensation for Level 3+ electric vehicle supply equipment. "

5. Infrastructure Costs

The cost to install EV charging infrastructure varies widely across projects, depending especially on:

- The **power output** of the charging ports.
- **Whether a new or upgraded utility service is required** (high connection costs can prevent projects from moving forward). The costs of new or upgraded services is highly variable between different sites, and is very difficult to predict prior to a detailed request for a service extension from electric utilities.
- **The scale of the investment.** Comprehensive EV-ready upgrades in residential buildings and depots can reduce the per-port cost significantly.
- **The extent to which EVEMS is used** to reduce electrical capacity per vehicle and share infrastructure, like branch circuits, between vehicles.
- In the case of public chargers, the **location of the charging station**. Curbside charging is typically more expensive than off-street charging.
- The **quality of the design**. The use of load management techniques can significantly reduce per-port costs.

Table 7 summarizes high level indicative cost estimates for different Level 2 EV charging infrastructure systems based on in-house knowledge of representative projects.

Table 7. Indicative Per-Port Costs of Level 2 Charging Infrastructure

EV Charging System	Approximate Cost Per Port			
	New Utility Connection	Equipment	Installation	Total Installed
Onsite ground-oriented home charging	Typically NA	$300-$3,000	$100-$2,000	**$400-$5,000**
multifamily building – Incremental approach (a few chargers at a time)	Typically NA	$1,000-$4,000	$3,000-$15,000	**$4,000-$20,000**
multifamily building – Comprehensive EV Ready Retrofit	Typically NA	$1000-$3000	Avg $1,300	**$2,000-$5,000**
Public L2 Charging*	$0 - $20k+	$1,000-$6,000	$3000-$10,000+	**$4,000-$16,000 plus connection costs**

* Public L2 charging on an existing service (e.g., a streetlight or building) will have no new utility connection costs. Generally, public L2 charging located at the curbside (rather than off-street) is at the higher end of the cost range.

A number of studies have estimated average per-port costs for fast charging infrastructure, including both the charging equipment itself and additional installation costs. Figure 7 compares estimates made under previous studies by the International Council for Clean Transportation,[23] the National Renewable Energy Lab,[24] and RMI,[25] showing variation between their estimates. As an outlier, Tesla has been reported to achieve significantly lower per-port costs down to between $60,000 and $80,000 CAD.[26] This suggests that as deployment volumes increase and deploying organizations build internal knowledge and a network of suppliers, per-port costs will come down.

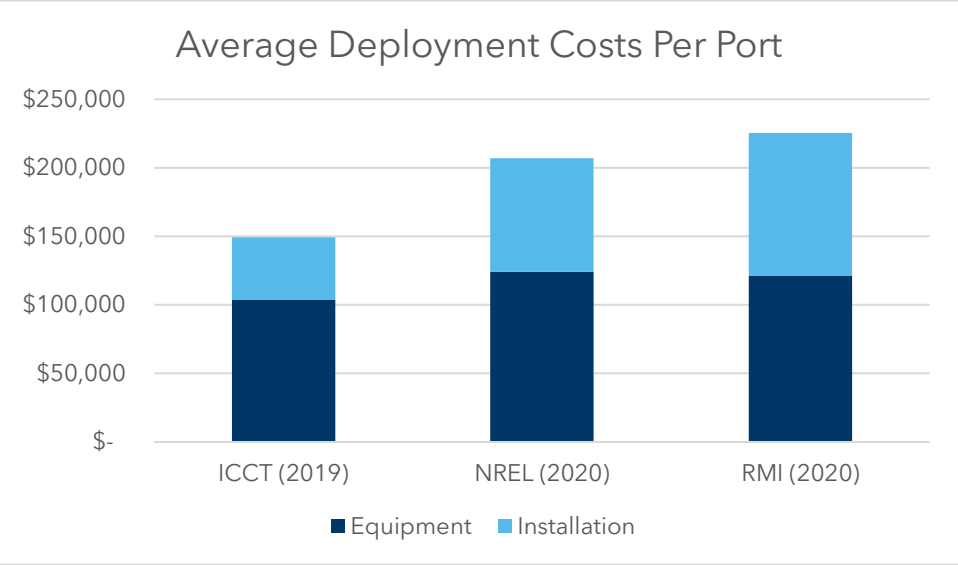

Figure 7. Comparison of per-port DCFC cost estimates across different studies. These values represent an average per-port cost across sites of various sizes using 150kW DCFC.

Moreover, these studies have also demonstrated the economies of scale that can be achieved when multiple ports are installed at the same site (electrical upgrades are used more efficiently in this case). ICCT's study estimated the per-port cost savings associated with larger deployments, shown in Figure 8.

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[23] International Council on Clean Transportation (ICCT) (2019). Estimating electric vehicle charging infrastructure costs across major U.S. metropolitan areas.
[24] Borlaug, B., Salisbury, S., Gerdes, M. and Muratori, M. (2020). Levelized Cost of Charging Electric Vehicles in the United States. *Joule,* Volume 4, Issue 7, 15 July 2020, Pages 1470-1485.
[25] Chris Nelder and Emily Rogers, Reducing EV Charging Infrastructure Costs, Rocky Mountain Institute, 2019.
[26] Templeton, B. "Tesla's Texas Charger Grant Applications Fail; It's Bad For Texas But Reveals Tesla's Super-Low Costs." *Forbes,* April 22, 2022.

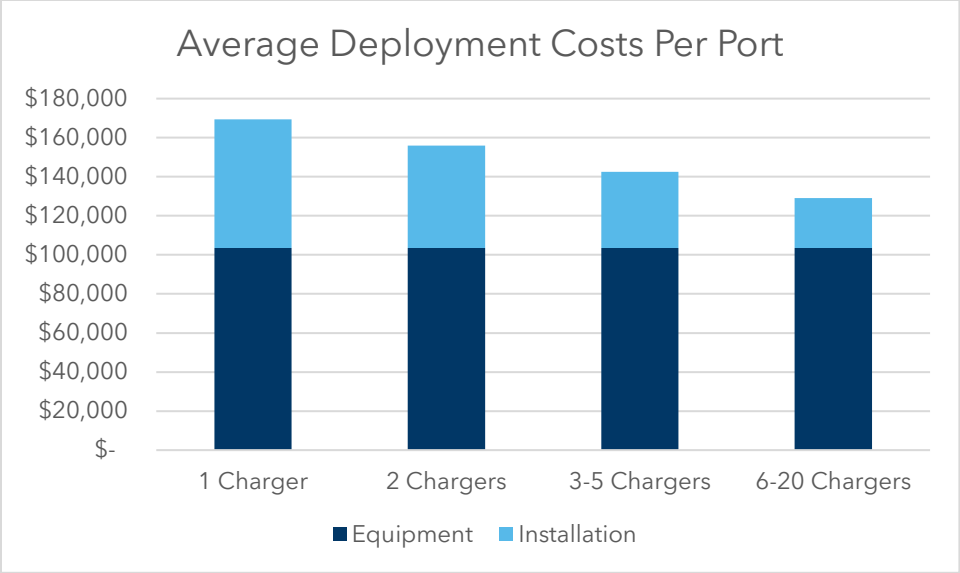


Figure 8. Comparison of per-port DCFC costs as a function of the number of ports per site, using 150kW DCFC. (Source: ICCT, 2019)

Table 8. Indicative Costs of DCFC Charging Infrastructure

Charging Power		1-2 port site			
	New Utility Connection ($)	Equipment ($/port)	Installation ($/port)	**Total ($/port)**	
Public DCFC - 50kW	0 - 100k+	45,000	40,000	**85,000**	
Public DCFC - 150kW	0 - 100k+	80,000	70,000	**150,000**	
Public DCFC - 350kW	0 - 100k+	140,000	84,000	**224,000**	
		4 port site			
	New Utility Connection ($)	Equipment ($/port)	Installation ($/port)	**Total ($/port)**	**Total ($/site)**
Public DCFC - 50kW	0 - 100k+	45,000	24,000	**69,000**	**276,000**
Public DCFC - 150kW	0 - 100k+	80,000	42,000	**122,000**	**488,000**
Public DCFC - 350kW	0 - 100k+	140,000	50,400	**190,400**	**761,600**

"NO DISCLAIMERS" POLICY

This report was prepared by Dunsky Energy + Climate Advisors, an independent firm focused on the clean energy transition and committed to quality, integrity and unbiased analysis and counsel. Our findings and recommendations are based on the best information available at the time the work was conducted as well as our experts' professional judgment. **Dunsky is proud to stand by our work.**

ATTACHMENT 3

Electric Vehicle Charging

Regional Electric Vehicle Charging Analysis and Guidance

Guidance for Collaborative Deployment of EV Charging in Metro Vancouver

Morgan Braglewicz
Air Quality Planner, Air Quality and Climate Action Services

Climate Action Committee, October 5, 2023
62391220

metrovancouver

PROJECT OVERVIEW

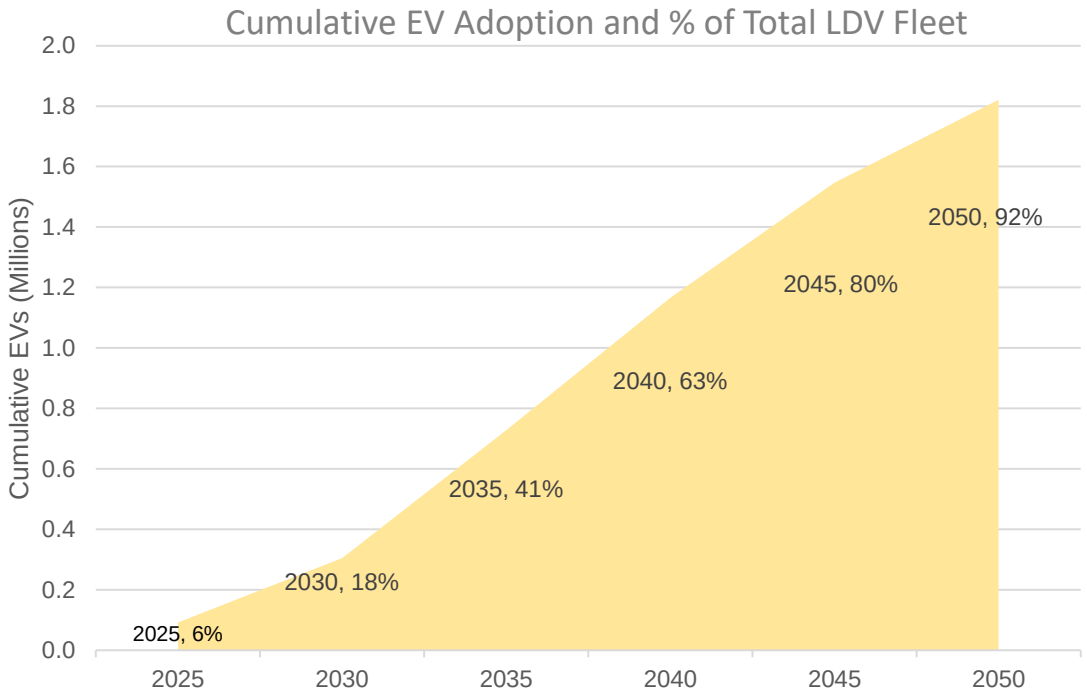
Regional EV Charging and Guidance

Purpose: To help Metro Vancouver, its members, and partners plan for and support the deployment of charging infrastructure for light-duty electric vehicles.

- Forecast EV uptake and demand for charging infrastructure
- Assess how EV charging demand can be met through home and public charging
- Estimate costs of EV charging deployment
- Identify proposed roles for key actors
- Recommend policy and actions to support EV charging deployment

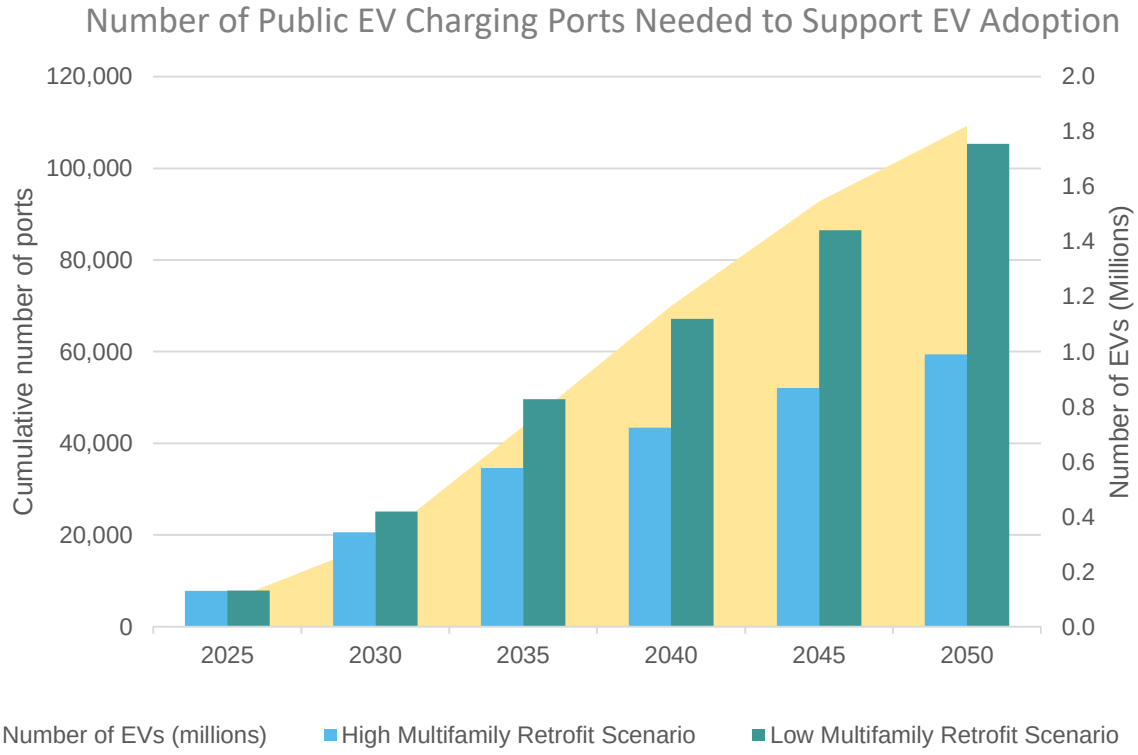
REGIONAL EV UPTAKE AND CHARGING NEEDS

Analysis Results



REGIONAL EV UPTAKE AND CHARGING NEEDS

Analysis Results



GUIDANCE FOR LOCAL GOVERNMENTS

Key Actions

- Provide timely project approvals, remove permitting and regulatory barriers to support private sector EV charging investment
- Adopt EV ready requirements for parking in new developments
- Use development approvals processes to secure additions to public charging network on private lands
- Advocate to provincial and federal governments for increased funding for public charging

KEY TAKEAWAYS

- Rapid expansion of EV charging needed to keep pace with EV uptake and avoid delaying transition to EVs
- Significant capital investment in EV charging for public charging and in multifamily homes will be needed
    - $1.2 billion by 2035
    - $2.1 - $2.9 billion by 2050
- Big, coordinated action across multiple actors in the region will be needed

Thank you

metrovancouver

DELEGATION EXECUTIVE SUMMARY

Name or Organization: Ken Carrusca, Vice President, Environment and Marketing, Cement Association of Canada
Subject: Concrete Zero: Canada's Cement and Concrete Industry Action Plan to Net-Zero
Presenting to: Climate Action Committee
Date of Meeting: October 5, 2023

Concrete Zero: Canada's cement and concrete industry action plan to net-zero.

Information on Concrete Zero is available at:

https://cement.ca/sustainability/concrete-zero/

https://cement.ca/app/uploads/2023/05/ConcreteZero-Report-FINAL-reduced.pdf

The Cement Association of Canada (CAC) is the voice of Canada's cement industry. In May 2023, the CAC released Concrete Zero, laying out the steps that we—together with our members and partners in the concrete sector— will take to help Canada achieve its net-zero carbon goals as we continue to make concrete a versatile, durable, cost-effective, resilient, and essential construction material.

Concrete Zero shares the journey we have been on as an industry. We have already begun our transition to lower-carbon fuel sources, carbon-reduced cements, and clean technologies. Cement-based materials—including ready mixed, precast and masonry concrete—have also been implementing carbon reductions in their product composition and manufacturing processes. And the industry has been on the leading edge of transparently disclosing and verifying carbon reductions through Environmental Product Declarations or EPDs. Our Action Plan lays the foundation for what we will do next and our role in delivering solutions to climate change.

This Action Plan sets out to reduce emissions (from a 2020 baseline) by 40% by 2030 and net-zero by 2050 using today's technologies. The Action Plan is about finding true net-zero, so we do not account for offset purchases. As part of the Action Plan, we intend to continue to work and collaborate with governments across the country, members of the procurement, architecture, engineering and design community, and the construction sector to realize these goals.

To: Indigenous Relations Committee

From: Marino Piombini, Program Manager, Indigenous Relations
Lauren Farmer, Senior Policy Analyst, Indigenous Relations

Date: September 5, 2023 Meeting Date: October 5, 2023

Subject: **Quarterly Update Report on Reconciliation Activities**

RECOMMENDATION

That the Indigenous Relations Committee receive for information the report dated September 5, 2023 titled "Quarterly Update Report on Reconciliation Activities."

EXECUTIVE SUMMARY

This update report provides a summary of reconciliation events and activities undertaken by Metro Vancouver over the past three months of 2023 as well as information on upcoming events and activities over the next three months. Thirty-one activities have taken place in this reporting period, including 9 training sessions and 18 meetings or events intended to strengthen relationships with local First Nations. The report also highlights that, over the next quarter, there are 5 planned training sessions on various topics for staff as well as 13 other meetings or relationship-building activities scheduled with First Nations. To this point in 2023, Metro Vancouver has already undertaken, scheduled or identified a total of 115 reconciliation-related activities. This number will continue to increase as the rest of the year unfolds. By comparison, the total number of reconciliation-related activities undertaken in 2022 was 101.

PURPOSE

To provide the Committee with a quarterly update report on reconciliation activities.

BACKGROUND

This quarterly update report on regional and local reconciliation activities and opportunities is part of the Indigenous Relations Committee's annual work plan. This information report is intended to identify opportunities for Committee members to learn about, and engage in, reconciliation activities in the region, and includes:

- Reconciliation events and activities that have been undertaken to date in 2023 by Metro Vancouver;
- Upcoming opportunities in 2023 for engaging in such activities.

SUMMARY OF RECONCILIATION-RELATED ACTIVITIES

Activities listed in Table 1 of this report are based on the four objectives established by the Metro Vancouver Board in October 2015 in its review of the Truth and Reconciliation Commission's (TRC) 94 *Calls to Action*. Examples of the different types of activities, either undertaken or identified for this current quarterly reporting period (third quarter or Q3) as well as the next quarterly period (Q4), are summarized below.

3rd Quarter of 2023 (Q3)

In the 3rd Quarter of 2023 (July to September), Metro Vancouver has either undertaken, or is scheduled to carry out, a number of reconciliation-related activities (i.e., meetings, training sessions, events, etc.), including the following, which are listed in chronological order:

- Renaming ceremony of Colony Farm Regional Park to ƛ̓éxətəm Regional Park (July 1st)
- Two half-day training sessions by Indigenous Relations staff to Metro Vancouver staff, on "Metro Vancouver's Approach to Building Relations with Indigenous Peoples" (July 6th and July 13th)
- Katzie Main Treaty Table (July 18th, September 12th)
- Discussions on areas of mutual interest with kʷikʷəƛ̓əm (Kwikwetlem First Nation), and other governments and interested parties (July 18th, August 24th)
- Co-development of an *Indigenous Cultural Safety Training Video for Construction Crews* with external consultants
- A virtual Lunch and Learn session with staff from Indian Residential School Survivor's Society for Metro Vancouver staff in honour of National Day for Truth and Reconciliation (September 26th)
- Coast Salish harvesting protocol and cedar bracelet training (September 28th)
- Uploading of a translated Territorial Acknowledgements on Metro Vancouver's public facing website (September 29th)
- Installing a Territorial Acknowledgement Plaque in the Metrotower III lobby (September 25th)
- Installation of a QR Code in the Metrotower III lobby, bringing staff to Metro Vancouver's translated Territorial Acknowledgements in həṅq̓əmiṅəṁ and Sḵwx̱wú7mesh languages (September 29th)
- Meetings with local First Nations to discuss Metro Vancouver's engagement protocol (various dates)
- Development of a video option for Archaeological Chance Find Procedure Training (various dates)
- Archaeological training sessions for Metro Vancouver staff
- Co-development of Phase 1 of a First Nation Engagement portal with the Metro Vancouver web services team
- Promotion of Indigenous Canada, University of Alberta course for staff to continue their education (October 4th)

4th Quarter of 2023 (Q4)

Over the next three months (October to December), Metro Vancouver staff will engage in a number of additional reconciliation-related activities, including the following:

- Half-day training session for staff on "Metro Vancouver's Approach to Building Relations with Indigenous Peoples" (date: TBA)
- Archaeological training sessions for Metro Vancouver staff (various dates)
- Meeting with local First Nations to discuss Metro Vancouver's engagement protocol (various dates)
- Discussions on areas of mutual interest with xʷməθkʷəy̓əm (Musqueam Indian Band) regarding various projects (regular ongoing meetings)

- Workshops with sə́lílwətaʔɬ (Tsleil-Waututh Nation) regarding various identified areas of mutual interest (dates: TBA)
- Discussions on areas of mutual interest with kʷikʷəƛ̓əm (Kwikwetlem First Nation), and other governments and interested parties (regular ongoing meetings)
- MTAC workshop on "Trauma-Informed Communication" (October 18th)
- MTAC meeting on implementing UNDRIP at the local government level (November 3rd)
- Half-day MTAC facilitated workshop on a topic of interest related to reconciliation (December 6th)

Statistics regarding the number of activities undertaken in the first, second, and third quarter of 2023 (Q1, Q2, and Q3), and those – to this point – scheduled to be undertaken in the fourth (Q4) quarter, are presented in Table 1 of this report.

Table 1:
Metro Vancouver Reconciliation-Related Activities for 2023

Metro Vancouver's Reconciliation Efforts based on the Board-established TRC-Related Objectives in 2015	2023 Activities Already Undertaken in Q1	2023 Activities Already Undertaken in Q2	2023 Activities Already Undertaken in Q3	2023 Activities Identified to date for Q4	TOTAL Activities Identified or Undertaken to date for 2023
1. Liaise with the TRC or Reconciliation Canada	1	0	0	0	**1**
2. Raise awareness of Indian Residential Schools	0	1	4	2	**7**
3. Provide Training Sessions for Staff	3	11	9	5	**28**
4. Strengthen Relationships with First Nations	18	30	18	13	**79**
TOTALS	**22**	**42**	**31**	**20**	**115**

The above table indicates that by the beginning of October 2023 (end of Q3), Metro Vancouver will have undertaken at least 95 reconciliation-related activities. By the end of 2023, at least 115 such activities will have been undertaken. It is anticipated that additional items will be added in the fourth quarter (Q4) of the year as additional meetings are scheduled and new activities are identified and/or undertaken by Metro Vancouver for 2023. By comparison, there were a total of 101 reconciliation-related activities undertaken by Metro Vancouver in 2022.

ALTERNATIVES

This is an information report. No alternatives are presented.

FINANCIAL IMPLICATIONS

The various Metro Vancouver activities identified in this report have been included in the Indigenous Relations budget. There are no additional financial implications with respect to the items identified in this information report.

CONCLUSION

This report provides a quarterly update on reconciliation activities involving Metro Vancouver and local governments as per the Committee's recommendations and for members' information.

58023402

To: Zero Waste Committee

From: Adriana Velázquez, Senior Project Engineer, Solid Waste Services

Date: October 5, 2023 Meeting Date: October 12, 2023

Subject: **Construction and Demolition Materials Waste Composition, Reuse and Recycling**

RECOMMENDATION

That the Zero Waste Committee receive for information the report dated October 5, 2023, titled "Construction and Demolition Materials Waste Composition, Reuse and Recycling".

EXECUTIVE SUMMARY

In 2021, 1,805,905 tonnes of construction and demolition waste were generated in the Metro Vancouver region, of which 79% of was recycled, compared to an overall regional diversion rate of 65%. Additional diversion opportunities continue to emerge for wood products. The 2022 Construction and Demolition Waste Composition Study found that disposed wood decreased from 2018 to 2022 and represents 50% of the construction and demolition waste stream.

Member jurisdictions and Metro Vancouver promote a range of initiatives to encourage reduction, reuse, and recycling of construction and demolition materials, including:

- A disposal ban program that helps keep readily recyclable materials and materials that pose operational risks and are hazardous out of the waste stream;
- The recently revised Construction and Demolition Waste Reduction and Recycling Toolkit that aims to increase awareness of reuse and recycling options for building materials; and
- Metro Vancouver's collaboration with a house moving company to provide a temporary storage location at the Coquitlam Landfill for relocated houses that would otherwise be demolished.

PURPOSE

To update the Zero Waste Committee on the results of the 2022 Construction and Demolition Waste Composition Study, and provide an overview of Metro Vancouver and member jurisdictions' initiatives to increase reduction, reuse, and recycling of construction and demolition materials.

BACKGROUND

On October 16, 2020 the Zero Waste Committee received for information the report titled "Waste Composition Program Plan", which outlined a proposed plan to increase the frequency of full-scale waste composition studies and sector-specific studies from alternating every other year to occurring annually. Waste composition studies provide valuable estimates of the types and quantities of material disposed in the region and provide baseline data for the solid waste management plan update. This report provides the results of the 2022 Construction and Demolition Waste Composition Study.

At its February 9, 2023 meeting, the Zero Waste Committee requested information on how relocation and repurposing of buildings contributes to creating a circular economy for the built environment and what Metro Vancouver can do to assist in facilitating it. This report provides

information on initiatives that promote reuse and recycling of construction and demolition material in the region.

CONSTRUCTION AND DEMOLITION WASTE IN METRO VANCOUVER

Metro Vancouver tracks and reports construction and demolition sector waste through three main data sources:

- Annual and biennial recycling and solid waste summaries, which include data from licensed and unlicensed construction and demolition recycling and disposal facilities in region and out of region;
- Construction and demolition waste composition studies; and
- The Metro Vancouver Housing Data Book published by Metro Vancouver Regional Planning Services, which contains housing trends including the number of demolitions and construction starts in the region.

This report presents the most recent results from the 2022 Construction and Demolition Waste Composition Study. The data is presented with the latest annual report tonnage data (2021) for context, and an overview of Metro Vancouver and member jurisdiction initiatives to reduce, reuse, and recycle more construction and demolition waste in the region.

2021 Annual Report Data

In 2021, 1,805,905 tonnes of construction and demolition waste were generated in the Metro Vancouver region, of which 79% was recycled, compared to an overall regional diversion rate of 65%. As shown in Table 1, by weight, the recycled construction and demolition material is mostly concrete, asphalt and wood. Other materials such as gypsum, fibre (e.g. cardboard), and metals are also commonly recycled by the construction and demolition sector. The recycling rate for gypsum is not calculated in the table as the disposed quantities are challenging to estimate, given that gypsum is frequently disposed of with other potentially asbestos containing materials. Nonetheless, the actual recycling rate for gypsum is estimated to be greater than 90%.

Table 1: Recycled Construction and Demolition Material Quantities in 2021*

Material	Recycled Material (tonnes)	Disposed Material (tonnes)	Diversion Rate (%)
Concrete	866,363	8,358	99
Asphalt	295,300	25,588	92
Wood	160,391	184,232	47
Gypsum	63,533	N/A	N/A
Fibre (Paper)	35,928	5,265	87
Metal	12,416	11,451	52
Other	2	137,040	N/A
Total	**1,433,933**	**371,972**	**79**

***Calculated disposed material quantities based on 2022 waste composition and 2021 tonnages.

2022 Construction and Demolition Waste Composition Results

The 2022 Construction and Demolition Waste Composition Study analyzed the composition of construction and demolition material disposed at the Vancouver Landfill and the Ecowaste Landfill, a private landfill in Richmond (Reference 1). Samples were visually categorized into material types by volume then converted to weight, based on the density of each material type. Table 2 compares the 2022 waste composition and total tonnage of each material type disposed in the region to the

previous study completed in 2018. In 2022, salvageable wood fixtures were added to the waste composition data.

Table 2: Comparison of C&D Waste Disposed by Material Type

Material Category by Type	% by Weight		Annual Weight (Tonnes)	
	2018	2022	2018	2022
Wood (total)	61	48	243,179	177,011
Clean Wood	-	*6*	-	*20,725*
Painted, Treated & Engineered Wood	-	*37*	-	*137,770*
Salvageable Wood Fixtures[1]	-	*6*	-	*18,516*
Land Clearing	1	4	2,000	14,944
Paper	2	2	6,399	6,168
Plastic	12	10	45,996	35,674
Concrete	<1	2	1,600	7,593
Asphalt	5	6	19,598	21,407
Metals	4	4	16,799	13,044
Masonry	1	2	4,000	7,316
Misc. Building Material[2]	4	6	16,399	22,880
Glass and Ceramics	2	2	7,199	6,674
Rubble/Soil	6	6	25,598	22,770
Household Garbage	2	5	5,999	19,956
Textiles	<1	1	1,000	3,529
Bulky Items	1	1	2,400	5,005
Rubber	<1	2	1,600	6,244
Miscellaneous	<1	<1	200	1,757
Total	**100**	**100**	**399,965**	**371,972**

[1] Salvageable wood fixtures include cabinets, shelves and doors.
[2] Miscellaneous building material includes stucco, insulation, carpet, and other building materials not covered by other defined categories.

Wood represented 48% of the construction and demolition waste stream, with the majority (75% of total wood) being painted, treated or engineered wood products. Clean wood is banned from disposal in Metro Vancouver because it has reliable landscaping, farming and engineered derived fuel markets. However, painted, treated and glued wood products (engineered wood) are challenging to recycle due to the chemicals and glues used in manufacturing; therefore, a large portion of engineered wood products are disposed of. Disposed wood decreased from 2018 and 2022 by approximately 66,000 tonnes. Disposed plastic decreased by almost 10,000 tonnes between 2018 and 2022 and represents the second largest component of construction and demolition waste.

C&D Waste Reduction and Recycling Toolkit

The Construction and Demolition Waste Reduction and Recycling Toolkit (Reference 2), originally launched in 2008, was updated in 2020 to increase awareness of reuse and recycling of building materials and provide a centralized source of information for contractors, designers, and homeowners. The toolkit also provides an overview of alternatives to demolition, such as home relocation and repurposing, deconstruction, and salvage of building materials. Rack cards and co-

branded versions of the toolkit are available upon request for member jurisdictions. Updates in the most recent release include updated recycling and waste disposal data, along with updated recycling facility information.

As part of the 2020 toolkit update, Metro Vancouver developed an online demolition waste generation calculator to help building permit applicants estimate waste generation on site. It also calculates the minimum amount of waste they need to divert to meet their municipality's diversion requirements.

In 2021, more than 3,800 residential units were demolished (apartments and single-family homes), in Metro Vancouver. Most buildings in the region are still taken down by traditional demolition methods, making building materials unsuitable for reuse or recycling. The toolkit details preferable alternatives to traditional demolition:

- Adaptive reuse: Reuse of existing building stock for a different purpose than it was designed (e.g. industrial facility converted to restaurant).
- House moving: Reuse of structurally sound buildings at a different location.
- Deconstruction: Selective dismantlement of building components to encourage reuse and recycling of building materials.
- Salvage: Recovery of valuable items from a building that reached its end of life.

An estimated 20% of demolished homes are high-quality homes that can be moved and repurposed, while another 60% could be deconstructed and the materials salvaged for reuse.

Temporary Storage to Facilitate House Moving

Metro Vancouver is working with a house moving company to provide temporary storage at the Coquitlam Landfill for relocated houses that would otherwise be demolished. The first house was successfully delivered on June 30, 2023. Currently five houses are being stored at the former landfill, preventing an estimated 90 tonnes of waste, preserving 360 tonnes of embodied carbon, and creating a lower cost housing option when they are moved to their final destination.

National Zero Waste Council Construction, Renovation and Demolition Working Group

Metro Vancouver supports the National Zero Waste Council's Construction, Renovation and Demolition Working Group work. This work includes a collaboration with City of Vancouver to increase wood waste diversion, through a pilot project to evaluate the use of construction and demolition waste wood to manufacture engineered wood products.

Disposal Ban Program at Regional Solid Waste Facilities

The disposal ban program helps keep readily recyclable materials and materials that pose operational risks and are hazardous out of the waste stream. Garbage loads received at regional solid waste facilities are visually inspected for banned materials, and surcharges are applied if banned materials are present. For example, if 5% of clean wood or any quantity of gypsum is present in a load, a surcharge is issued.

Solid Waste Regulatory Program
The Solid Waste Regulatory Program is part of Metro Vancouver's Environmental Regulation and Enforcement Division, and primarily focuses on licensing and inspecting private solid waste facilities, promoting bylaw compliance, and inspecting waste hauler records. The Metro Vancouver region has 17 private licensed facilities that accept various materials including metals, concrete, gypsum and wood. Metro Vancouver regulates private construction and demolition processing facilities to increase reuse, recycling, and energy recovery of those materials across the region.

Zero Waste Construction Certification
Metro Vancouver supported the development of a 'Zero Waste' construction site materials management certification program. HSR Zero Waste, in partnership with Zero Waste Canada, and Light House Sustainable Building Centre developed an on-site recycling and waste reduction certification program. The certification was launched at the Zero Waste Conference in late 2022 and is currently at the pilot stage. The certification is specific to individual construction projects, with tiered levels of accomplishment.

Municipal Construction and Demolition Diversion Requirements
Ten member jurisdictions have construction and demolition diversion requirements in place to encourage recycling and reuse. The requirements range from submission of a waste management declaration form, to meeting minimum diversion requirements of all material generated on site with a refundable deposit based on levels of compliance. A summary of municipal construction and demolition diversion requirements in the region is provided in Attachment 1.

ALTERNATIVES
This is an information report. No Alternatives are presented.

FINANCIAL IMPLICATIONS
Metro Vancouver's initiatives to encourage diversion of construction and demolition materials are carried out within existing budgets for Solid Waste Services, External Relations and the National Zero Waste Council.

CONCLUSION
Construction and demolition waste is a significant component of the region's disposed waste stream and various initiatives are underway to increase diversion, particularly for wood. Nine member jurisdictions have adopted construction and demolition waste recycling requirements to encourage reuse and recycling, and to help meet the region's diversion goals.

Attachments
1. Summary of Municipal Construction and Demolition Diversion Requirements
2. Presentation re: Construction and Demolition Materials Waste Composition, Reuse and Recycling

References
1. 2022 Construction & Demolition Waste Composition Study
2. Construction and Demolition Waste Reduction and Recycling Toolkit – Metro Vancouver

ATTACHMENT 1

Summary of Municipal Construction and Demolition Diversion Requirements*
Report Date: October 5, 2023

Municipality	Regulatory measures	Applies to	Requirements
Burnaby	Construction and Demolition Waste Diversion Bylaw Demolition permit with recycling requirements	October 1, 2022: Multi-family residential, non-residential and accessory buildings March 1, 2023: single- and two-family and accessory buildings	• Waste Diversion Plan • Non-refundable Waste Diversion Permit Fee ($250) • Waste diversion deposit ($2.25 per square feet (net) up to a maximum of $50,000) • Waste Diversion Compliance Report (90 days post demolition) • One regular full-time position (RFT) to run the program based on the number of demolition permits issued (1 RFT per 200 permits)
Coquitlam	Demolition permit with recycling requirements	All demolition permits	• Demolition Waste Management Declaration Form
City of North Vancouver	Demolition permit with recycling requirements	All demolition permits	• Demolition Waste Recycling Checklist • Hazardous Materials Report • Hazardous Materials Clearance Letter
District of North Vancouver	Demolition Waste Reduction Bylaw Demolition permit with wood salvage requirements	Pre-1950 single-family homes	• Wood salvage plan • Non-refundable administration fee • Refundable waste diversion security deposit • Wood salvage compliance report
New Westminster	Management of Waste and Recyclable Materials from Demolition Work Bylaw Demolition permit with recycling requirements	Single-family homes	• Refundable Recycling Incentive Deposit • Non-refundable administration fee • Waste Disposal and Recycling Services Plan • Compliance Report • Hazardous Materials Report

Port Moody	Waste Management Bylaw Deconstruction permit	All deconstruction permits	• Refundable Waste Management Fee • Non-refundable administration fee • Waste Management Plan • Compliance Report • Hazardous Materials Report
Richmond	Demolition Waste and Recyclable Materials Bylaw Demolition permit with recycling requirements	One and two family homes and any accessory buildings	• Refundable Waste Disposal and Recycling Services Fee • Non-refundable application fee • Waste Disposal and Recycling Services Plan • Compliance Report
Surrey	Demolition and New Construction Waste Management Bylaw Demolition permit with recycling requirements	All demolition and new construction permits	• Waste Diversion Deposit – Refundable • Non-refundable program administration fee • Waste Disposal and Recycling Services Plan • Waste Diversion Compliance Report
Vancouver	Green Demolition Bylaw Demolition permit with recycling/deconstruction requirements	Pre-1950 single-family homes- minimum recycling rate of 75% Single-family homes with character status - minimum recycling rate of 90% Pre-1910 and heritage listed homes – deconstruction requirement	• Refundable Green Demolition Deposit • Non-refundable Demolition Waste Compliance Fee • Recycling and Reuse Plan • Recycling and Reuse Compliance Report • Hazardous Materials Report Form
West Vancouver	Demolition permit with recycling requirements	All demolition permits	• Demolition Material Recycling and Disposal Report – Stamped by Notary Public

* All information and content available in this document are for general informational purposes only. Information in this report may not constitute the most up-to date information. For specific requirements, check individual municipalities' websites.

ATTACHMENT 2

North Vancouver Recycling and Waste Centre

Construction and Demolition Materials

WASTE COMPOSITION, REUSE AND RECYCLING

Adriana Velázquez P.Eng M.Eng
Senior Project Engineer, Solid Waste Services

Zero Waste Committee Meeting October 12, 2023

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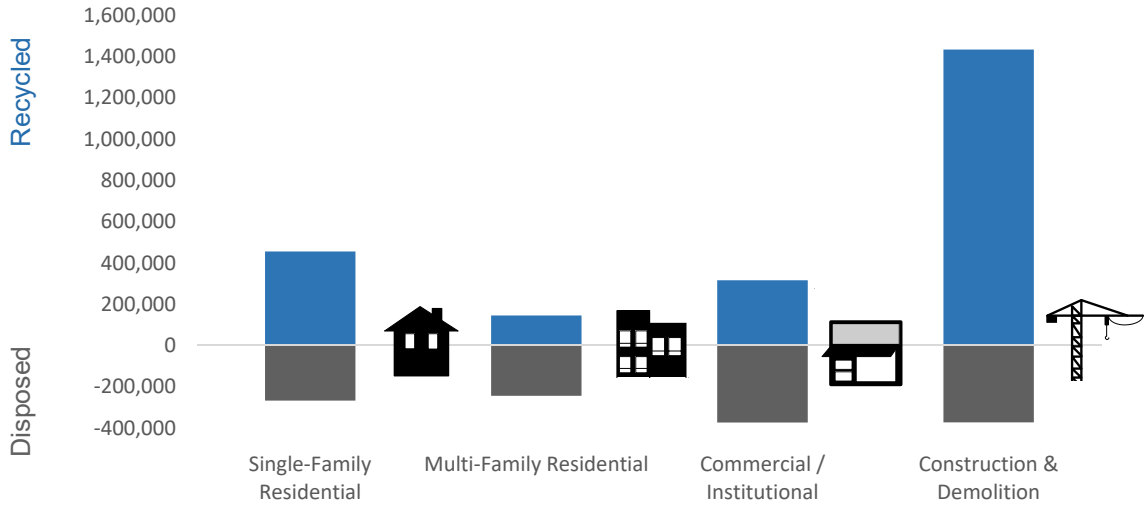
REGIONAL RECYCLING AND DISPOSAL IN 2021

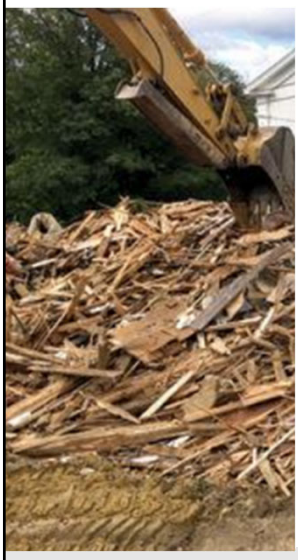
Shown in metric tonnes



Source: Metro Vancouver, 2021 Solid Waste Management Annual Summary

DEMOLITION

3,856 residential demolitions in 2021



Machine assisted deconstruction. Source: Unbuilders

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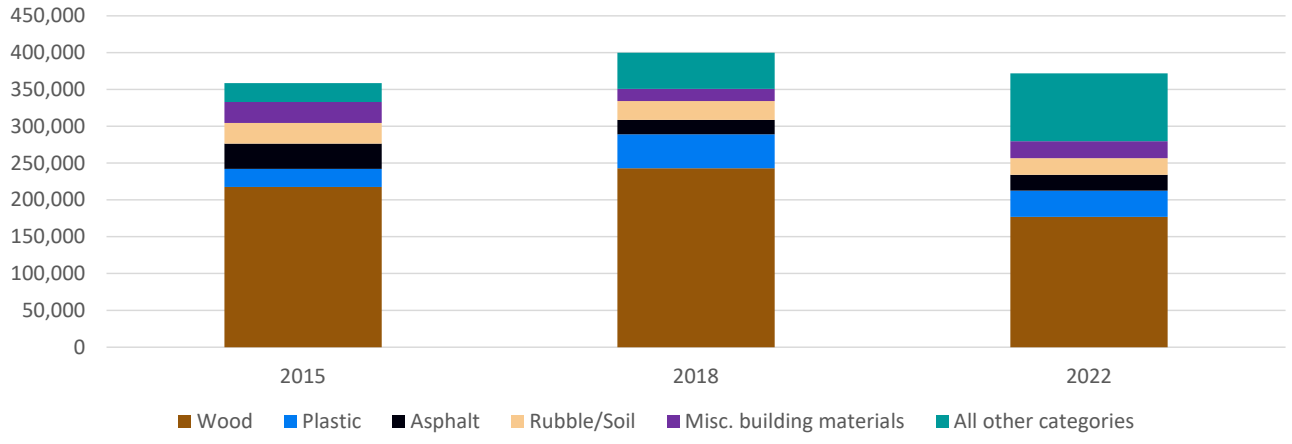
2022 CONSTRUCTION & DEMOLITION WASTE COMPOSITION STUDY

Shown in metric tonnes



*Calculated disposed material quantities based on 2022 waste composition and 2021 tonnages.

C&D WASTE REDUCTION AND RECYCLING TOOLKIT

Alternatives to Demolition

- Adaptive Reuse
- House Moving
- Deconstruction
- Salvage and Reuse

TEMPORARY STORAGE TO FACILITATE HOUSE MOVING

Metro Vancouver is working with a house moving company providing temporary storage at the Coquitlam Landfill for relocated houses.

CONSTRUCTION AND DEMOLITION WASTE REDUCTION INITIATIVES

Regional programs and collaborations with other organizations

- National Zero Waste Council Construction Renovation and Demolition Working Group
- Disposal Ban Program at Regional Solid Waste Facilities
- Solid Waste Regulatory Program
- Zero Waste Construction Certification
- Municipal Construction and Demolition Diversion Requirements

Thank you!

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To: Zero Waste Committee

From: Shellee Ritzman, Division Manager, Corporate Communications
Alison Schatz, Sr. Communications Specialist, Corporate Communications

Date: September 21, 2023 Meeting Date: October 12, 2023

Subject: **2023 Single-Use Item Reduction "What's Your Superhabit?" Campaign Results**

RECOMMENDATION

That the Zero Waste Committee receive for information the report dated September 21, 2023, titled "2023 Single-Use Item Reduction "What's Your Superhabit?" Campaign Results".

EXECUTIVE SUMMARY

The 2023 "What's Your Superhabit?" campaign ran from May 29 to July 30, 2023. The objective was to reduce the use and disposal of single-use items among Metro Vancouver residents, particularly those aged 18–44, who are more likely to have received a single-use item in the past day. A regional paid media buy was complemented by a social media strategy to create and amplify moments of celebration. The campaign performed strongly with over 42 million total impressions and over 22,500 likes, comments, and shares on social media. The campaign will run again in mid-2024.

PURPOSE

To update the Committee on the results of the 2023 regional single-use item reduction campaign, "What's Your Superhabit?".

BACKGROUND

The single-use item reduction campaign is part of a suite of education, policy, regulatory, and facility investments by Metro Vancouver to reduce waste in the region. It supports the waste reduction objectives in the *Integrated Solid Waste and Resource Management Plan.* 2023 marked the third year of the campaign. This report provides an update on the results of the 2023 campaign as identified in the 2023 Zero Waste Committee Work Plan.

2023 SINGLE-USE ITEM REDUCTION CAMPAIGN

The 2023 "What's Your Superhabit?" campaign ran from May 29 to July 30, 2023. The objective was to reduce the use and disposal of single-use items among Metro Vancouver residents, particularly those aged 18–44, who are more likely to have received a single-use item in the past day. The strategy is to celebrate the everyday actions we all take to reduce single-use items. These small daily routines are "Superhabits!".

Single-use item reduction is a complex and quickly changing issue in our region. The goal with the regional single-use item reduction campaign is to support and align with member jurisdictions' actions. As such, the campaign does not refer to any bans or bylaws, but rather focuses on voluntary actions that residents can take to reduce single-use items. Engagement with the Metro

Vancouver Board and member jurisdictions informed the selection of five items of focus for the campaign: cups, containers, bags, utensils, and straws.

The creative features everyday people in powerful, superhero-like poses holding reusable items. The tone is fun and celebratory. The campaign website (Superhabits.ca) features easy tips to start a superhabit and reduce single-use items.

The paid media targeted a younger audience. Tactics included social media (YouTube, Facebook, Instagram, Pinterest), television PSA, radio ads and host endorsements, and digital out of home (billboards, SkyTrain station ads, transit shelter ads). Notably, no tactics that require single-use materials were included in the plan.

In Metro Vancouver's 2022 waste composition data, takeout containers and cups both showed increases from historical levels, coinciding with a continued return to in-person work and study, and an increase in food delivery services and mobile ordering (Reference 2, page 13). As such, those two items were featured in the majority of media placements.

Complementing the paid media and building on successes and learnings from 2022, a social media strategy was used to create moments of celebration and further amplify the message.

- **Social media influencers.** Eleven social media influencers created and shared content (videos, images) about how they reduce single-use items in their lives. The influencers came from a variety of backgrounds and interests, which helped the campaign reach a wider audience. They included five lifestyle influencers (parenting, beauty, sustainability, pet humour), a drag performer (Synthia Kiss), and radio hosts (Carmen Cruz of CFOX, Alece Anderson of Rock 101, Amy Spencer of Virgin, Simone Grewal of The Breeze, Vanessa Newman of Z95.3, and Leanne McLaren of Move).
- **Celebrations in the community.** A "What's Your Superhabit?" street team visited local hubs and events throughout Metro Vancouver. The street team gave kudos to those who were using reusables by sharing their superhabits on social media and offering them high-quality swag like reusable utensil sets and mesh produce bags.
- **Pinterest.** New in 2023, content that highlighted easy tips to start a superhabit was created. This content was tailored for Pinterest's audience, but still connected to the campaign.

Engagement of Metro Vancouver Members

Campaign materials were made available to all Metro Vancouver members, including social media content and co-branded assets like transit shelter ads and digital message boards. Several members used the materials on their social media channels and throughout their municipalities.

Results

Paid Media Performance:

- The campaign delivered 41.5 million impressions;
- Traditional tactics delivered 23.4 million impressions across out of home (digital billboards and transit shelter ads), television, and radio;

- Digital tactics (YouTube, Facebook, Instagram, Pinterest) delivered 18.5 million impressions across social media with a reach of 2.9 million and 1,150 likes, comments, shares, and saves; and
- The new Pinterest creative performed strongly, reaching 530,000 people and receiving 3,024 clicks.

The impacts of inflation were noticeable on this campaign, with year-over-year cost increases for media buys on both Meta (+26%) and YouTube (+18%) for similar targeting, which hurt the overall impressions and reach delivered.

Social Media Influencers Performance:

- Social media influencers delivered a reach of 878,000, with 21,400 likes, comments, shares and saves, and close to 400,000 video views; and
- There are now 300 posts using the campaign hashtag, #WhatsYourSuperhabit.

A post campaign survey was not conducted in 2023 but is planned for 2024.

ALTERNATIVES

This is an information report. No alternatives are presented.

FINANCIAL IMPLICATIONS

The 2023 single-use item reduction campaign has a budget of $200,000, supported under the Zero Waste Communications Program of the 2023 General Government budget.

CONCLUSION

2023 was the third year of the "What's Your Superhabit" campaign, which aims to reduce the use and disposal of single-use items among Metro Vancouver residents. The campaign focused on adults aged 18–44, who are more likely to have received a single-use item in the past day. The creative was the same as in 2022, and the regional media buy was complemented by a social media strategy focused on celebrating everyday actions to reduce single-use. The campaign performed strongly with over 42 million total impressions and over 22,500 likes, comments, and shares on social media. The campaign will run again in 2024, informed by learnings from 2023 and building on the long-term equity of the creative platform.

Attachments

1. Presentation re: 2023 Single-Use Item Reduction "What's Your Superhabit?" Campaign Results

References

1. "What's Your Superhabit?" Website
2. Report titled "2022 Waste Composition Data" dated May 15, 2023

2023 Single-Use Item Reduction "What's Your Superhabit?" Campaign Results

Alisha Drinkwater
Communications Specialist

Zero Waste Committee, October 12, 2023

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BACKGROUND

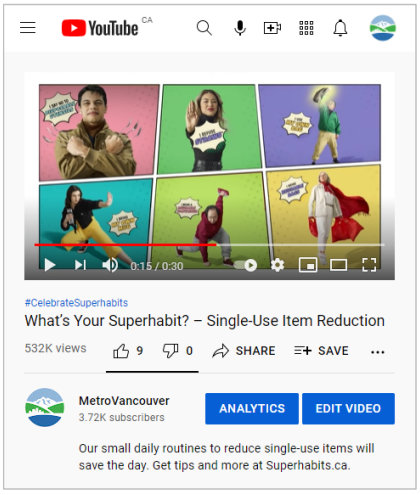
Regional Single-Use Item Reduction Campaign

Objective	Reduce the use and disposal of single-use items in Metro Vancouver through voluntary reduction.
Audience	• Metro Vancouver residents • Focus on younger residents (18–44), who are more likely to have received a single-use item in the past day
Strategy	• Celebrate everyday actions to reduce single-use items • Increase motivation to use reusables by creating sense of accomplishment / reward

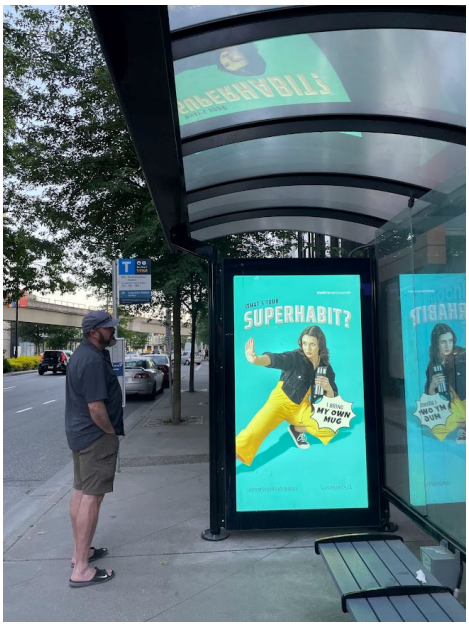
CREATIVE DIRECTION

"What's Your Superhabit?"

REGIONAL MEDIA BUY



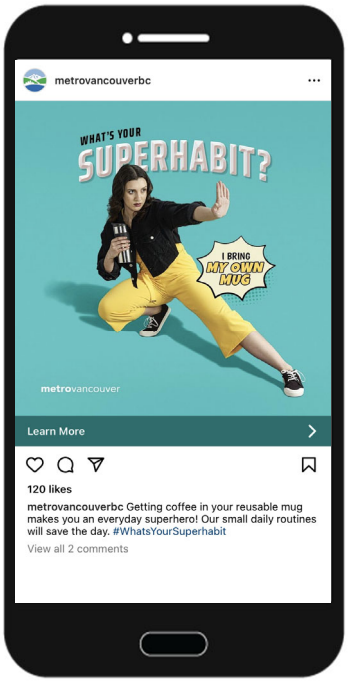
YouTube Video Ad



Digital Transit Shelter Ad

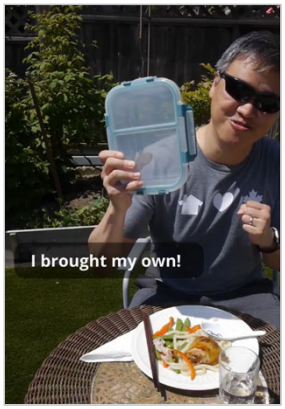
FEATURED ITEMS

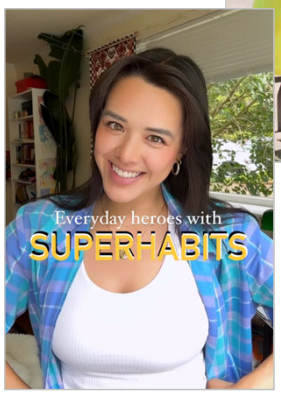
Cups and Containers



SOCIAL MEDIA INFLUENCERS

Lifestyle and Drag Performer



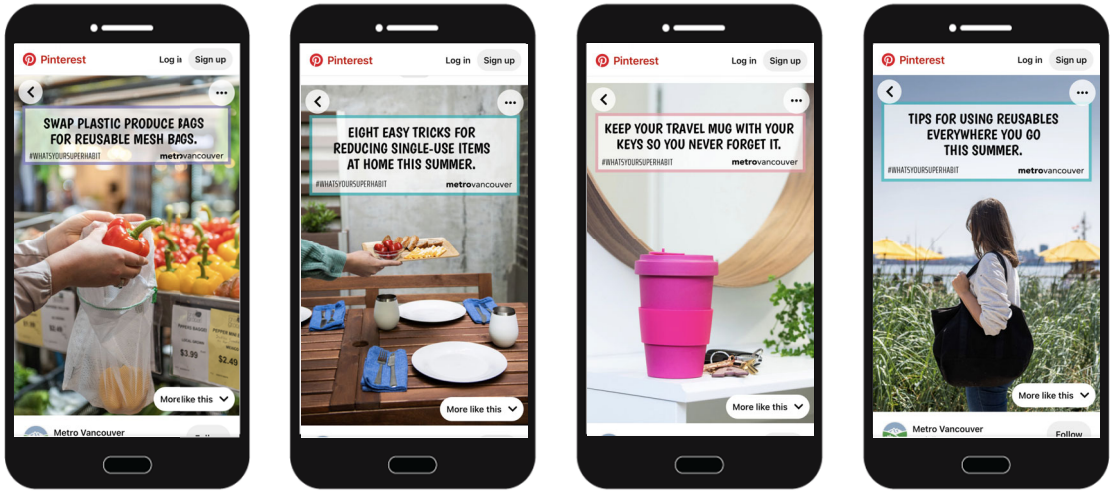


SOCIAL MEDIA INFLUENCERS

Radio Personalities

COMMUNITY CELEBRATIONS

PINTEREST

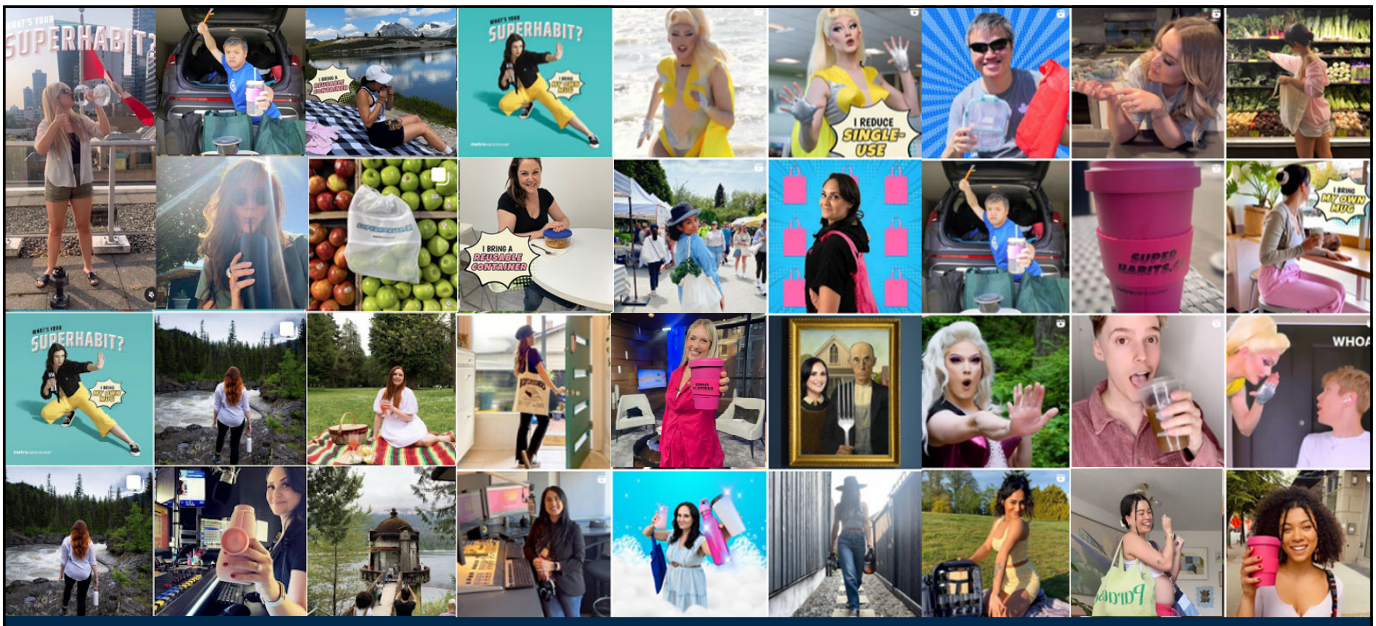


RESULTS HIGHLIGHTS

42 million
total impressions

22,500+
likes, comments, and shares on social media

300+
posts using #WhatsYourSuperhabit



#WhatsYourSuperhabit

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11

To: Zero Waste Committee

From: Sandra Jansen, General Manager, External Relations
Lucy Duso, Division Manager, External Relations

Date: September 25, 2023 Meeting Date: October 12, 2023

Subject: **2023 Zero Waste Conference Update**

RECOMMENDATION

That the Zero Waste Committee receive for information the report dated September 25, 2023, titled "2023 Zero Waste Conference Update".

EXECUTIVE SUMMARY

The 2023 Zero Waste Conference, taking place November 1 and 2, will provide a dynamic, curated program bringing together keynote speakers and panelists who will challenge participants to envision a circular future that is resilient, carbon neutral and economically sound. The narrative and speakers are chosen to address the challenges relevant in the 2020s. Hosted by Metro Vancouver, the Conference includes international, national and local speakers and stories. The overarching theme of the Zero Waste Conference for 2023 is "Climate Action through Circularity". This year's subthemes are:

- Building circular cities of tomorrow;
- Accelerating action on plastic pollution; and,
- Revolutionizing the future of fashion.

Each subtheme explores a current waste conundrum, and presents circular solutions. Day 2 introduces an intensive exploration of four more circular topics through workshops co-hosted by Metro Vancouver, the National Zero Waste Council and multiple national partners. The conference is held at the Vancouver Convention Centre, with in-person and virtual options.

PURPOSE

This report provides an update on the planning for the 2023 Zero Waste Conference.

BACKGROUND

The annual Zero Waste Conference, hosted by Metro Vancouver supports the first two goals of the *Integrated Solid Waste and Resource Management Plan* related to waste prevention. The Conference attracts interest from all orders of government, the business sector, sustainability practitioners, academia and the broader general public within the region and across Canada.

PROGRAM

The 2023 program agenda has been adjusted in response to requests from previous attendees to offer more time for networking, and an opportunity to collaborate on solutions to ongoing challenges in the waste and circularity conversation.

There are special presentations from both provincial and federal governments, connecting directly to current policy and conference themes.

Day 1, on November 1, includes featured presentations from strong story tellers with extensive and global connections to the circularity movement. Two examples are; Dr. Jonathan Foley, Executive Director of Project Drawdown, and Dr. Ehab Sayed, Founder and Chief Evolution Officer, Biohm.

Panels will address three subthemes, chosen to reflect current and lively conversations in circular opportunities for urban form, plastics, and textiles. Again, panelists reflect global perspectives and bring real solutions to the conversation. Examples are; Dr. Zosia Brown, Vice President, Sustainability, at Nexii Building Solutions, Kelly Drennan, Founding Executive Director, Fashion Takes Action as well as architects, CEOs, sustainability-focused designers and more.

In response to the request for collaborative experiences, the second day of the program includes four simultaneous workshops, each addressing a different waste challenge; cities, food, textiles, and consumer habits. Delivery partnerships are forming now, largely among members of the National Zero Waste Council and their networks, and workshop programs are developing towards exciting sessions that will guide participants to discuss cutting-edge ideas and scalable solutions.

Day 2 will close at noon for most participants. The Conference is followed in the afternoon of November 2 with the AGM for the National Zero Waste Council membership.

Registration
Looking to previous years' attendance is in the range of 500+ participants. This year the target is to move towards 600, including a virtual participation option. An early bird rate was offered until September 12th and will be honoured for municipal staff going forward, as member jurisdictions of Metro Vancouver. Metro Vancouver Board and members of the Zero Waste and Climate Action Committees are invited to attend. Sponsorship is also offered to youth, specifically through Metro Vancouver's new Youth Education Advisory Panel membership.

ALTERNATIVES
This is an information report. No alternatives are presented.

FINANCIAL IMPLICATIONS
There are no financial implications. The Conference is supported through the 2023 General Government Program of $212,000 and the remainder through conference registration fees.

CONCLUSION
The 2023 National Zero Waste Conference is again building to be an exciting, worthy event, attracting interest for participation across the country. The Conference program, under the theme "Action through Circularity" is dynamic and includes a combination of presentations, audience participation, thought leaders and networking opportunities. Registration is building, with additional attention to ensuring a diverse audience is welcomed to participate.

References
1. Metro Vancouver Zero Waste Conference Website

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SERVICES AND SOLUTIONS FOR A LIVABLE REGION

To: Regional Parks Committee

From: Sonu Kailley, Acting Director, Financial Planning, Financial Services

Date: October 5, 2023 Meeting Date: October 18, 2023

Subject: **Development Cost Charge Engagement Update and Proposed Rate Bylaws**

RECOMMENDATION

That the Regional Parks Committee receive for information the report dated October 5, 2023, titled "Development Cost Charge Engagement Update and Proposed Rate Bylaws".

The attached report dated October 5, 2023 titled "Development Cost Charge Engagement Update and Proposed Rate Bylaws" is being presented to the Finance Committee for consideration and recommendation at its October 12, 2023 meeting. The report is presented to the Regional Parks Committee for its information only.

ATTACHMENT

1. Development Cost Charge Engagement Update and Proposed Rate Bylaws Report dated October 5, 2023

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SERVICES AND SOLUTIONS FOR A LIVABLE REGION

To: Finance Committee

From: Sonu Kailley, Acting Director, Financial Planning, Financial Services

Date: October 5, 2023 Meeting Date: October 12, 2023

Subject: **Development Cost Charge Engagement Update and Proposed Rate Bylaws**

RECOMMENDATION

That the GVWD, GVS&DD and MVRD Board:

a) approve the Development Cost Charge rates as proposed in:
   - Schedules A to D in *Greater Vancouver Sewerage and Drainage District Development Cost Charge Bylaw No. 371, 2023;*
   - Schedule A in the *Greater Vancouver Water District Development Cost Charge Amendment Bylaw No. 260,* 2023;
   - Schedule A in the *Metro Vancouver Regional District Development Cost Charge Bylaw No. 1369,* 2023;

   as found in the report dated October 5, 2023 titled "Development Cost Charge Engagement Update and Proposed Rate Bylaws", and endorse the inclusion of interest costs directly related to those activities that are approved by the Inspector of Municipalities in the GVS&DD and GVWD Development Cost Charge initiatives; and

b) give first, second and third reading to the *Greater Vancouver Sewerage and Drainage District Development Cost Charge Bylaw No. 371, 2023; and*

c) give first, second and third reading to the *Greater Vancouver Water District Development Cost Charge Amendment Bylaw No. 260,* 2023; and

d) give first, second and third reading to the *Metro Vancouver Regional District Development Cost Charge Bylaw No. 1369, 2023*; and

e) direct staff to forward to the Inspector of Municipalities for approval:
   - *Greater Vancouver Sewerage and Drainage District Development Cost Charge Bylaw No. 371, 2023*
   - *Greater Vancouver Water District Development Cost Charge Amendment Bylaw No. 260, 2023*
   - *Metro Vancouver Regional District Development Cost Charge Bylaw No. 1369, 2023*

EXECUTIVE SUMMARY

In April 2023, the Metro Vancouver Board endorsed moving toward a one-per-cent assist factor for water and liquid waste development cost charges (DCCs), and implementing a new parkland acquisition DCC and moving it to a 1% assist factor within the 2024-2028 Financial Plan, and directed staff to approach the 2024-2028 financial plan with targets of 12% for 2024, 11% for 2025, 5% for 2026, and 5% for 2027. Furthermore, at the July 28 Board meeting, GVS&DD/GVWD/MVRD Board direct staff to consult with member jurisdictions, the Urban Development Institute and other parties on proposed updates to Development Cost Charges.

Communication and engagement on updating the Liquid Waste and Water development cost charge (DCC) rates and establishing a regional parkland acquisition DCC took place in August and September 2023. Staff met with members of the development industry, member jurisdictions, First Nations, and the public where feedback and comments were received and addressed. 166 people primarily from industry and member jurisdictions participated in the engagement sessions. There was an overall appreciation for the transparency and a shared acknowledgement that the critical growth infrastructure needs to continue, however, there was concern that the rates would impact affordability and potentially add to the rising cost of housing. In addition, there were questions on the sharing of growth costs, the administration and coordination of DCCs across the region and the impacts on housing delivery.

Metro Vancouver has endeavored to reduce the financial impact of the rate changes as much as possible, while pursuing the Board endorsed goals of growth pays for growth and financial sustainability and regional affordability. Measures to reduce the financial impact have included phasing-in the increase in rates over a 3-year period, with a proposed effective date beginning January 1, 2025.

It is recommended that the GVWD, GVS&DD and MVRD Board approve the implementation of the DCC rates and the DCC bylaws and direct staff to forward the DCC bylaws to the Inspector of Municipalities for approval. Once the bylaws are approved by the Inspector of Municipalities, staff will bring back the bylaws for final adoption by the GVWD, GVS&DD and MVRD Board.

PURPOSE

The purpose of this report is to provide an update on the feedback received as part of the engagement process for the DCC update and to recommend that the GVWD, GVS&DD and MVRD give three readings to the proposed bylaws such that they can be sent to the Inspector of Municipalities for approval.

BACKGROUND

As part of the *2022–2026 Board Strategic Plan*, the Metro Vancouver Board committed to pursuing the adoption of DCCs with the purpose of ensuring new development in the region fund the cost of growth infrastructure expansion required to service that development. The concept of 'growth paying for growth' through DCCs has been encouraged by most Metro Vancouver Board members for several years. At the April 2023 Board Budget workshop, the Board endorsed and directed staff to prepare the 2024-2028 Financial Plan with the following assumptions:

- Liquid Waste DCCs, including interest, moving to a 1% assist factor.
- Water DCCs, including interest, moving to a 1% assist factor.
- Implementation of a DCC for Regional Parks and moving to a 1% assist factor.

The Liquid Waste DCC has been in place since 1997, with an update in 2022 and currently includes an assist factor of 17.5% with interest. A Water DCC was recently established in April 2023 with a 50% assist factor with interest. A new MVRD parkland acquisition DCC is being proposed to help fund future parkland acquisitions needed to service our growing region.

DCC rates were developed using the current 2023-2052 30-year growth capital plan. To reduce the impact on the development industry, staff are proposing a 3-year transition from the existing assist factors to a 1% assist factor beginning January 1, 2025.

To assess the possible financial impact of the proposed DCC rate increases, staff asked real estate consultancy firm Coriolis Consulting to complete an evaluation. Coriolis found the potential financial impacts of the proposed DCC rates to be similar to the impact from the latest 12-month change in financing rates, significantly less than the impact of the latest 12-month change in hard construction costs, and significantly less than the impact of the latest 12-month change in residential unit prices and rents. The results also indicated that the impacts to the housing market would be one or a combination of the following: a reduction in development site land values if the increased cost can be passed back to landowners, a reduction in profit margins for new projects or an increase in the market price of new units or floor space.

Engagement took place with the development industry, First Nations, municipal members and the public. This report summarizes the feedback received during engagement activities and presents proposed bylaws to revise the GVS&DD and GVWD DCC rates and the implementation of a new MVRD parkland acquisition DCC.

ENGAGEMENT PROCESSES

During August and September, staff reached out to First Nations, the development industry, and municipal members on the engagement process and with invitation to attend webinars to discuss regional DCCs. Engagement opportunities were promoted on social media and in e-newsletters. Information on the regional DCC was provided to staff of member jurisdictions through regional advisory committees. As well, 201 email notifications and invitations to register for the webinars were sent to all interested parties that had signed up over the past several years to the Metro Vancouver DCC email list.

Meetings with development industry and public were held September 20th and 22nd. A municipal members meeting was held on September 19 as were meetings with four First Nations on September 18, 25 and 28.

To aid accessibility and participation, all sessions were virtual. Each meeting began with a presentation summarizing regional growth, the growth capital program for each service area, the proposed rates for water, liquid waste and parkland, cumulative regional rates, and economic and financial impact analysis from Coriolis. This was followed by a question and answer period where attendees inquired on topics of interest to them. Metro Vancouver representatives from Finance, Water Services, Liquid Waste Services and Regional Park departments explained the proposed DCC program and answered questions from those in attendance.

The meetings were well attended with 166 participants attending six engagement sessions representing the development industry, First Nations, municipal members and the public. There were 111 attendees for the two industry sessions. With a diverse group of attendees, there were a wide variety of questions and feedback.

Overall there was appreciation for the transparency and a shared acknowledgement that the critical work needs to continue, however, there was concern that the rates would impact affordability and potentially add to the rising cost to deliver housing overall. The development community were the most vocal on the impact this would have on their ability to deliver affordable housing and were interested in more time to collaborate and analyze the cost sharing between existing rate payers or other levels of government. Member jurisdictions were mainly concerned with the administration efforts, the cost to administer and their ability to collect municipal DCC's. The First Nations were primarily concerned with the ability to co-manage and steward future parks and water conservation.

The key issues identified and discussed from the engagement sessions and correspondence are further summarized into the basic themes as set out below.

SUMMARY OF FEEDBACK

Interest	How We're Responding
Financial Impact	**What we heard:** Many in the development industry expressed the rate increase would have a negative effect on residential and industrial development. Given the challenges industry is already facing, such increased financing and construction inflation and other DCC increases and building code changes, the development industry expressed the proposed DCC is another charge adding a burden to development. As well, the rate revisions are counter to the objectives of senior levels of government, and place the funding burden on new homeowners and away from existing homeowners who have benefited from rising home values. Given the cumulative effect of regional/municipal DCCs, more economic analysis is needed on the viability of housing projects. Consideration of the impact on housing delivery, land price adjustment, and a pause in implementing the increases is needed. **How we're responding:** Metro Vancouver acknowledges the current challenging development environment. To give as much notice as possible Metro Vancouver engaged on the new rates as soon as possible, fifteen months before the proposed bylaw effective date of January 1, 2025. To further allow time to adjust, the proposed rates are to be phased-in over a 3-year period from January 1, 2025 to January 1, 2027. In addition, Metro Vancouver commissioned a study to examine the financial impact of the proposed DCCs. The findings in the study concluded that the proposed DCCs have a commensurate impact to the financing rate changes over the past 12 months, but a significantly less of an impact than the construction inflation and changes in unit prices over the past 12 months.

Sharing Growth Costs	**What we heard:** The costs of growth infrastructure should be shared between new developments and existing ratepayers as both will use and benefit from the new infrastructure and parkland. This will help reduce the burden on new homeowners, reduce the cost of new dwellings and aid in housing delivery. Several member jurisdictions expressed concerns about how Metro Vancouver's proposed DCCs would impact their ability to raise their own DCCs to sufficiently have growth pay for growth, and the desire to establish a regional growth funding framework. However, member Advisory Committees agreed with the goal of growth paying for growth. **How we're responding:** Existing infrastructure and parks have already been funded by existing rate payers, and the ongoing maintenance and upgrades continue to be funded through their utility fees. New additional infrastructure and parkland acquisition are built to facilitate new developments, whether those new developments are purchased by newcomers or existing residents of the region. To balance the funding requirement between existing rate payers and new developments, Metro Vancouver seeks to best match the cost of infrastructure with those who benefit from it. Metro Vancouver will continue to work with member Advisory Committees and TransLink on coordinating future DCC changes
Administration and Coordination of Regional DCCs	**What we heard:** There was a request to provide a mechanism to coordinate the timing of any changes which would simplify the administrative burden necessary for the municipal staff that collect the charges. The challenge will be coordinating timing with member jurisdictions that are updating their DCC rates. **How we're responding:** Metro Vancouver has proposed all three of the proposed bylaws with the same effective date of January 1st. This date also aligns with Translink's DCC bylaw effective date. It is hoped this consistency will help to reduce some of the administrative effort involved in collecting regional DCCs.
Impacts on housing delivery	**What we heard:** The DCC rate increases, in conjunction with other market driven increases in financing and inflation, will cause projects to be delayed and have a negative effect on housing delivery and housing affordability including non-market housing. The increases also offset other housing incentives such as the federal elimination of GST on purpose built rental housing. **How we're responding:** Non-market affordable rental housing including student housing are currently eligible for a regional DCC waiver or reduction for not-for-profit developers.

	Bylaw review to potentially extend the waiver or reduction to profit oriented developers of affordable rental housing is currently underway. The region is expected to increase by a million new residents over the next 30 years. Funding is required to build the utility infrastructure needed to facilitate future real estate development and help ensure housing supply. This is a pro-active measure, otherwise, there is risk of deferring work, future development and further impacting affordability for the long-term.

First Nation Engagement
Staff reached out to the First Nations of the region and four First Nations were interested in engaging on regional DCCs. As part of the engagement, staff communicated regional DCCs will not apply to developments on First Nations reserves unless a First Nation voluntarily seeks out municipal approvals or permits, by entering into agreements, or otherwise obtaining municipal approvals or permits for land development.

Some of the issues raised included the difficulty with such a short timeline to give the DCC initiative a wholesome review. Also, if large initiatives could be presented earlier at the conceptual stage, or broken into individual referrals, it would allow for a more in depth review and greater collaboration.

The importance of water conservation to First Nations and the desire to co-manage and steward parklands with Metro Vancouver was indicated. The application and administration of regional DCCs was also discussed. Staff are committed to continue to work with First Nations on DCC related questions and issues.

BYLAWs
The Greater Vancouver Sewer and Drainage District Development Cost Charge Bylaw No. 371, 2023 (Attachment 1) has been structured with the following:

- The 3-year rate transition to a 1% assist factor.
- The assist factor is 16% January 1, 2025, 10% January 1, 2026, and 1% January 1, 2027.
- These are the rates and assist factors presented through the stakeholder engagement process.
- The proposed effective date is January 1, 2025.

The *Greater Vancouver Water District Development Cost Charge Amendment Bylaw No. 260, 2023* (Attachment 2) has been structured with the following:

- The 3-year rate transition to a 1% assist factor.
- The assist factor is 45% January 1, 2025, 15% January 1, 2026, and 1% January 1, 2027.
- These are the rates and assist factors presented through the stakeholder engagement process.
- The proposed effective date is January 1, 2025.

The *Metro Vancouver Regional District Development Cost Charge Bylaw No. 1369, 2023* (Attachment 3) has been structured with the following:

- The 3-year rate transition to a 1% assist factor.
- The assist factor is 75% January 1, 2025, 50% January 1, 2026, and 1% January 1, 2027.
- These are the rates and assist factors presented through the stakeholder engagement process.
- The proposed effective date is January 1, 2025.

ALTERNATIVES

1. That the GVWD, GVS&DD and MVRD Board:
   a) approve the Development Cost Charge rates as proposed in:
      - Schedules A to D to the *Greater Vancouver Sewerage and Drainage District Development Cost Charge Bylaw No. 371, 2023;*
      - Schedule A to the *Greater Vancouver Water District Development Cost Charge Amendment Bylaw No. 260,* 2023;
      - Schedule A to the *Metro Vancouver Regional District Development Cost Charge Bylaw No. 1369,* 2023;

      as found in the report dated October 5, 2023 titled "Development Cost Charge Engagement Update and Proposed Rate Bylaws", and endorse the inclusion of interest costs directly related to those activities that are approved by the Inspector of Municipalities in the GVS&DD and GVWD Development Cost Charge initiatives; and
   b) give first, second and third reading to the *Greater Vancouver Sewerage and Drainage District Development Cost Charge Bylaw No. 371, 2023; and*
   c) give first, second and third reading to the *Greater Vancouver Water District Development Cost Charge Amendment Bylaw No. 260,* 2023; and
   d) give first, second and third reading to the *Metro Vancouver Regional District Development Cost Charge Bylaw No. 1369, 2023*; and
   e) direct staff to forward to the Inspector of Municipalities for approval:
      - *Greater Vancouver Sewerage and Drainage District Development Cost Charge Bylaw No. 371, 2023*
      - *Greater Vancouver Water District Development Cost Charge Amendment Bylaw No. 260, 2023*
      - *Metro Vancouver Regional District Development Cost Charge Bylaw No. 1369, 2023*

2. That the GVWD, GVS&DD and MVRD Board:
   a) approve the Development Cost Charge rates "As of January 1, 2025 to December 31, 2025", as proposed in:
      - Schedules A to D to the *Greater Vancouver Sewerage and Drainage District Development Cost Charge Bylaw No. 371, 2023;*
      - *Schedule A* to the *Greater Vancouver Water District Development Cost Charge Amendment Bylaw No. 260,* 2023;
      - *Schedule A* to the *Metro Vancouver Regional District Development Cost Charge Bylaw No. 1369,* 2023;

      as found in the report dated October 5, 2023 titled "Development Cost Charge Engagement Update and Proposed Rate Bylaws", and endorse the inclusion of interest costs directly related to those activities that are approved by the Inspector of Municipalities in the GVS&DD and GVWD Development Cost Charge initiatives; and

b) from each of Schedules A to D to the *Greater Vancouver Sewerage and Drainage District Development Cost Charge Bylaw No. 371, 2023,* delete the phrase, "As of January 1, 2025 to December 31, 2025" and also delete the phrase, "As of January 1, 2026 to December 31, 2026" and all text within each of Schedules A to D that follows the latter phrase; and
c) give first, second and third reading to the *Greater Vancouver Sewerage and Drainage District Development Cost Charge Bylaw No. 371, 2023* as now amended*;* and
d) from Schedule A to the G*reater Vancouver Water District Development Cost Charge Amendment Bylaw No. 260, 2023,* delete the phrase, "As of January 1, 2025 to December 31, 2025" and also delete the phrase, "As of January 1, 2026 to December 31, 2026" and all text within Schedule A that follows the latter phrase; and
e) give first, second and third reading to the *Greater Vancouver Water District Development Cost Charge Amendment Bylaw No. 260,* 2023 as now amended; and
f) from Schedule A, from the *Metro Vancouver Regional District Development Cost Charge Bylaw No. 1369, 2023*, delete the phrase, "As of January 1, 2025 to December 31, 2025" and also delete the phrase, "As of January 1, 2026 to December 31, 2026" and all text within Schedule A that follows the latter phrase; and
g) give first, second and third reading to the *Metro Vancouver Regional District Development Cost Charge Bylaw No. 1369, 2023* as now amended; and
h) direct staff to forward to the Inspector of Municipalities for approval:
    - *Greater Vancouver Sewerage and Drainage District Development Cost Charge Bylaw No. 371, 2023*, as now amended
    - *Greater Vancouver Water District Development Cost Charge Amendment Bylaw No. 260,* 2023, as now amended
    - *Metro Vancouver Regional District Development Cost Charge Bylaw No. 1369, 2023*, as now amended

3. That the Metro Vancouver Board receive for information the report dated October 5, 2023 titled "Development Cost Charge Engagement Update and Proposed Rate Bylaws" and provide alternate direction to staff.

FINANCIAL IMPLICATIONS

If Finance Committee endorses Alternative 1 or 2, the report will be forwarded to the GVWD, GVS&DD and MVRD Board for approval. The DCC program will generate funding which will be allocated to the completion of growth infrastructure and parkland acquisition necessary to meet the needs of our growing region.

If the DCCs are not approved any shortfall in funding for growth related capital infrastructure will be covered by existing waters sales, liquid waste levies or MVRD tax requisitions. Furthermore, the Financial Plan Task Force recommendations that was endorsed by the Board in April 2023, will not be met with respect to the household impact targets as well as moving the liquid waste and water DCCs to a 1% assist factor with interest as well as introducing a parkland acquisition DCC and moving that to 1% over the 2024-2028 Financial Plan. Without DCCs, and no projects deferred or reduced in scope, and funding instead covered by existing ratepayers, the average long-term annual household impact would be in the double digit range.

CONCLUSION

Following the Metro Vancouver Board direction, an engagement process was undertaken to gather feedback on the proposed DCC rate revisions and new regional parkland acquisition DCC. Engagement sessions were held in September 2023. A total of 166 people attended the sessions representing the development industry, member jurisdictions, First Nations, and the public. Key feedback received throughout the engagement activities included the financial impact on housing development resulting from the rate increases, questions on the sharing of growth costs, the administration and coordination of regional DCCs, and the potential impact on housing affordability for different types of housing developments.

Based on the feedback received, the goals of growth to pay for growth, financial sustainability and regional affordability, it is recommended the proposed DCC bylaws be given three readings and staff be directed to forward the proposed Bylaws to the Inspector of Municipalities for approval.

ATTACHMENTS

1. *Greater Vancouver Sewerage and Drainage District Development Cost Charge Bylaw No. 371, 2023*
2. *Greater Vancouver Water District Development Cost Charge Amendment Bylaw No. 260, 2023*
3. *Metro Vancouver Regional District Development Cost Charge Bylaw No. 1369, 2023*
4. Coriolis Report
5. Development Cost Charge Engagement Update and Proposed Rate Bylaws - Presentation

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GREATER VANCOUVER SEWERAGE AND DRAINAGE DISTRICT
BYLAW NO. 371, 2023
A Bylaw to Impose Development Cost Charges

WHEREAS:

A. Pursuant to the *Greater Vancouver Sewerage and Drainage District Act*, the Greater Vancouver Sewerage and Drainage District ("the GVS&DD") may, by bylaw, impose development cost charges on every person who obtains approval of a subdivision or a building permit authorizing the construction, alteration or extension of a building or structure from a Member Municipality;

B. Development cost charges provide funds to assist the GVS&DD in paying capital costs, including interest costs directly related to those activities that are approved by the inspector of municipalities to be included as capital costs, incurred to provide, construct, alter or expand sewerage facilities to service development within the area of the GVS&DD, excluding the portion of capital costs charged by the GVS&DD to Member Municipalities under section 54 of the Act;

C. Pursuant to the Act, development cost charges are not payable in certain circumstance and the GVS&DD may waive or reduce development cost charges for eligible developments;

D. Member Municipalities collect the development cost charges imposed under this Bylaw and remit them to the GVSⅅ

E. The GVS&DD and a Member Municipality may enter into an agreement under section 58.3 of the Act under which all, some or some portion of the development cost charges under this Bylaw that would otherwise apply are not required to be collected and remitted by the Member Municipality and the Member Municipality agrees to pay to the GVS&DD an amount equal to the development cost charges that the Member Municipality would have collected under this Bylaw but for such an agreement; and

F. In setting development cost charges under this Bylaw, the GVS&DD has considered:

   a. future land use patterns and development and the phasing of works and services; and

   b. how development designed to result in a low environmental impact may affect the capital costs of infrastructure referred to in section 58.2(2) of the Act.

NOW THEREFORE the Board of the Greater Vancouver Sewerage and Drainage District enacts as follows:

1.0 Citation

1.1 The official citation for this Bylaw is "Greater Vancouver Sewerage and Drainage District Development Cost Charge Bylaw No. 371, 2023".

1.2 This Bylaw may be cited as the "GVS&DD Development Cost Charge Bylaw".

2.0 Repeal of Bylaw

2.1 "Greater Vancouver Sewerage and Drainage District Development Cost Charge Bylaw No. 254, 2010" as amended is hereby repealed.

3.0 Definitions

3.1 In this Bylaw:

"Apartment Dwelling Unit" means a Dwelling Unit in a building or structure that consists or may consist of two or more storeys and contains or may contain four or more Dwelling Units, whereby the building or structure has a principal exterior entrance used in common for access to the Dwelling Units. Apartment Dwelling Unit does not include Dwelling Units that are Townhouse Dwelling Units;

"Building Permit" means any permit required by a Member Municipality that authorizes the construction, alteration or extension of a building or structure;

"Combination Development" means any Development that comprises two or more of the following uses:

(a) Apartment Dwelling Unit;

(b) Residential Lot Development Unit;

(c) Townhouse Dwelling Unit; and

(d) Non-Residential Use;

"Community Charter" means the *Community Charter*, SBC 2003, c. 26;

"Development" means:

(a) a Subdivision; or

(b) the construction, alteration or extension of a building or structure for which a Building Permit is obtained;

"Dwelling Unit" means one or more rooms comprising a self-contained unit that is used or intended to be used for living and sleeping purposes and for which are provided cooking facilities, or the facilities for installation of cooking facilities, and one or more bathrooms having a sink or wash-basin, a water closet, and a shower or bath;

"Floor Area" means:

(a) the floor area of the building or structure (measured from the outside edge of all exterior walls of the building or structure), less the number of square feet of the floor area of the building or structure that is used or is intended to be used for the parking of motor vehicles and the storage of bicycles; or

(b) in the case of an alteration or extension of less than the entire building or structure, the portion of the building or structure to which the Building Permit applies (measured from the outside edge of any exterior walls in such portion of the building or structure), less the number of square feet of the floor area of the building or structure that is used or is intended to be used for the parking of motor vehicles and the storage of bicycles;

"Fraser Sewerage Area" means the area established from time to time by the GVS&DD under the Act as the Fraser Sewerage Area;

"GVS&DD" means the Greater Vancouver Sewerage and Drainage District;

"*Greater Vancouver Sewerage and Drainage District Act*" or **"Act"** means the *Greater Vancouver Sewerage and Drainage District Act,* SBC 1956, c. 59;

"*Land Title Act*" means the *Land Title Act*, RSBC 1996, c.250;

"Laneway House" has the definition ascribed to such term in the bylaws of the Member Municipality where the laneway house is located, or, in the absence of such a definition, means a detached building or structure containing one Dwelling Unit and constructed in the yard of a site on which is situate a Single Family Residential Dwelling;

"*Local Government Act*" means the *Local Government Act*, RSBC 2015, c. 1;

"Lulu Island West Sewerage Area" means the area established from time to time by the GVS&DD under the Act as the Lulu Island West Sewerage Area;

"Member Municipality" means a municipality that is a member of the GVSⅅ

"Minister" means the member of the Executive Council appointed under the *Constitution Act* charged by order of the Lieutenant Governor in Council with the administration of the *Local Government Act*;

"Municipal Charges" means development cost charges imposed by a Member Municipality under either the *Local Government Act*, *Community Charter* or the *Vancouver Charter*;

"Non-Residential Use" means any building or structure or any portion of any building or structure that is not Apartment Dwelling Unit, Residential Lot Development Unit or Townhouse Dwelling Unit but for greater certainty, does not include any portion of any Residential Use building or structure that is not part of a Dwelling Unit and is used or is intended to be used solely for the purpose of gaining access to and from Dwelling Units, solely for the maintenance of the building or structure or solely by the occupants of the Dwelling Units in the building or structure;

"North Shore Sewerage Area" means the area established from time to time by the GVS&DD under the Act as the North Shore Sewerage Area;

"Parcel" means any lot, block or other area in which land is held or into which it is legally subdivided and for greater certainty, without limiting the foregoing, including a strata lot under the *Strata Property Act*;

"Rate Schedules" means the schedules of development cost charge rates for each Sewerage Area that are attached as Schedules A, B, C and D to this Bylaw;

"Rent" means money paid or agreed to be paid, or value or a right given or agreed to be given, by or on behalf of a tenant to a landlord in return for the right to rent a Dwelling Unit, for the use of common areas and for services or facilities and includes any and all strata fees, regardless of whether such fees are paid directly to the landlord, but does not include any of the following:

(a) a security deposit;

(b) a pet damage deposit;

(c) a fee prescribed under section 97 (2) (k) of the *Residential Tenancy Act*;

"**Residential Lot Development Unit**" means a Dwelling Unit on a lot (not including an Apartment Dwelling Unit or a Townhouse Dwelling Unit) but, if the Dwelling Unit is a Single Family Residential Dwelling, also includes:

(a) the construction, alteration or extension of a building or structure for up to one Secondary Suite in the Single Family Residential Dwelling,

(b) the construction, alteration or extension of up to one Laneway House, or

(c) both.

"*Residential Tenancy Act*" means the *Residential Tenancy Act*, SBC 2002, c. 78;

"Residential Use" means Apartment Dwelling Unit, Residential Lot Development Unit and Townhouse Dwelling Unit;

"Secondary Suite" has the definition ascribed to such term in the bylaws of the Member Municipality where the secondary suite is located, or, in the absence of such a definition, means the smaller Dwelling Unit contained within a Single Family Residential Dwelling;

"Sewerage Area" means any of the GVS&DD's four sewerage areas, being the Vancouver Sewerage Area, the North Shore Sewerage Area, the Lulu Island West Sewerage Area and the Fraser Sewerage Area;

"Sewage Facility" means any work, service or plant of the GVS&DD for conveying, disposing of or treating sewage or waste water;

"Single Family Residential Dwelling" means a detached building or structure that contains one principal Dwelling Unit and may contain one smaller Dwelling Unit;

"Strata Property Act" means the *Strata Property Act*, SBC 1998, c. 43;

"Subdivision" includes a division of land into two or more Parcels, whether by plan, apt descriptive words or otherwise under the *Land Title Act* or the *Strata Property Act*, the consolidation of two or more Parcels of land, and phased strata plans;

"Townhouse Dwelling Unit" means a Dwelling Unit in a building or structure that contains or may contain four or more Dwelling Units, whereby each Dwelling Unit has a direct exterior entrance;

"*Vancouver Charter*" means the *Vancouver Charter,* SBC 1953, *c. 55*;

"Vancouver Sewerage Area" means the area established from time to time by the GVS&DD under the Act as the Vancouver Sewerage Area;

4.0 Development Cost Charges

4.1 **Application of Development Cost Charges.** Subject to section 4.2, every person who obtains:

(a) approval of a Subdivision from a Member Municipality; or

(b) a Building Permit from a Member Municipality;

must pay the applicable development cost charges set out in this Bylaw to that Member Municipality on behalf of the GVS&DD prior to the approval of the Subdivision or the issuance of the Building Permit.

4.2 **Exemptions from Development Cost Charges.** Development cost charges are not payable under this Bylaw if:

(a) the Development is not and will not be capable of being serviced by a Sewerage Facility of the GVS&DD or by a Sewerage Facility of a Member Municipality that is connected to a Sewerage Facility of the GVSⅅ

(b) the Development will not impose new capital cost burdens on the GVSⅅ

(c) a development cost charge has previously been paid for the same Development unless, as a result of further Development, new capital cost burdens will be imposed on the GVSⅅ

(d) the Building Permit authorizes the construction, alteration or extension of a building or structure or part of a building or structure that is, or will be, after the construction, alteration or extension, exempt from taxation under subsection 220(1)(h) of the *Community Charter*;

(e) the value of the work authorized by the Building Permit does not exceed $50,000 or such other amount which the Minister may prescribe by regulation; or

(f) the Building Permit authorizes the construction, alteration or extension of self-contained Dwelling Units in a building in which:

(i) each Dwelling Unit is no larger in area than 29 square metres [312.153 square feet]; and

(ii) each Dwelling Unit is to be put to no use other than Residential Use in those Dwelling Units.

4.3 **Calculation of Development Cost Charges.** Development cost charges imposed under this Bylaw will be calculated in accordance with the rates set out in the Rate Schedules. The rates set out in the Rate Schedules may be different in relation to one or more of the following**:**

(a) different Sewerage Areas;

(b) different classes of Sewerage Facilities;

(c) different areas within a Sewerage Area;

(d) different uses;

(e) different capital costs as they relate to different classes of Development; or

(f) different sizes or different numbers of lots or units in a Development.

4.4 **Combination Development.** Without restricting the generality of section 4.3, the development cost charges for a Combination Development will be calculated separately for the portion of the Combination Development attributable to each of Apartment Dwelling Unit, Residential Lot Development Unit, Townhouse Dwelling Unit and Non-Residential Use and will be the sum of the development cost charges for each such use, calculated according to the Rate Schedules.

4.5 **Payment, Collection and Remittance of Development Cost Charges.** Development cost charges imposed under this Bylaw must be paid to the Member Municipality of the GVS&DD approving the Subdivision or issuing the Building Permit, as the case may be, as follows:

(a) at the same time as any Municipal Charges as may be levied on the Development under a bylaw of the Member Municipality are payable to the Member Municipality; or

(b) if no Municipal Charges will be levied on the Development under a bylaw of the Member Municipality, as follows:

(i) where an application is made only for Subdivision, prior to the issuance of the approval of the Subdivision by the Member Municipality; or

(ii) where an application is made only for a Building Permit or for both Subdivision and for a Building Permit, prior to the issuance of the Building Permit by the Member Municipality.

4.6 **Payment of Development Cost Charges by Instalments.** The development cost charges imposed under this Bylaw may not be paid by instalments unless a regulation under either subsection 58.2(6) of the Act or subsection 559(5) of the *Local Government Act* applies to the Development and authorizes the payment of development cost charges in instalments.

5.0 Collection and Remittance of Development Cost Charges

5.1 **Collection of Development Cost Charges by Member Municipalities.** Subject to section 6.1, each Member Municipality must:

(a) collect the development cost charges imposed on a Development under this Bylaw; and

(b) not issue approval of a Subdivision or issue a Building Permit for any Development unless the development cost charges imposed under this Bylaw have been paid in accordance with section 4.0.

5.2 **Separate Account.** Subject to section 6.1, each Member Municipality must establish and maintain a separate account for the development cost charge monies collected under this Bylaw and deposit and hold these monies in that separate account, in trust for the GVS&DD, until the monies are remitted to the GVS&DD under section 5.3.

5.3 **Remittance of Development Cost Charges by Municipalities.** Each Member Municipality, within 30 days after June 30 and December 31 of each year, must remit to the GVS&DD the total amount of development cost charges collected by the Member Municipality under this Bylaw during the six-month period previous to such date, or an amount equal to such development cost charges if the Member Municipality did not collect development cost charges under this Bylaw, together with the statement referred to in section 5.4.

5.4 **Statements.** Each Member Municipality must provide statements to the GVS&DD, in respect of each Sewerage Area within the Member Municipality, pursuant to section 5.3, for every six-month period comprising January 1 to June 30 and July 1 to December 31, setting out:

(a) the number and type of use of all Dwelling Units and Residential Lot Development Units on which development cost charges were levied by it under this Bylaw;

(b) the aggregate floor area of all Non-Residential Use buildings or structures on which development cost charges were levied by it under this Bylaw (calculated in accordance with the Rate Schedules);

(c) the legal description and civic address of each Parcel on which development cost charges were levied by it under this Bylaw, whether such development cost charges were levied in respect of a Subdivision or a Building Permit;

(d) the date and amount of each payment of development cost charges levied by it under this Bylaw and where section 4.6 applies to permit development cost charges levied under this Bylaw to be paid by instalments, the amount of instalment payments remaining to be paid to it and the dates for payment of such remaining instalments;

(e) the total amount of all development cost charges levied by it under this Bylaw and the total amount of all remaining instalment payments;

(f) the number, legal description, civic address and type of use of all Parcels in respect of which Subdivisions were approved where no development cost charges were levied by it under this Bylaw; and

(g) the number and type of use of all Dwelling Units and Residential Lot Development Units and the aggregate floor area of all Non-Residential Use buildings or structures (calculated in accordance with the Rate Schedules) in respect of which Building Permits were required where no development cost charges were levied by it under this Bylaw.

5.5 **Records.** Each Member Municipality shall retain, for a period of four years, sufficient records to support the statements and payments referred to in sections 5.3 and 5.4.

5.6 **Inspection and Review of Municipal Records.** The GVS&DD may, at any time, subject to first giving reasonable notice to any Member Municipality, inspect any and all records of the Member Municipality relating to the information required under section 5.4, the calculation, collection and remittance by the Member Municipality of development cost charges levied under this Bylaw, and the calculation and remittance by the Member Municipality of any payments required under section 6.0. Each Member Municipality shall permit any employee or agent of the GVS&DD to inspect the records referred to above and to make and take away copies of those records.

6.0 Replacement of Development Cost Charges

6.1 **Municipal Agreements.** Despite any other provision of this Bylaw, the GVS&DD may enter into an agreement or agreements with any Member Municipality under which:

(a) all, some or some portion of the development cost charges under this Bylaw that would otherwise apply are not required to be collected and remitted by the Member Municipality; and

(b) the Member Municipality agrees to pay to the GVS&DD an amount equal to the development cost charges that the Member Municipality would have collected under this Bylaw but for such an agreement, in the manner and at the times set out in the agreement, or otherwise in the same manner and at the same times that development cost charges would otherwise have been payable.

6.2 **Failure to Remit Development Cost Charges.** If a Member Municipality fails, for any reason, other than under an agreement under section 6.1, to collect any development cost charges payable under this Bylaw or to remit to the GVS&DD any development cost charges collected by it, the Member Municipality must pay to the GVS&DD on demand an amount equal to the development cost charges that the Member Municipality should have collected or remitted under this Bylaw.

7.0 Interpretation

7.1 **Severability.** If a portion of this Bylaw is held to be invalid it shall be severed and the remainder of the Bylaw shall remain in effect.

7.2 **Schedules.** The following Schedules are attached to and form part of this bylaw:

- Schedule “A”, Fraser Sewerage Area – Development Cost Charge Rates;
- Schedule “B”, Lulu Island West Sewerage Area – Development Cost Charge Rates;
- Schedule “C”, North Shore Sewerage Area – Development Cost Charge Rates; and
- Schedule “D”, Vancouver Sewerage Area – Development Cost Charge Rates.

8.0 Effective Date

8.1 This bylaw will come into effect on January 1, 2025.

Read a first, second, and third time this _____ day of _____, _____.

Approved by the Inspector of Municipalities this _____ day of _____,

Adopted this _____ day of _____, _____.

George V. Harvie, Chair

Dorothy Shermer, Corporate Officer

Schedule A

FRASER SEWERAGE AREA – DEVELOPMENT COST CHARGE RATES

As of January 1, 2025 to December 31, 2025

	Description	Rate	
1.	Residential Lot Development Unit	$11,443	per Residential Lot Development Unit
2.	Townhouse Dwelling Unit	$10,015	per Dwelling Unit
3.	Apartment Dwelling Unit	$7,302	per Dwelling Unit
4.	Non-Residential Use	$5.41	multiplied by the number of square feet of Floor Area

As of January 1, 2026 to December 31, 2026

	Description	Rate	
1.	Residential Lot Development Unit	$12,311	per Residential Lot Development Unit
2.	Townhouse Dwelling Unit	$10,775	per Dwelling Unit
3.	Apartment Dwelling Unit	$7,855	per Dwelling Unit
4.	Non-Residential Use	$5.82	multiplied by the number of square feet of Floor Area

As of January 1, 2027

	Description	Rate	
1.	Residential Lot Development Unit	$13,613	per Residential Lot Development Unit
2.	Townhouse Dwelling Unit	$11,914	per Dwelling Unit
3.	Apartment Dwelling Unit	$8,686	per Dwelling Unit
4.	Non-Residential Use	$6.43	multiplied by the number of square feet of Floor Area

Schedule B

LULU ISLAND WEST SEWERAGE AREA – DEVELOPMENT COST CHARGE RATES

As of January 1, 2025 to December 31, 2025

	Description	Rate	
1.	Residential Lot Development Unit	$5,683	per Residential Lot Development Unit
2.	Townhouse Dwelling Unit	$4,927	per Dwelling Unit
3.	Apartment Dwelling Unit	$3,516	per Dwelling Unit
4.	Non-Residential Use	$2.55	multiplied by the number of square feet of Floor Area

As of January 1, 2026 to December 31, 2026

	Description	Rate	
1.	Residential Lot Development Unit	$6,152	per Residential Lot Development Unit
2.	Townhouse Dwelling Unit	$5,333	per Dwelling Unit
3.	Apartment Dwelling Unit	$3,806	per Dwelling Unit
4.	Non-Residential Use	$2.76	multiplied by the number of square feet of Floor Area

As of January 1, 2027

	Description	Rate	
1.	Residential Lot Development Unit	$6,855	per Residential Lot Development Unit
2.	Townhouse Dwelling Unit	$5,943	per Dwelling Unit
3.	Apartment Dwelling Unit	$4,241	per Dwelling Unit
4.	Non-Residential Use	$3.08	multiplied by the number of square feet of Floor Area

Schedule C

NORTH SHORE SEWERAGE AREA – DEVELOPMENT COST CHARGE RATES

As of January 1, 2025 to December 31, 2025

	Description	Rate	
1.	Residential Lot Development Unit	$9,760	per Residential Lot Development Unit
2.	Townhouse Dwelling Unit	$8,996	per Dwelling Unit
3.	Apartment Dwelling Unit	$6,005	per Dwelling Unit
4.	Non-Residential Use	$5.00	multiplied by the number of square feet of Floor Area

As of January 1, 2026 to December 31, 2026

	Description	Rate	
1.	Residential Lot Development Unit	$10,478	per Residential Lot Development Unit
2.	Townhouse Dwelling Unit	$9,658	per Dwelling Unit
3.	Apartment Dwelling Unit	$6,448	per Dwelling Unit
4.	Non-Residential Use	$5.37	multiplied by the number of square feet of Floor Area

As of January 1, 2027

	Description	Rate	
1.	Residential Lot Development Unit	$11,557	per Residential Lot Development Unit
2.	Townhouse Dwelling Unit	$10,652	per Dwelling Unit
3.	Apartment Dwelling Unit	$7,111	per Dwelling Unit
4.	Non-Residential Use	$5.92	multiplied by the number of square feet of Floor Area

Schedule D

VANCOUVER SEWERAGE AREA – DEVELOPMENT COST CHARGE RATES

As of January 1, 2025 to December 31, 2025

	Description	Rate	
1.	Residential Lot Development Unit	$10,498	per Residential Lot Development Unit
2.	Townhouse Dwelling Unit	$9,593	per Dwelling Unit
3.	Apartment Dwelling Unit	$6,298	per Dwelling Unit
4.	Non-Residential Use	$5.30	multiplied by the number of square feet of Floor Area

As of January 1, 2026 to December 31, 2026

	Description	Rate	
1.	Residential Lot Development Unit	$11,290	per Residential Lot Development Unit
2.	Townhouse Dwelling Unit	$10,316	per Dwelling Unit
3.	Apartment Dwelling Unit	$6,772	per Dwelling Unit
4.	Non-Residential Use	$5.70	multiplied by the number of square feet of Floor Area

As of January 1, 2027

	Description	Rate	
1.	Residential Lot Development Unit	$12,476	per Residential Lot Development Unit
2.	Townhouse Dwelling Unit	$11,400	per Dwelling Unit
3.	Apartment Dwelling Unit	$7,484	per Dwelling Unit
4.	Non-Residential Use	$6.30	multiplied by the number of square feet of Floor Area

GREATER VANCOUVER WATER DISTRICT
BYLAW NO. 260, 2023
A Bylaw to Amend "Greater Vancouver Water District Development Cost Charge Bylaw No. 257, 2022"

WHEREAS:

A. The Board of Directors of the Greater Vancouver Water District has adopted "Greater Vancouver Water District Development Cost Charge Bylaw No. 257, 2022", a bylaw imposing development cost charges on every person who obtains approval of a subdivision or a building permit authorizing the construction, alternation or extension of a building or structure from a Member Municipality; and

B. The Board of Directors of the Greater Vancouver Water District wishes to amend "Greater Vancouver Water District Development Cost Charge Bylaw No. 257, 2022";

NOW THEREFORE the Board of the Greater Vancouver Water District enacts as follows:

Citation

1. The official citation of this bylaw is "Greater Vancouver Water District Development Cost Charge Amendment Bylaw No. 260, 2023".

Effective Date

2. This bylaw will come into effect on January 1, 2025.

Schedule

3. The following Schedule is attached to and forms part of the bylaw:
    - Schedule "A", GVWD Development Cost Charge Rates

Amendment of Bylaw

4. The "Greater Vancouver Water District Development Cost Charge Bylaw No. 257, 2022" (the "Bylaw") is hereby amended as follows:

    (a) The definition **"Non-Residential Use"** in section 3 of the Bylaw is amended by deleting the word "Unity" and replacing it with the word "Unit";

    (b) Section 5.4(a) of the Bylaw is deleted and replaced with the following:

        (a) the number and type of use of all Dwelling Units and Residential Lot Development Units on which development cost charges were levied by it under this Bylaw;

    (c) Schedule "A" of the Bylaw is deleted and replaced with the Schedule "A" attached to and forming part of this bylaw.

Read a first, second, and third time this _____ day of _____, _____.

Approved by the Inspector of Municipalities this _____ day of _____,

Adopted this _____ day of _____, _____.

George V. Harvie, Chair

Dorothy Shermer, Corporate Officer

Schedule A

GVWD DEVELOPMENT COST CHARGE RATES

As of January 1, 2025 to December 31, 2025

	Description	Rate
1.	Residential Lot Development Unit	$10,952 per Residential Lot Development Unit
2.	Townhouse Dwelling Unit	$9,839 per Dwelling Unit
3.	Apartment Dwelling Unit	$6,791 per Dwelling Unit
4.	Non-Residential Use	$5.30 multiplied by the number of square feet of Floor Area

As of January 1, 2026 to December 31, 2026

	Description	Rate
1.	Residential Lot Development Unit	$16,926 per Residential Lot Development Unit
2.	Townhouse Dwelling Unit	$15,206 per Dwelling Unit
3.	Apartment Dwelling Unit	$10,495 per Dwelling Unit
4.	Non-Residential Use	$8.19 multiplied by the number of square feet of Floor Area

As of January 1, 2027

	Description	Rate
1.	Residential Lot Development Unit	$19,714 per Residential Lot Development Unit
2.	Townhouse Dwelling Unit	$17,710 per Dwelling Unit
3.	Apartment Dwelling Unit	$12,223 per Dwelling Unit
4.	Non-Residential Use	$9.54 multiplied by the number of square feet of Floor Area

METRO VANCOUVER REGIONAL DISTRICT
BYLAW NO. 1369, 2023
A Bylaw to Impose Development Cost Charges for the Provision of Regional Park Land

WHEREAS:

A. Pursuant to the *Local Government Act* ("the Act"), the Metro Vancouver Regional District ("the MVRD"), may, by bylaw, impose development cost charges on every person who obtains approval of a subdivision or a building permit authorizing the construction, alteration or extension of a building or structure from a Member Municipality;

B. Development cost charges provide funds to assist the MVRD in paying the capital costs of providing regional park land, to service, directly or indirectly, the development for which the charge is being imposed;

C. Pursuant to the Act, development cost charges are not payable in certain circumstances and the MVRD may waive or reduce development cost charges for eligible developments;

D. Member Municipalities collect the development cost charges imposed under this Bylaw and remit them to the MVRD;

E. In setting development cost charges under this Bylaw, the MVRD has considered:

(a) future land use patterns and development;
(b) the phasing of works and services;
(c) the provision of park land described in an official community plan;
(d) how development designed to result in a low environmental impact may affect the capital costs of infrastructure referred to in sections 559(2) and (3) of the Act;
(e) whether the charges are excessive in relation to the capital cost of prevailing standards of service in the municipality or regional district;
(f) whether the charges will, in the municipality or regional district,
    (i) deter development,
    (ii) discourage the construction of reasonably priced housing or the provision of reasonably priced serviced land, or
    (iii) discourage development designed to result in a low environmental impact.

NOW THEREFORE the Board of the Metro Vancouver Regional District enacts as follows:

1. Citation

1.1 The official citation of this bylaw is "Metro Vancouver Regional District Development Cost Charge Bylaw No. 1369, 2023". This bylaw may be cited as the "MVRD Development Cost Charge Bylaw".

2. Schedule

2.1 The following Schedule is attached to and forms part of the bylaw:

- Schedule "A", MVRD Development Cost Charge Rates for Provision of Regional Park Land

3. Definitions

3.1 In this Bylaw:

"Apartment Dwelling Unit" means a Dwelling Unit in a building or structure that consists or may consist of two or more storeys and contains or may contain four or more Dwelling Units, whereby the building or structure has a principal exterior entrance used in common for access to the Dwelling Units. Apartment Dwelling Unit does not include Dwelling Units that are Townhouse Dwelling Units;

"Building Permit" means any permit required by a Member Municipality that authorizes the construction, alteration or extension of a building or structure;

"Combination Development" means any Development that comprises two or more of the following uses:

(a) Apartment Dwelling Unit;

(b) Residential Lot Development Unit;

(c) Townhouse Dwelling Unit; and

(d) Non-Residential Use;

"*Community Charter*" means the *Community Charter*, SBC 2003, c. 26;

"Development" means:

(a) a Subdivision; or

(b) the construction, alteration or extension of a building or structure for which a Building Permit is obtained;

"Dwelling Unit" means one or more rooms comprising a self-contained unit that is used or intended to be used for living and sleeping purposes and for which are provided cooking facilities, or the facilities for installation of cooking facilities, and one or more bathrooms having a sink or wash-basin, a water closet, and a shower or bath;

"Floor Area" means:

(a) the floor area of the building or structure (measured from the outside edge of all exterior walls of the building or structure), less the number of square feet of the floor area of the building or structure that is used or is intended to be used for the parking of motor vehicles and the storage of bicycles; or

(b) in the case of an alteration or extension of less than the entire building or structure, the portion of the building or structure to which the Building Permit applies (measured from the outside edge of any exterior walls in such portion of the building or structure), less the number of square feet of the floor area of the building or structure that is used or is intended to be used for the parking of motor vehicles and the storage of bicycles;

"Metro Vancouver Regional District" or "MVRD" means the Metro Vancouver Regional District, a regional district pursuant to the *Local Government Act,* RSBC 2015, c. 1;

"Land Title Act" means the *Land Title Act*, RSBC 1996, c.250;

"Laneway House" has the definition ascribed to such term in the bylaws of the Member Municipality where the laneway house is located, or, in the absence of such a definition, means a detached building or structure containing one Dwelling Unit and constructed in the yard of a site on which is situate a Single Family Residential Dwelling;

"Local Government Act" means the *Local Government Act*, RSBC 1996, c. 323;

"Member Municipality" means a municipality that is a member of the MVRD;

"Minister" means the member of the Executive Council appointed under the *Constitution Act* charged by order of the Lieutenant Governor in Council with the administration of the *Local Government Act;*

"Municipal Charges" means development cost charges imposed by a Member Municipality under either the *Local Government Act, Community Charter* or the *Vancouver Charter*;

"Non-Residential Use" means any building or structure or any portion of any building or structure that is not Apartment Dwelling Unit, Residential Lot Development Unit or Townhouse Dwelling Unit but for greater certainty, does not include any portion of any Residential Use building or structure that is not part of a Dwelling Unit and is used or is intended to be used solely for the purpose of gaining access to and from Dwelling Units, solely for the maintenance of the building or structure or solely by the occupants of the Dwelling Units in the building or structure;

"Parcel" means any lot, block or other area in which land is held or into which it is legally subdivided and for greater certainty, without limiting the foregoing, including a strata lot under the *Strata Property Act*;

"Rate Schedule" means the schedule of development cost charge rates that is attached as Schedule A to this Bylaw;

"Regional Park" has the definition ascribed to such term in the Metro Vancouver Regional District Regional Parks Regulation Bylaw No. 1177, 2012 as amended (or replaced) from time to time;

"Rent" means money paid or agreed to be paid, or value or a right given or agreed to be given, by or on behalf of a tenant to a landlord in return for the right to rent a Dwelling Unit, for the use of common areas and for services or facilities and includes any and all strata fees, regardless of whether such fees are paid directly to the landlord, but does not include any of the following:

(a) a security deposit;

(b) a pet damage deposit;

(c) a fee prescribed under section 97 (2) (k) of the *Residential Tenancy Act*;

"Residential Lot Development Unit" means a Dwelling Unit on a lot (not including an Apartment Dwelling Unit or a Townhouse Dwelling Unit) but, if the Dwelling Unit is a Single Family Residential Dwelling, also includes:

(a) the construction, alteration or extension of a building or structure for up to one Secondary Suite in the Single Family Residential Dwelling,

(b) the construction, alteration or extension of up to one Laneway House, or

(c) both.

"Residential Tenancy Act" means the *Residential Tenancy Act*, SBC 2002, c. 78;

"Residential Use" means Apartment Dwelling Unit, Residential Lot Development Unit and Townhouse Dwelling Unit;

"Secondary Suite" has the definition ascribed to such term in the bylaws of the Member Municipality where the secondary suite is located, or, in the absence of such a definition, means the smaller Dwelling Unit contained within a Single Family Residential Dwelling;

"Single Family Residential Dwelling" means a detached building or structure that contains one principal Dwelling Unit and may contain one smaller Dwelling Unit;

"Strata Property Act" means the *Strata Property Act*, SBC 1998, c. 43;

"Subdivision" includes a division of land into two or more Parcels, whether by plan, apt descriptive words or otherwise under the *Land Title Act* or the *Strata Property Act*, the consolidation of two or more Parcels of land, and phased strata plans;

"Townhouse Dwelling Unit" means a Dwelling Unit in a building or structure that contains or may contain four or more Dwelling Units, whereby each Dwelling Unit has a direct exterior entrance;

"Vancouver Charter" means the *Vancouver Charter*, SBC 1953, c. 55;

4.0 Development Cost Charges

4.1 **Application of Development Cost Charges**. Subject to section 4.2, every person who obtains:

(a) approval of a Subdivision from a Member Municipality; or

(b) a Building Permit from a Member Municipality;

must pay the applicable development cost charges set out in this Bylaw to that Member Municipality on behalf of the MVRD prior to the approval of the Subdivision or the issuance of the Building Permit.

4.2 **Exemptions from Development Cost Charges**. Development cost charges are not payable under this Bylaw if:

(a) the Development will not impose new capital cost burdens on the MVRD;

(b) a development cost charge has previously been paid for the same Development unless, as a result of further Development, new capital cost burdens will be imposed on the MVRD;

(c) the Building Permit authorizes the construction, alteration or extension of a building or structure or part of a building or structure that is, or will be, after the construction, alteration or extension, exempt from taxation under subsection 220(1)(h) of the *Community Charter*;

(d) the value of the work authorized by the Building Permit does not exceed $50,000 or such other amount which the Minister may prescribe by regulation; or

(e) the Building Permit authorizes the construction, alteration or extension of self-contained Dwelling Units in a building in which:

(i) each Dwelling Unit is no larger in area than 29 square metres [312.153 square feet]; and

(ii) each Dwelling Unit is to be put to no use other than Residential Use in those Dwelling Units.

4.3 **Calculation of Development Cost Charges**. Development cost charges imposed under this Bylaw will be calculated in accordance with the rates set out in the Rate Schedule. The rates set out in the Rate Schedule may be different in relation to one or more of the following:

(a) different zones or different defined or specified areas;

(b) different uses;

(c) different capital costs as they relate to different classes of Development; or

(d) different sizes or different numbers of lots or units in a Development.

4.4 **Combination Development.** Without restricting the generality of section 4.3, the development cost charges for a Combination Development will be calculated separately for the portion of the Combination Development attributable to each of Apartment Dwelling Unit, Residential Lot Development Unit, Townhouse Dwelling Unit and Non-Residential Use and will be the sum of the development cost charges for each such use, calculated according to the Rate Schedule.

4.5 **Payment, Collection and Remittance of Development Cost Charges**. Development cost charges imposed under this Bylaw must be paid to the Member Municipality of the MVRD approving the Subdivision or issuing the Building Permit, as the case may be, as follows:

(a) at the same time as any Municipal Charges as may be levied on the Development under a bylaw of the Member Municipality are payable to the Member Municipality; or

(b) if no Municipal Charges will be levied on the Development under a bylaw of the Member Municipality, as follows:

(i) where an application is made only for Subdivision, prior to the issuance of the approval of the Subdivision by the Member Municipality; or

(ii) where an application is made only for a Building Permit or for both Subdivision and for a Building Permit, prior to the issuance of the Building Permit by the Member Municipality.

4.6 **Payment of Development Cost Charges by Instalments**. The development cost charges imposed under this Bylaw may not be paid by instalments unless a regulation under

subsection 559(5) of the *Local Government Act* applies to the Development and authorizes the payment of development cost charges in instalments.

5.0 Collection and Remittance of Development Cost Charges

5.1 **Collection of Development Cost Charges by Member Municipalities**. Each Member Municipality must:

(a) collect the development cost charges imposed on a Development under this Bylaw; and

(b) not issue approval of a Subdivision or issue a Building Permit for any Development unless the development cost charges imposed under this Bylaw have been paid in accordance with section 4.0.

5.2 **Separate Account.** Each Member Municipality must establish and maintain a separate account for the development cost charge monies collected under this Bylaw and deposit and hold these monies in that separate account, in trust for the MVRD, until the monies are remitted to the MVRD under section 5.3

5.3 **Remittance of Development Cost Charges by Municipalities**. Each Member Municipality, within 30 days after June 30 and December 31 of each year, must remit to the MVRD the total amount of development cost charges collected by the Member Municipality under this Bylaw during the six-month period previous to such date, or an amount equal to such development cost charges if the Member Municipality did not collect development cost charges under this Bylaw, together with the statement referred to in section 5.4.

5.4 **Statements.** Each Member Municipality must provide statements to the MVRD, pursuant to section 5.3, for every six-month period comprising January 1 to June 30 and July 1 to December 31, setting out:

(a) the number and type of use of all Dwelling Units and Residential Lot Development Units on which development cost charges were levied by it under this Bylaw;

(b) the aggregate floor area of all Non-Residential Use buildings or structures on which development cost charges were levied by it under this Bylaw (calculated in accordance with the Rate Schedule);

(c) the legal description and civic address of each Parcel on which development cost charges were levied by it under this Bylaw, whether such development cost charges were levied in respect of a Subdivision or a Building Permit;

(d) the date and amount of each payment of development cost charges levied by it under this Bylaw and where section 4.6 applies to permit development cost charges levied under this Bylaw to be paid by instalments, the amount of instalment

payments remaining to be paid to it and the dates for payment of such remaining instalments;

(e) the total amount of all development cost charges levied by it under this Bylaw and the total amount of all remaining instalment payments;

(f) the number, legal description, civic address and type of use of all Parcels in respect of which Subdivisions were approved where no development cost charges were levied by it under this Bylaw; and

(g) the number and type of use of all Dwelling Units and Residential Lot Development Units and the aggregate floor area of all Non-Residential Use buildings or structures (calculated in accordance with the Rate Schedule) in respect of which Building Permits were required where no development cost charges were levied by it under this Bylaw.

5.5 **Failure to Remit Development Cost Charges**. If a Member Municipality fails, for any reason, to collect any development cost charges payable under this Bylaw or to remit to the MVRD any development cost charges collected by it, the Member Municipality must pay to the MVRD on demand an amount equal to the development cost charges that the Member Municipality should have collected or remitted under this Bylaw.

6.0 Severability

6.1 If a portion of this Bylaw is held to be invalid it shall be severed and the remainder of the Bylaw shall remain in effect.

7.0 Effective Date

7.1 This bylaw will come into effect on January 1, 2025.

Read a first, second, and third time this _____ day of _____, _____.

Approved by the Inspector of Municipalities this _____ day of _____,

Adopted this _____ day of _____, _____.

George V. Harvie, Chair

Dorothy Shermer, Corporate Officer

Schedule A

MVRD DEVELOPMENT COST CHARGE RATES FOR PROVISION OF REGIONAL PARK LAND

As of January 1, 2025 to December 31, 2025

	Description	Rate
1.	Residential Lot Development Unit	$491 per Residential Lot Development Unit
2.	Townhouse Dwelling Unit	$442 per Dwelling Unit
3.	Apartment Dwelling Unit	$303 per Dwelling Unit
4.	Non-Residential Use	$0.24 multiplied by the number of square feet of Floor Area

As of January 1, 2026 to December 31, 2026

	Description	Rate
1.	Residential Lot Development Unit	$981 per Residential Lot Development Unit
2.	Townhouse Dwelling Unit	$884 per Dwelling Unit
3.	Apartment Dwelling Unit	$606 per Dwelling Unit
4.	Non-Residential Use	$0.48 multiplied by the number of square feet of Floor Area

As of January 1, 2027

	Description	Rate
1.	Residential Lot Development Unit	$1,943 per Residential Lot Development Unit
2.	Townhouse Dwelling Unit	$1,751 per Dwelling Unit
3.	Apartment Dwelling Unit	$1,199 per Dwelling Unit
4.	Non-Residential Use	$0.94 multiplied by the number of square feet of Floor Area

Metro Vancouver Development Cost Charges:

Comparison of Potential Financial Impact on New Development of Metro Vancouver's Proposed DCC Rate Increases and Changes in Other Market Factors

15 September 2023

Prepared for:
Metro Vancouver

By:
coriolis
CONSULTING CORP.

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1.0 Introduction

1.1 Background

Metro Vancouver collects development cost charges (DCCs) from new residential and non-residential developments in the region to help pay for the new liquid waste and water infrastructure that is needed to provide services to the future occupants of these buildings.

Currently, Metro Vancouver has two separate DCC charges: a Liquid Waste DCC and a Water DCC. These existing DCCs only recover a share of the capital costs associated with new urban development. Metro Vancouver is considering changes to its Liquid Waste DCC rates and its Water DCC rates to recover a higher portion of the growth-related capital costs through DCCs. Metro Vancouver is also considering implementing a new DCC for Regional Parks.

In the absence of DCCs, funding for Metro Vancouver's liquid waste, water, and regional parks capital programs would need to come from a combination of long-term debt, contributions from the operating budget (e.g. utility/user fees), reserves, and external contributions (e.g. interagency and senior level government grants).

Metro Vancouver's objective in charging DCCs is to help ensure that new development in the region funds the capital costs of regional liquid waste, water, and park expansion projects required to serve the new development.

However, increased DCCs lead to increased project costs (in the absence of any reduction in other costs). Like any other cost increase, increased DCCs can lead to three different potential impacts:

- A reduction in development site land values if the increased cost can be passed back to landowners. This can occur when the value of a development site under its existing use (e.g. house, low density commercial building) is lower than the land value supported by redevelopment.
- An increase in the market price (sales prices or rents) of new units/floorspace. This can occur if the increased cost reduces the number of projects that are financially viable for development, creating downward pressure on the supply of new product in the market. Decreasing new supply in the face of continued demand will likely result in increased market prices for new (and existing) product.
- A reduction in profit margins for new projects. This can occur if the increased cost cannot be passed along to buyers/renters of the new space and cannot be passed back to landowners (e.g. if the site was already purchased).

The actual impact will depend on the dynamics of the market (e.g., supply of development sites, viability of new development, amount of new product). To determine which of these three outcomes should be expected (or which combination) due to the proposed Metro Vancouver DCC rate increases, it would be necessary to complete detailed financial analysis for a large sample of case study development projects throughout the region.

However, prior to completing detailed financial analysis for a large sample of case study sites in the region, as an input to consultation and engagement about the proposed rate increases, Metro Vancouver retained Coriolis Consulting to provide a high level evaluation of the potential financial impact of the proposed DCC rate increase in comparison to other key market variables that developers of new projects often face, such as:

- Hard construction cost changes (due to inflation).
- Changes in interest rates on construction financing.

- Revenue changes (unit sales prices or rents due to changes in demand and supply).

This report summarizes our approach and key findings. It focuses on residential development projects (not non-residential projects).

1.2 Professional Disclaimer

This document may contain estimates and forecasts of future growth and urban development prospects, estimates of the financial performance of possible future urban development projects, opinions regarding the likelihood of approval of development projects, and recommendations regarding development strategy or municipal policy. All such estimates, forecasts, opinions, and recommendations are based in part on forecasts and assumptions regarding population change, economic growth, policy, market conditions, development costs and other variables. The assumptions, estimates, forecasts, opinions, and recommendations are based on interpreting past trends, gauging current conditions, and making judgments about the future. As with all judgments concerning future trends and events, however, there is uncertainty and risk that conditions change or unanticipated circumstances occur such that actual events turn out differently than as anticipated in this document, which is intended to be used as a reasonable indicator of potential outcomes rather than as a precise prediction of future events.

Nothing contained in this report, express or implied, shall confer rights or remedies upon, or create any contractual relationship with, or cause of action in favor of, any third party relying upon this document.

In no event shall Coriolis Consulting Corp. be liable to Metro Vancouver or any third party for any indirect, incidental, special, or consequential damages whatsoever, including lost revenues or profits.

2.0 Role of Metro Vancouver Development Cost Charges

Metro Vancouver's liquid waste infrastructure capital programs are "funded by a combination of long-term debt, contributions from the operating budget, some external (interagency and senior level government grant) contributions, and development cost charges (DCCs)."[1]

The existing liquid waste DCC rates reflect a 17.5% assist factor (i.e. 82.5% of *development-related* capital costs are funded through the DCC). Metro Vancouver proposes to adjust the liquid waste DCC rates over a three-year period to achieve a 1% assist factor by January 2027 (i.e. 99% of development-related liquid waste capital costs would be funded through the DCC).

Metro Vancouver's water infrastructure capital programs are "funded by a combination of long-term debt, reserves, contributions from the operating budget, external (interagency) contributions"[2] and DCCs which help fund growth-related projects. The water capital program includes projects needed to meet the needs of a growing population, maintenance of aging infrastructure, upgrades to improve the resiliency of the regional water system, and projects to achieve goals such as climate change mitigation.

The existing water DCC rates reflect a 50% assist factor. Metro Vancouver proposes to adjust the water DCC rates over a three period to achieve a 1% assist factor by January 2027 (i.e. 99% of development-related water infrastructure capital costs would be funded through the DCC).

Metro Vancouver's parks capital program is currently "funded primarily by reserve funds."[3] Metro Vancouver proposes to establish a new regional parks DCC to help ensure that new development in the region helps fund the cost of major park development and parkland acquisition required to serve growth. As with its other DCCs, Metro Vancouver proposes to establish rates phased in over a three-year period that will achieve a 1% assist factor by January 2027 (i.e. 99% of development-related park development and acquisition capital costs would be funded through the DCC).

The infrastructure provided by Metro Vancouver is a critical part of supporting new urban development in the region so new development should help fund the growth-related costs. Therefore, Metro Vancouver's objective in charging DCCs is to help ensure that new development in the region funds or partially funds the capital costs of regional liquid waste, water, and park expansion projects required to serve new development.

In the absence of DCCs, funding for Metro Vancouver's liquid waste, water, and regional parks capital programs would need to come entirely from a combination of long-term debt, contributions from the operating budget (e.g. utility/user fees), reserves, and external contributions (e.g. interagency and senior level government grants).

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[1] Metro Vancouver, "Memorandum - 2023 - 2027 Financial Plan - Liquid Waste Services" from the General Manager, Liquid Waste Services, to the Liquid Waste Committee. September 28, 2022, page 6. Available online at: https://metrovancouver.org/about-us/Documents/financial-plan-standing-committee-reports-2027.pdf

[2] Metro Vancouver, "Memorandum - 2023 - 2027 Financial Plan - Water Services" from the General Manager, Water Services, to the Water Committee. September 27, 2022, page 5. Available online at: https://metrovancouver.org/about-us/Documents/financial-plan-standing-committee-reports-2027.pdf

[3] Metro Vancouver, "Memorandum - 2023 - 2027 Financial Plan - Regional Parks" from the General Manager, Parks and Environment and the Director, Regional Parks, to the Regional Parks Committee. October 6, 2022, page 5. Available online at: https://metrovancouver.org/about-us/Documents/financial-plan-standing-committee-reports-2027.pdf

3.0 Approach to Evaluation

Our evaluation included the following main steps:

1. Confirmed the proposed DCC rates with Metro Vancouver.
2. Reviewed key trends in regional market factors including changes in construction costs, interest rates, residential unit sales prices, and apartment unit rents over the past year.
3. Selected representative residential project case studies for our evaluation of possible financial impacts. We selected a case study for each of the following five types of projects:
   - Lowrise condominium apartment.
   - Highrise condominium apartment.
   - Townhouse project.
   - Single family house.
   - Lowrise rental apartment.
4. Modelled the financial performance of the hypothetical case study development projects to calculate:
   - The building value upon completion.
   - The likely building creation cost (the all-in costs, including hard costs, soft costs, DCCs, financing, other costs).
   - The likely land acquisition cost.
   - The calculated profit margin to the developer (revenues less costs).
5. Estimated the potential impact of the proposed Metro Vancouver DCC rate increases on:
   - Land values (if the increased DCC is passed back to landowners).
   - The calculated profit (if the increased cost is absorbed by the developer).
   - End unit prices (or rents) if the increased DCC results in higher unit prices or rents due to a reduced supply of new product.
6. Repeated the analysis in step 5 to estimate the potential impact of changes (based on the past 12 month change) in construction costs, construction financing rates, and market sales prices (or rents).
7. Compared the potential impact of the proposed changes in Metro Vancouver DCC rates with the impact of changes in the other key market variables on:
   - Land values (if the increased DCC is passed back to landowners).
   - The calculated profit (if the increased cost is absorbed by the developer).
   - End unit prices (or rents) if the increased DCC results in higher unit prices or rents due to a reduced supply of new housing product.

4.0 Proposed DCC Rates

Exhibit 1 shows the existing Metro Vancouver DCC rates, the proposed Metro Vancouver DCC rates as of January 1, 2027, and the total change between the existing rates and proposed January 1, 2027 rates. The DCC rates vary by land use category (single family residential, townhouse, apartment, non-residential). Residential categories are charged per unit/dwelling, while non-residential developments are charged per square foot.

It should be noted that the liquid waste DCC varies across four separate sewerage areas in the region. The water DCC rates and the proposed regional park DCC rates have one fee structure across the entire region.

It should also be noted that Metro Vancouver proposes to phase in the increased DCC rates over a three-year period, with new rates as of January 1, 2025, January 1, 2026, and January 1, 2027. For our analysis, we focused on the total combined DCC rate increase being proposed (water, liquid waste, parks) to achieve a 1% assist factor (i.e. the change between the existing rates and the proposed January 1, 2027 rates), not the changes to the individual DCC rates.

Exhibit 1: Existing and Proposed Metro Vancouver DCC Rates

	Existing DCC rates				Proposed Jan 1, 2027 DCC Rates				**Change** from Existing DCC Rates to Jan 1, 2027 DCC Rates			
	Water	Liquid Waste	Park	Total	Water	Liquid Waste	Park	Total	Water	Liquid Waste	Park	Total Change
Vancouver Sewerage Area:												
Single Family Residential	$ 6,692	$ 3,335	none	$ 10,027	$ 19,714	$ 12,476	$ 1,943	$ 34,133	$ 13,022	$ 9,141	$ 1,943	$ 24,106
Townhouse	$ 5,696	$ 2,983	none	$ 8,679	$ 17,710	$ 11,400	$ 1,751	$ 30,861	$ 12,014	$ 8,417	$ 1,751	$ 22,182
Apartment	$ 4,261	$ 1,988	none	$ 6,249	$ 12,223	$ 7,484	$ 1,199	$ 20,906	$ 7,962	$ 5,496	$ 1,199	$ 14,657
Non Residential	$ 3.39	$ 1.63	none	$ 5.02	$ 9.54	$ 6.30	$ 0.94	$ 16.78	$ 6.15	$ 4.67	$ 0.94	$ 11.76
North Shore Sewerage Area:												
Single Family Residential	$ 6,692	$ 3,300	none	$ 9,992	$ 19,714	$ 11,557	$ 1,943	$ 33,214	$ 13,022	$ 8,257	$ 1,943	$ 23,221
Townhouse	$ 5,696	$ 2,786	none	$ 8,482	$ 17,710	$ 10,652	$ 1,751	$ 30,113	$ 12,014	$ 7,866	$ 1,751	$ 21,632
Apartment	$ 4,261	$ 2,030	none	$ 6,291	$ 12,223	$ 7,111	$ 1,199	$ 20,533	$ 7,962	$ 5,081	$ 1,199	$ 14,242
Non Residential	$ 3.39	$ 1.67	none	$ 5.06	$ 9.54	$ 5.92	$ 0.94	$ 16.40	$ 6.15	$ 4.25	$ 0.94	$ 11.34
Lulu Island West Sewerage Area:												
Single Family Residential	$ 6,692	$ 3,313	none	$ 10,005	$ 19,714	$ 6,855	$ 1,943	$ 28,512	$ 13,022	$ 3,542	$ 1,943	$ 18,506
Townhouse	$ 5,696	$ 2,756	none	$ 8,452	$ 17,710	$ 5,943	$ 1,751	$ 25,404	$ 12,014	$ 3,187	$ 1,751	$ 16,952
Apartment	$ 4,261	$ 2,042	none	$ 6,303	$ 12,223	$ 4,241	$ 1,199	$ 17,663	$ 7,962	$ 2,199	$ 1,199	$ 11,360
Non Residential	$ 3.39	$ 1.54	none	$ 4.93	$ 9.54	$ 3.08	$ 0.94	$ 13.56	$ 6.15	$ 1.54	$ 0.94	$ 8.63
Fraser Sewerage Area:												
Single Family Residential	$ 6,692	$ 6,254	none	$ 12,946	$ 19,714	$ 13,613	$ 1,943	$ 35,270	$ 13,022	$ 7,359	$ 1,943	$ 22,324
Townhouse	$ 5,696	$ 5,390	none	$ 11,086	$ 17,710	$ 11,914	$ 1,751	$ 31,375	$ 12,014	$ 6,524	$ 1,751	$ 20,289
Apartment	$ 4,261	$ 4,269	none	$ 8,530	$ 12,223	$ 8,686	$ 1,199	$ 22,108	$ 7,962	$ 4,417	$ 1,199	$ 13,578
Non Residential	$ 3.39	$ 3.30	none	$ 6.69	$ 9.54	$ 6.43	$ 0.94	$ 16.91	$ 6.15	$ 3.13	$ 0.94	$ 10.22

The proposed combined DCC rate increases for residential projects are as follows:

- $18,506 to $24,106 per single family lot (depending on location).
- $16,952 to $22,182 per townhouse unit (depending on location.
- $11,360 to $14,657 per apartment unit (depending on location).

5.0 Types of Case Studies Analyzed

The financial performance of redevelopment varies throughout the region depending on a site's location, existing use and zoning (which influence existing value), proposed use, redevelopment density and other land use regulations (such as municipal DCCs and CAC or density bonus policies) so any impacts of increased Metro Vancouver DCCs will vary from project to project.

For this high level evaluation, we selected five sites to model the financial performance of hypothetical case study projects that are representative of a range of different types of residential projects that occur in Metro Vancouver (and that account for a large share of new development in the region). The sites selected are all in locations that are good candidates for redevelopment, based on municipal policy and market interest. Any impact on these hypothetical projects from increased Metro Vancouver DCCs will be broadly indicative of the potential impact on similar types of redevelopment projects.

The five case studies can be summarized as follows:

1. A new lowrise condominium apartment project in Coquitlam. This case study is located in Burquitlam and assumes 6-storey woodframe strata apartment development at a density of 2.3 FSR.
2. A new highrise condominium apartment project in Surrey. This case study is located in Surrey City Centre and assumes highrise strata apartment development at a density of 7.5 FSR.
3. A new strata townhouse project in Vancouver. This case study is located in Marpole and assumes a 3-storey townhouse project with underground parking at a density of 1.2 FSR.
4. A new single family house in Surrey. This case study is located in a hypothetical new 25 lot subdivision in South Surrey. The analysis focuses on one new single family home in the overall subdivision.
5. A new lowrise rental apartment project in Vancouver. This case study is located in East Vancouver and assumes 5-storey woodframe market rental apartment development at a density of 2.4 FSR.

6.0 Trends in Key Market Factors

To inform the component of the analysis that examines the impact of changes in key market factors on new development projects, we examined third party indicators of the changes for each of the variables over the past year or so in Metro Vancouver, including:

- Construction costs changes (by type) for the Vancouver CMA (Statistics Canada building construction price index).
- Construction financing costs (Bank of Canada).
- Residential sales prices (by type) in Metro Vancouver (Greater Vancouver Real Estate Board's Home Price Index).
- Rental apartment rent rates in the Vancouver CMA (CMHC).

The key findings are summarized in the following sections.

6.1 Construction Costs

Exhibit 2 shows the change in residential construction costs in Greater Vancouver by quarter from Q2 2022 to Q2 2023 (most recent available) based on Statistics Canada data.

Exhibit 2: Building Construction Price Index – Vancouver CMA

Vancouver Metropolitan Area	Q2 2022	Q2 2023	12 Month Change
Highrise Apartment Buildings	133.8	145.2	8.5%
Lowrise Apartment Buildings	148.4	158.8	7.0%
Townhouse	150.4	160.2	6.5%
Single Detached House	149.8	160.2	6.9%

Source: Statistics Canada Building Construction Price Index – base year = 2017.

Between Q2 2022 and Q2 2023, residential construction costs increased by between 6.5% and 8.5% depending on the type of project. This follows higher increases in the previous two years.

6.2 Construction Financing Rates

Developers of new projects rely on construction financing in order to proceed with a project. Construction financing is often linked to the prime rate. Since March 2022, the Bank of Canada has increased its policy rate nine times leading to increases in the prime rate.

As of September 2023, the prime rate is 7.2%. This is up 2.5 percentage points from September 2022 (and up 4.75 percentage points from early 2022). This has increased the cost of financing new projects.

6.3 Home Prices

The Real Estate Board of Greater Vancouver publishes a monthly index (Home Price Index – HPI) that tracks the value of a typical home by neighbourhood and by structure type (detached, townhouse, apartment).

Exhibit 3 shows the HPI data for Metro Vancouver from August 2022 to August 2023.

From August 2022 to August 2023, the HPI for homes in Metro Vancouver increased by 3.2% for detached homes, 3.8% for townhouse units, and 4.4% for apartment units.

The rate of increase has been higher during 2023 (to August).

Exhibit 3: Home Price Index – Metro Vancouver

Metro Vancouver	Aug 2022		Jan 2023	Feb 2023	Mar 2023	Apr 2023	May 2023	Jun 2023	Jul 2023	Aug 2023	12 Month Change
Single Detached	363.5		336.6	342.0	347.7	356.8	363.3	370.3	374.3	375.3	3.2%
Townhouse	369.2		355.2	365.0	368.2	375.5	376.2	381.7	383.7	383.4	3.8%
Apartment	339.9		331.9	336.5	338.9	346.8	350.6	353.5	355.6	354.8	4.4%

Source: Greater Vancouver Real Estate Board.

6.4 Apartment Rents

Exhibit 4 shows the average rent rate for apartment units in the Vancouver CMA by building age between October 2021 and October 2022 as reported by CMHC.

Rents for apartment units in the Vancouver CMA increased by 7.6% per year over this time period in newer rental buildings (2005 and newer). The rate of increase was higher in the overall rental stock.

Exhibit 4: Apartment Rents – Vancouver CMA

Average Rent per Unit	October 2021	October 2022	12 Month Change
All Buildings	$ 1,537	$ 1,665	8.3%
2005 and New Buildings	$ 2,072	$ 2,230	7.6%

Source: CMHC.

More recent data from CMHC data is not available. However information and reports published on rental websites such as Rentals.ca and Liv.rent indicate rent rates have continued to increase at this rate (or faster) from October 2022 to August 2023.

6.5 Summary

Exhibit 5 summarizes the year over year (12 month) change in the market variables that we reviewed.

Exhibit 5: 12 Month Change in Market Variables

Variable	Directional Trend	Year over Year Change	Impact on Project Performance
Single Detached, Townhouse, and Apartment Home Prices	Increasing	3.2% to 4.4%	Positive
Newer Apartment Rents	Increasing	7.6%	Positive
Residential Construction Costs by unit type	Increasing	6.5% to 8.5%	Negative
Financing Costs	Increasing	2.5 percentage points	Negative

7.0 Financial Evaluation

7.1 Methodology

Increased DCCs lead to increased project construction costs. Any increase in development costs (not just DCCs) can lead to three different potential impacts:

- A reduction in development site land values if the increased cost can be passed back to landowners. This can occur when the value of a development site under its existing use (e.g. house, low density commercial building) is lower than the land value supported by redevelopment. In this case, property owners still have an incentive to sell for redevelopment at a reduced land value as the land value exceeds the value under existing use. However, if the additional DCC cost is large and it has a significant impact on land values, then this can change the highest and best use of a property from a redevelopment site into a holding property (which can reduce the number of sites that are attractive and available for development).
- A reduction in profit margins for new projects. This can occur if the increased cost cannot be passed to landowners (e.g. if the site has already been purchased or if the highest value of the site is based on its existing use not on the redevelopment land value) and if the increased cost cannot be passed along to the buyers/renters of the new space.
- An increase in the market price (sales prices or rents) of new units/floorspace. Market pricing is determined by supply and demand, not by project costs. So a developer cannot just pass increased costs along to buyers/renters. However, market prices can increase if the increased DCC reduces the number of projects that are financially viable for development, creating downward pressure on the supply of new product. Decreasing new supply in the face of continued demand will likely result in increased market prices for new (and existing) product.

The actual impact will depend on the dynamics of the market (e.g., supply of development sites, viability of new development, amount of new product). So, it is not possible to determine which of these three outcomes should be expected for the proposed Metro Vancouver DCC rate increases without completing detailed financial analysis for a large sample of cases study development projects throughout the region.

Therefore, for this high level evaluation, we estimated the potential impact of the proposed DCC rate increase at each of the five case studies for all three potential outcomes (i.e. possible impact on land values, profit margins, and end unit pricing).

Our evaluation included the following steps:

1. For each case study scenario, we modelled the financial performance of the hypothetical new development project based on the applicable allowable use and density (and other development regulations) at the site using residual land value analysis (proforma analysis). Residual land value analysis is a common method of estimating the land value supported by development. The steps include: estimating the revenue from selling (or renting) completed units, deducting all construction costs (hard and soft), and deducting a typical allowance for developer profit. The amount left over is the residual land value, which is the maximum amount a developer could afford to pay for the site and have a viable development project. Our analysis for each case study scenario incorporates other existing municipal and regional DCCs and any fixed rate local government Community Amenity Contributions (CACs) or density bonus contributions where applicable, as of August 2023.

2. We used the financial modelling to test five scenarios at each case study site:
   - Scenario 1 is the base case scenario which assumes the existing Metro Vancouver DCC rates, current construction costs, current financing rates, and current market unit values (or rents).
   - Scenario 2 tests the proposed increase to the Metro Vancouver DCC rates. All other assumptions are the same as in the base case.
   - Scenario 3 assumes increased construction costs (based on the 12 month change in costs). All other assumptions are the same as in the base case.
   - Scenario 4 tests increased construction financing rates (based on the 12 month change in the prime rate). All other assumptions are the same as in the base case.
   - Scenario 5 tests increased residential sales prices or rents (based on the 12 month change in market values). All other assumptions are the same as in the base case.
3. For each of the scenarios tested, we calculated the potential impact of the change on the:
   - Land values supported by redevelopment (assuming the impact is passed back to landowners).
   - Profit margins for new projects (assuming the change cannot be passed back to landowners or passed forward to end users and is instead absorbed by developers in the form of reduced profit margins).
   - End unit prices (assuming the change reduces the number of development sites available, which creates downward pressure on the supply of new product and, in the context of continued demand, can increase end unit prices).
4. We compared the potential impacts from the increased DCC rates (Scenario 2) on each potential variable that could be impacted (i.e. land values, profit margins, end unit prices) with the potential impact of changes due to the other key market variables (Scenarios 3 to 5).

7.2 Key Assumptions for Financial Scenarios

The revenue and costs for the base case scenarios vary across the five different case study sites due to the differences in product types and location in the region.

The key assumptions for the four different impact scenarios that we tested at each case study (Scenarios 2 to 5) are based on the proposed Metro Vancouver DCC rate increases or the latest 12 month change in each market variable as outlined in Section 6.0.

Exhibit 6 outlines the scenarios for each case study site and scenario.

Exhibit 6: Scenarios Tested for Each Case Study

	1. Base Case: Existing Combined Metro Van DCC Rate[4]	2. All Assumptions Same as in Base Case, but Increased Metro Vancouver DCC Rate[5]	3. All Assumptions Same as in Base Case, but Hard Construction Cost Increase	4. All Assumptions Same as in Base Case, but Construction Financing Interest Rate Increase[6]	5. All Assumptions Sames as in Base Case, but Unit Sales Price or Rent Increase
Lowrise Strata Apartment Case Study in Coquitlam (Fraser Sewerage Area)	$8,530 per unit	$22,108 per unit	+ 7.0%	+ 2.5 percentage points	+ 4.4%
Highrise Strata Apartment Case Study in Surrey (Fraser Sewerage Area)	$8,530 per unit	$22,108 per unit	+ 8.5%	+ 2.5 percentage points	+ 4.4%
Townhouse Case Study in Vancouver (Vancouver Sewerage Area)	$8,679 per unit	$30,861 per unit	+ 6.5%	+ 2.5 percentage points	+ 3.8%
Single Detached Case Study in Surrey (Fraser Sewerage Area)	$12,946 per lot	$35,270 per lot	+ 6.9%	+ 2.5 percentage points	+3.2%
Lowrise Rental Apartment Case Study in Vancouver (Vancouver Sewerage Area)	$6,249 per unit	$20,906 per unit	+ 7.0%	+ 2.5 percentage points	+ 7.6%

[4] This is the sum of Metro Vancouver's existing liquid waste DCC and existing water DCC rates applicable to the location of the case study site.

[5] The proposed Metro Vancouver DCC rate increases vary by sewerage area. Our analysis uses the proposed combined total Metro Vancouver DCC rate increase (liquid waste, water, and parks) for the specific location of each case study site.

[6] We did not analyze the impact of increased interest rates for take-out financing for a new rental project, just the impact of increased interest rates on construction financing. So our evaluation understates the overall combined impact of construction and take-out financing rates on rental projects.

8.0 Summary of Findings

This section summarizes the results of the case study financial analysis. As previously noted, a total of five sites were analyzed with five scenarios for each site:

- Scenario 1 is the base case scenario that assumes the existing Metro Vancouver DCC rates, current construction costs, current financing rates, and current market unit values (or rents).
- Scenario 2 includes the proposed increases to the Metro Vancouver DCC rates. All other assumptions are the same as in the base case.
- Scenario 3 assumes increased construction costs (based on the most recent 12 month change for which data is available). All other assumptions are the same as in the base case.
- Scenario 4 assumes increased construction financing rates (based on the most recent 12 month change for which data is available). All other assumptions are the same as in the base case.
- Scenario 5 assumes increased residential sales prices or rents (based on the most recent 12 month change for which data is available). All other assumptions are the same as in the base case.

Exhibits 7 to 11 show the following for each case study site and each scenario:

- The location of the project and type of project.
- The estimated change in land value supported by the development scenario in comparison to the base case.
- The estimated profit margin (as a percentage of total project costs) assuming the land is acquired at the current base case market value (for example, if the site was already purchased or the property value is based on its existing use value not the land value supported by redevelopment).
- The approximate change in unit sales prices (or rents) in comparison to the base case if the additional project costs are passed along to end unit buyers or renters (for example, if a reduction in the supply of development sites results in higher unit prices/rents).

The figures in each exhibit for the estimated supportable land value and estimated unit prices (or rents) are expressed as an index with the base case index values set at 100%. Comparing the index figures for the other "impact" scenarios (Scenarios 2 to 5) with the base case indicates the percentage change from the base case.

The estimated profit margin figures are the profit as a percentage of total estimated project costs, so the changes represent percentage points.

Exhibit 7: Lowrise Coquitlam Strata Apartment Project

Lowrise Strata Apartment Project in Coquitlam	1. Base Case	2. Increased Metro Van DCC Rates	3. Increased Hard Costs	4. Increased Financing Rate	5. Increased Unit Values
Estimated Supportable Land Value	100.0%	88.6%	74.4%	88.7%	122.1%
Estimated Profit if Acquired at Current Land Value	15.0%	12.6%	9.8%	12.7%	19.7%
Approximate Unit Prices if Cost Impact is Passed Through to Buyers	100.0%	102.3%	105.1%	102.0%	104.4%

Exhibit 8: Highrise Surrey Strata Apartment Project

Highrise Strata Apartment Project in Surrey	1. Base Case	2. Increased Metro Van DCC Rates	3. Increased Hard Costs	4. Increased Financing Rate	5. Increased Unit Values
Estimated Supportable Land Value	100.0%	76.4%	34.7%	76.5%	141.1%
Estimated Profit if Acquired at Current Land Value	15.0%	12.3%	7.9%	12.3%	19.7%
Approximate Unit Prices if Cost Impact is Passed Through to Buyers	100.0%	102.6%	107.1%	102.1%	104.4%

Exhibit 9: Vancouver Townhouse Project

Townhouse Strata Apartment Project in Vancouver	1. Base Case	2. Increased Metro Van DCC Rates	3. Increased Hard Costs	4. Increased Financing Rate	5. Increased Unit Values
Estimated Supportable Land Value	100.0%	96.6%	93.3%	95.2%	108.6%
Estimated Profit if Acquired at Current Land Value	15.1%	13.5%	12.0%	12.9%	19.1%
Approximate Unit Prices if Cost Impact is Passed Through to Buyers	100.0%	101.5%	103.0%	101.7%	103.8%

Exhibit 10: Surrey Single Family House

Single Family House in Surrey	1. Base Case	2. Increased Metro Van DCC Rates	3. Increased Hard Costs	4. Increased Financing Rate	5. Increased Unit Values
Estimated Supportable Land Value	100%	96.8%	88.1%	95.4%	108.7%
Estimated Profit if Acquired at Current Land Value	15.0%	13.7%	10.3%	13.3%	18.6%
Approximate Unit Prices if Passed Through to Buyers	100%	101.3%	104.6%	101.4%	103.2%

Exhibit 11: Vancouver Lowrise Rental Apartment Project

Lowrise Rental Apartment Project in Vancouver	1. Base Case	2. Increased Metro Van DCC Rates	3. Increased Hard Costs	4. Increased Financing Rate	5. Increased Unit Values
Estimated Supportable Land Value	100.0%	91.1%	85.4%	93.5%	128.3%
Estimated Profit if Acquired at Current Land Value	10.0%	7.4%	5.8%	8.1%	18.2%
Approximate Rent if Cost Impact Passed is Through to Renters	100.0%	102.2%	103.5%	101.5%	107.6%

Exhibit 12 summarize the range of estimated impacts (from the base case) for each of the other scenarios that we tested. The biggest variation across scenarios is for the supportable land value estimates as some sites have comparatively low existing land values. An increased cost has a larger impact on the lower land value sites than the same cost increase on a higher land value site. The range in estimated impacts for the profit margin and end unit prices is much narrower.

It is important to note that the impacts shown in Exhibit 12 would likely not happen in isolation. Other market variables would also likely change at the same time. For example, the impact shown for land values due to construction cost increases would not materialize if market values for new units prices were also increasing simultaneously (which has generally been the case over the past few years).

Exhibit 12 – Summary of Change from the Base Case for Each Scenario Tested

Range of Impact for Scenarios Tested	2. Increased Metro Van DCC Rates	3. Increased Hard Costs	4. Increased Financing Rate	5. Increased Unit Values
Estimated Supportable Land Value	-3.2% to -23.6%	-6.7% to -65.3%	-4.6% to -23.5%	+8.3% to +41.1%
Estimated Profit if Acquired at Current Land Value	-1.3 to -2.7 percentage points	-3.1 to -7.1 percentage points	-1.7 to -2.7 percentage points	+3.2 to +4.7 percentage points
Approximate Price/Rent if Cost Impact Passed Through to Buyers/Renters	+1.3% to +2.6%	+3.0% to +7.1%	+1.4% to +2.1%	+3.2% to +7.6%

The key findings are as follows:

1. The impact of the proposed DCC rate increases on the estimated supportable land value for each site ranges from -3.2% to -23.6%. The latest 12 month change in financing rates has had a similar impact while the latest 12 month change in hard construction costs and unit values have had much larger impacts than the proposed Metro Vancouver DCC rate increases.
2. The impact of the proposed DCC rate increases on the estimated profit margin for each case study (if developers cannot pay less for land and cannot pass the cost increase on to end users) ranges from -1.3 percentage points to -2.7 percentage points. The latest 12 month change in financing rates has had a similar impact while the latest 12 month change in hard construction costs and unit values have had much larger impacts than the proposed Metro Vancouver DCC rate increases.
3. The impact of the proposed DCC rate increases on unit prices/rents (if the cost increases are passed along to end users) for each case study ranges from 1.3% to 2.6%. The latest 12 month change in financing rates has had a similar impact while the latest 12 month change in hard construction costs and unit values have had a much larger impact than the proposed Metro Vancouver DCC rate increase2.

9.0 Conclusions

The key points from our evaluation are as follows:

1. The infrastructure provided by Metro Vancouver is a critical part of supporting new urban development in the region so new development should help fund the growth related costs. In the absence of DCCs, funding for growth related costs associated with Metro Vancouver's liquid waste, water, and regional parks capital programs would need to come entirely from a combination of long-term debt, contributions from the operating budget (e.g. utility/user fees), reserves, and external contributions (e.g. interagency and senior level government grants).
2. The proposed Metro Vancouver DCC rate increases are significant and will add to the cost of new construction. Like any other cost increase, the increased DCCs will lead to one of three different potential impacts (or a combination):
   - A reduction in development site land values if the increased cost can be passed back to landowners. This can occur when the value of a development site under its existing use (e.g. house, low density commercial building) is lower than the land value supported by redevelopment.
   - An increase in the market price (sales prices or rents) of new units/floorspace. This can occur if the increased cost reduces the number of projects that are financially viable for development, creating downward pressure on the supply of new product in the market. Decreasing new supply in the face of continued demand will likely result in increased market prices for new (and existing) product.
   - A reduction in profit margins for new projects. This can occur if the increased cost cannot be passed along to buyers/renters of the new space and cannot be passed back to landowners.

   Which of these three outcomes (or combination) is most likely and the actual impact will depend on the dynamics of the market (e.g., supply of development sites, viability of new development, amount of new product), which requires detailed financial analysis for a large sample of case study development projects throughout the region.
3. The estimated potential financial impacts from the proposed increases to the Metro Vancouver DCC rates on land values, profit margins, or end unit prices are:
   - Similar to the impact from the latest 12 month change in financing rates.
   - Significantly less than the latest 12 month change in hard construction costs.
   - Significantly less than the latest 12 month change in unit prices (and rents).
4. Spreading the proposed DCC rate increases over three years (as proposed) will help mitigate any impacts and provide predictability to landowners and developers.

Second Narrows Water Supply Tunnel

Development Cost Charge Review Process and Rate Bylaw

FINANCE COMMITTEE

Sonu Kailley
Acting Director, Financial Planning

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AGENDA

1. Metro Vancouver Board Direction
2. What We Heard From Engagement
3. Metro Vancouver Water DCC
4. Metro Vancouver Liquid Waste DCC
5. Metro Vancouver Regional Parkland Acquisition DCC
6. Summary of Proposed New DCC Rates
7. Expert Advice – Comparative Analysis
8. Questions and Discussion

METRO VANCOUVER BOARD DIRECTION

Financial Sustainability & Regional Affordability:

- Infrastructure for growing region
- Labor Market competition & massive Inflation
- Long Range Sustainable Rates

Financial Plan Task Force & Board Direction:

- Growth pay for Growth (DCC/Debt/Senior Govt)
- Defer/remove low & medium risk projects from current Five Year Plan ($650 million)
- Average Annual Rate Increases down to 5% by 2026

METRO VANCOUVER BOARD DIRECTION

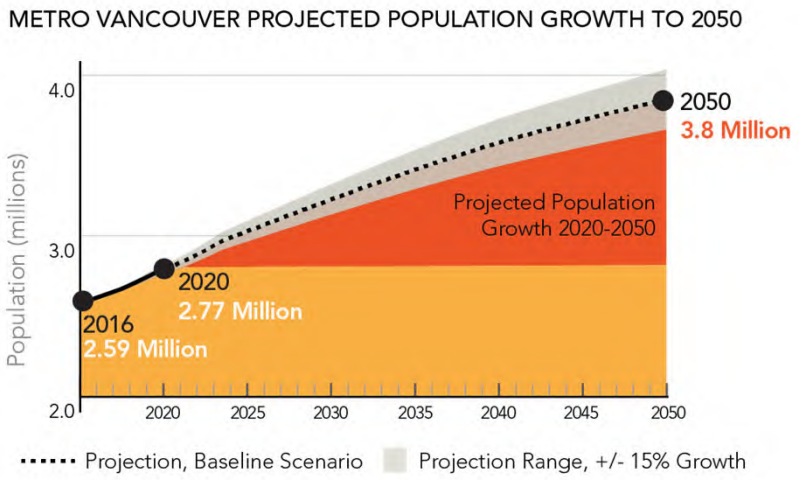
Board directed staff to prepare the 2024–2028 Financial Plan with the following DCC rate assumptions:

Liquid Waste DCC moving to a 1% assist factor with interest

Water DCC moving to a 1% assist factor with interest

Implementation of a **DCC for Regional Parks,** moving to a 1% assist factor

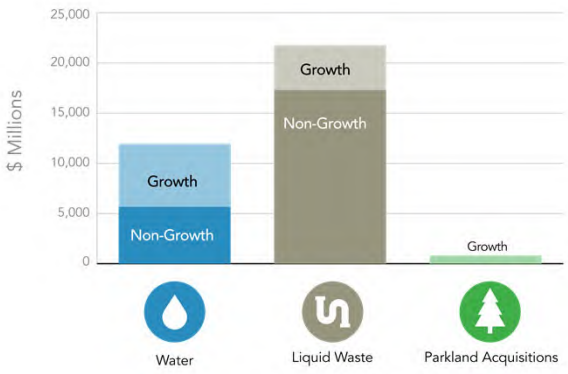
A GROWING REGION



30 YEAR CAPITAL PLAN TOTAL

For Water, Liquid Waste, and Regional Parks

Project Capital Expenditures



Total Capital Plan

DCC REVISION TIMELINE

- First Nations Engagement
- Industry/Public Engagement
- Member Municipality Engagement
- Metro Vancouver Advisory Committees

- 3 Readings

- Fourth Reading
- Effective Date January 1, 2025

WHAT WE HEARD

What We Heard	What We're Doing
Financial impact on housing development	Proposing a three year phase-in with effective dates of Jan 1, 2025, Jan 1, 2026 and Jan 1, 2027 Commissioned financial impact analysis study
Sharing of growth costs	Ongoing maintenance, major rehabilitation and upgrades continue to be funded through existing water sales, liquid waste levies and tax requisitions The member Advisory Committees have endorsed growth paying for growth

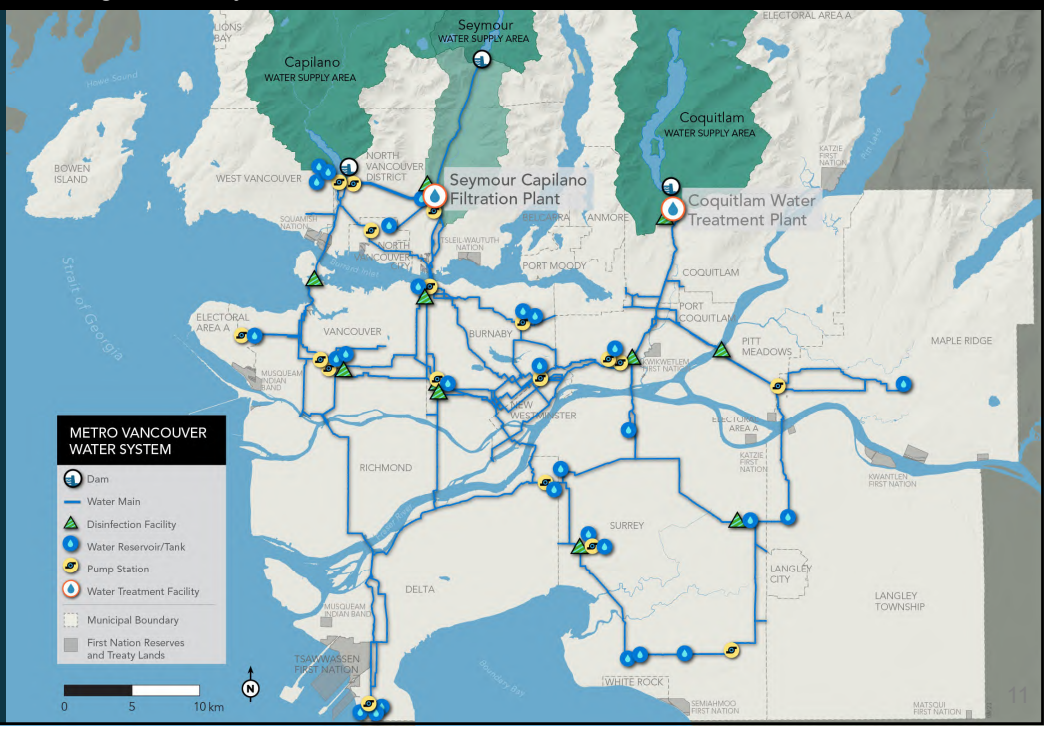
WHAT WE HEARD

What We Heard	What We're Doing
There are administrative challenges and burden on member jurisdictions	Metro Vancouver has dedicated a point of contact as well as a set annual effective date aligning with other DCC updates
Impacts on housing delivery	Non-market affordable rental housing including student housing are currently eligible for a regional DCC waiver or reduction for not-for-profit developers. Affordable housing waiver is under review with any amendment estimated Q1 2024

Metro Vancouver's Drinking Water System

GROWTH PROJECTS

- 90 kms of new transmission mains
- 2 new in-system reservoirs
- 2 new pump stations
- 1 new source water intake and treatment facilities



Key Projects and Changes - Growth

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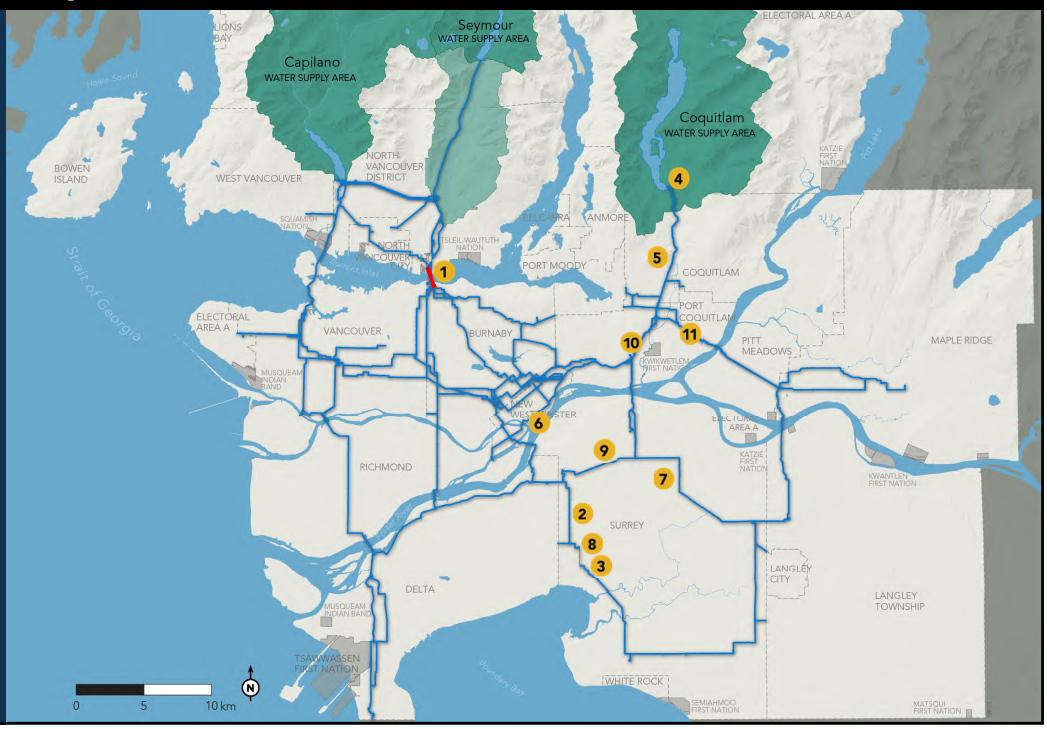
1. Second Narrows Water Supply Tunnel
2. Kennedy Newton Water Main
3. South Surrey Water Main No. 2
4. Coquitlam Lake Water Supply Project
5. Coquitlam Water Main
6. Annacis Water Main No. 5
7. Fleetwood Reservoir
8. Newton Pump Station No.2
9. Whalley Kennedy Water Main No. 2
10. Cape Horn Water Main No. 2
11. Haley Main No. 4 (West Section)

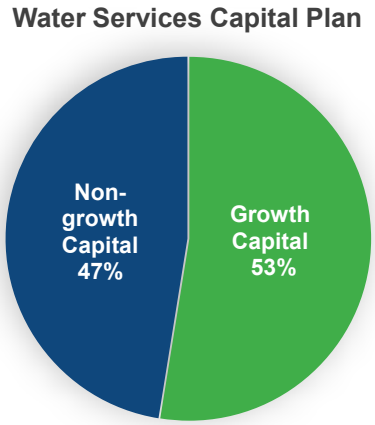


GROWTH REQUIREMENTS: WATER SERVICES

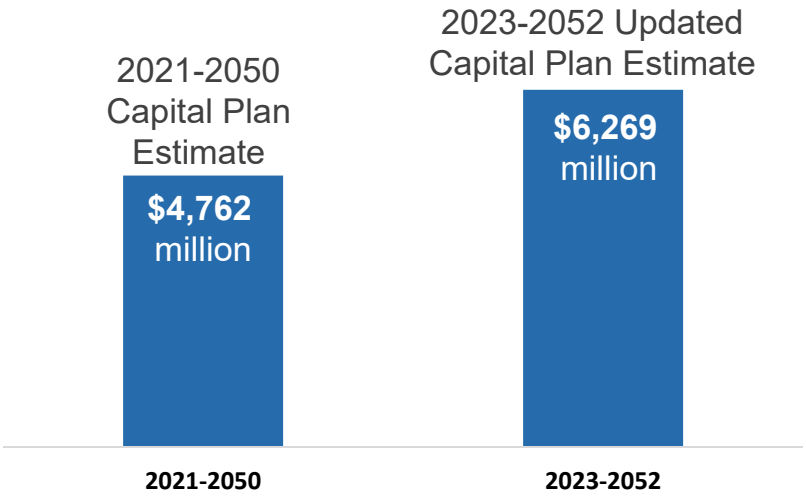
30 Year Capital Plan Update

Project Capital Expenditures

	$ Millions
Growth Capital	6,269
Non-growth Capital	5,661
Total Capital Plan	**11,930**



GROWTH REQUIREMENT IN WATER SERVICES 30 YEAR CAPITAL PLAN UPDATE



PROPOSED RATES – WATER DCCS

DWELLING	EXISTING 50%	STEP 1 45% Jan 1, 2025	STEP 2 15% Jan 1, 2026	STEP 3 1% Jan 1, 2027	$ INCREASE TO 1%
Single Family	$6,692	$10,952	$16,926	$19,714	$13,022
Townhouse	$5,696	$9,839	$15,206	$17,710	$12,014
Apartment	$4,261	$6,791	$10,495	$12,223	$7,962
Non-Residential (per ft^2 of floor area)	$3.39	$5.30	$8.19	$9.54	$6.15

Liquid Waste System

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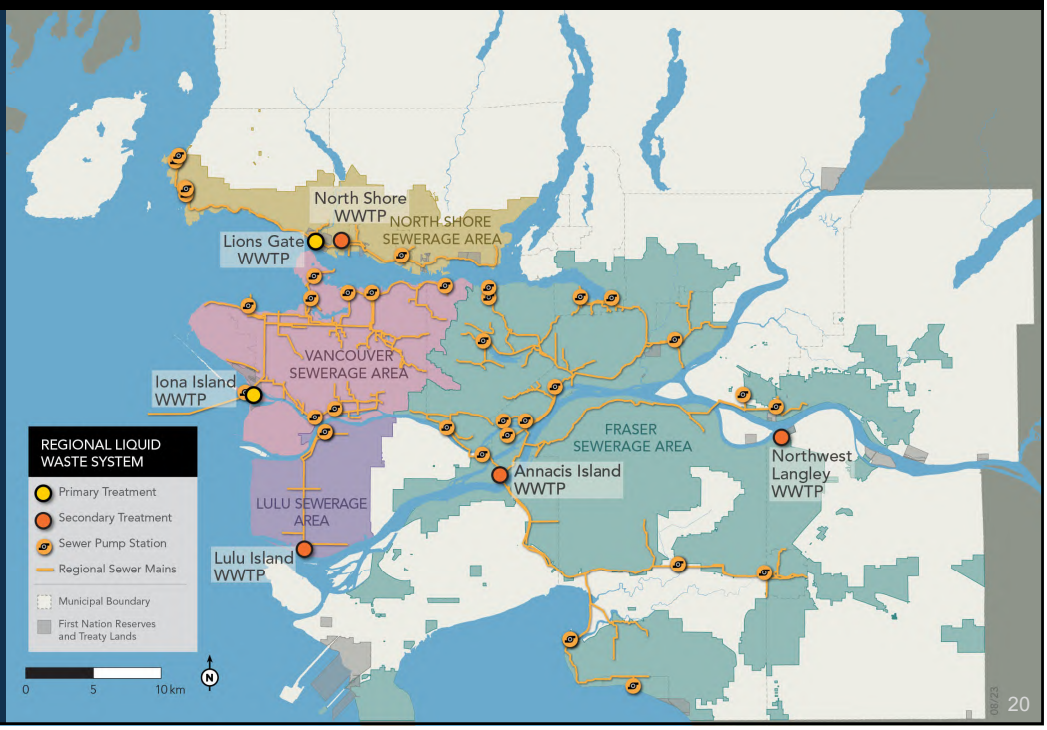
Growing region: approximately 1.5% annually

Increasing service demands

Infrastructure expansion

Development pays for growth



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Liquid Waste – 2023-2032 Growth

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Sewer Facility Project

Sewer Main Project

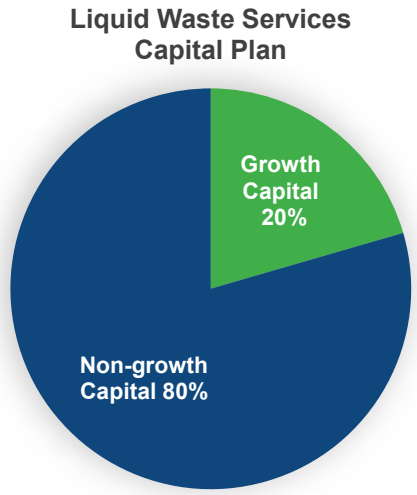
21

GROWTH REQUIREMENTS: LIQUID WASTE SERVICES

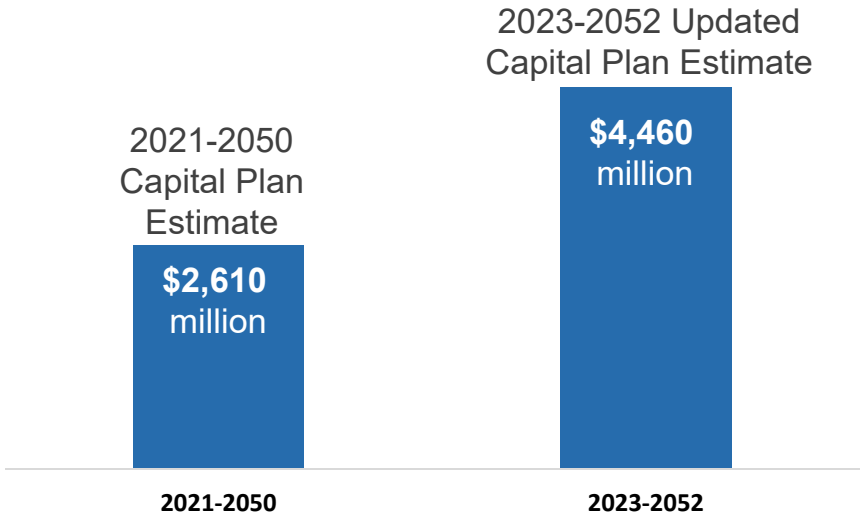
30 Year Capital Plan Update

Project Capital Expenditures

	$ Millions
Growth Capital	$4,460
Non-growth Capital	$17,298
Total Capital Plan	**$21,758**



GROWTH REQUIREMENT IN LIQUID WASTE SERVICES 30 YEAR CAPITAL PLAN UPDATE



PROPOSED RATES – LIQUID WASTE DCC - VSA

DWELLING	EXISTING 17.5%	STEP 1 16% Jan 1, 2025	STEP 2 10% Jan 1, 2026	STEP 3 1% Jan 1, 2027	$ INCREASE TO 1%
Single Family	$3,335	$10,498	$11,290	$12,476	$9,141
Townhouse	$2,983	$9,593	$10,316	$11,400	$8,417
Apartment	$1,988	$6,298	$6,772	$7,484	$5,496
Non-Residential (per ft^2 of floor area)	$1.63	$5.30	$5.70	$6.30	$4.67

PROPOSED RATES – LIQUID WASTE DCC - NSSA

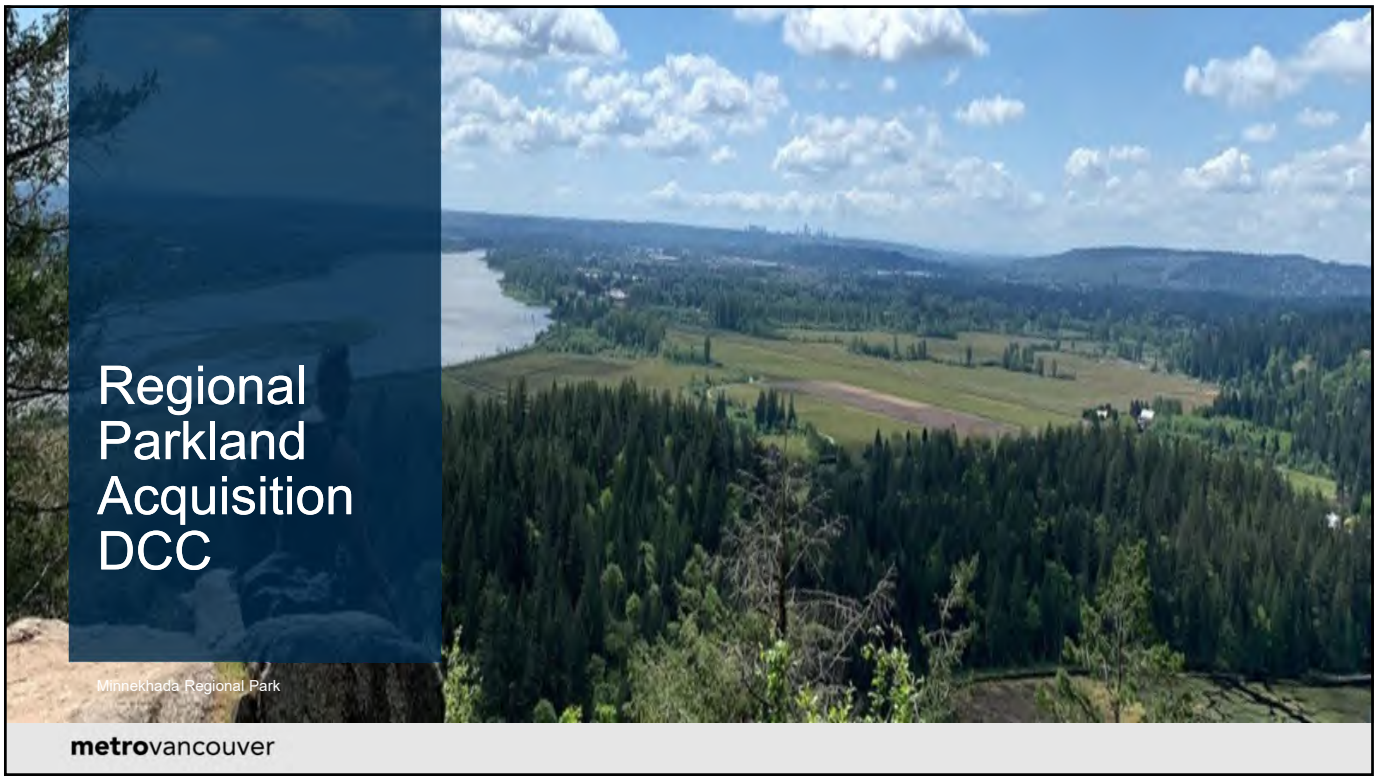
DWELLING	EXISTING 17.5%	STEP 1 16% Jan 1, 2025	STEP 2 10% Jan 1, 2026	STEP 3 1% Jan 1, 2027	$ INCREASE TO 1%
Single Family	$3,300	$9,760	$10,478	$11,557	$8,257
Townhouse	$2,786	$8,996	$9,658	$10,652	$7,866
Apartment	$2,030	$6,005	$6,448	$7,111	$5,081
Non-Residential (per ft^2 of floor area)	$1.67	$5.00	$5.37	$5.92	$4.25

PROPOSED RATES – LIQUID WASTE DCC - LIWSA

DWELLING	EXISTING 17.5%	STEP 1 16% Jan 1, 2025	STEP 2 10% Jan 1, 2026	STEP 3 1% Jan 1, 2027	$ INCREASE TO 1%
Single Family	$3,313	$5,683	$6,152	$6,855	$3,542
Townhouse	$2,756	$4,927	$5,333	$5,943	$3,187
Apartment	$2,042	$3,516	$3,806	$4,241	$2,199
Non-Residential (per ft^2 of floor area)	$1.54	$2.55	$2.76	$3.08	$1.54

PROPOSED RATES – LIQUID WASTE DCC - FSA

DWELLING	EXISTING 17.5%	STEP 1 16% Jan 1, 2025	STEP 2 10% Jan 1, 2026	STEP 3 1% Jan 1, 2027	$ INCREASE TO 1%
Single Family	$6,254	$11,443	$12,311	$13,613	$7,359
Townhouse	$5,390	$10,015	$10,775	$11,914	$6,524
Apartment	$4,269	$7,302	$7,855	$8,686	$4,417
Non-Residential (per ft^2 of floor area)	$3.30	$5.41	$5.82	$6.43	$3.13



Metro Vancouver Regional Parks and Greenspace

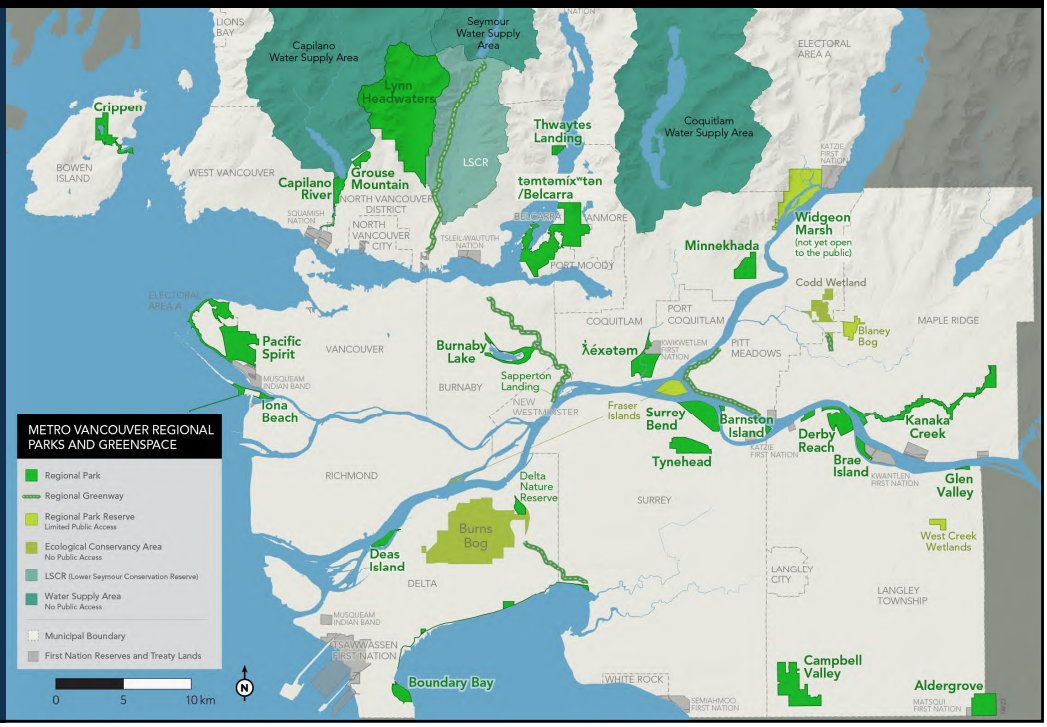
13,938.5
hectares protected

23 regional parks

5 regional greenways

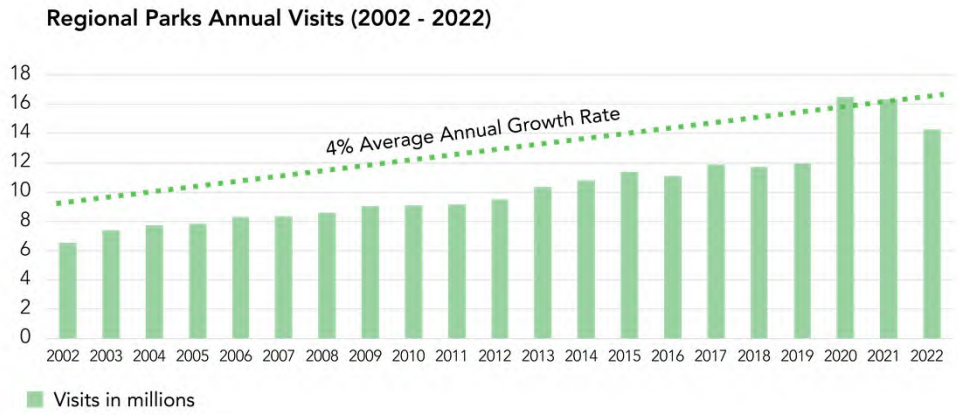
3 regional park reserves

2 ecological conservancy areas



GROWTH

Strong increases in visitation to regional parks as Metro Vancouver's population grows and demand for time in nature increases

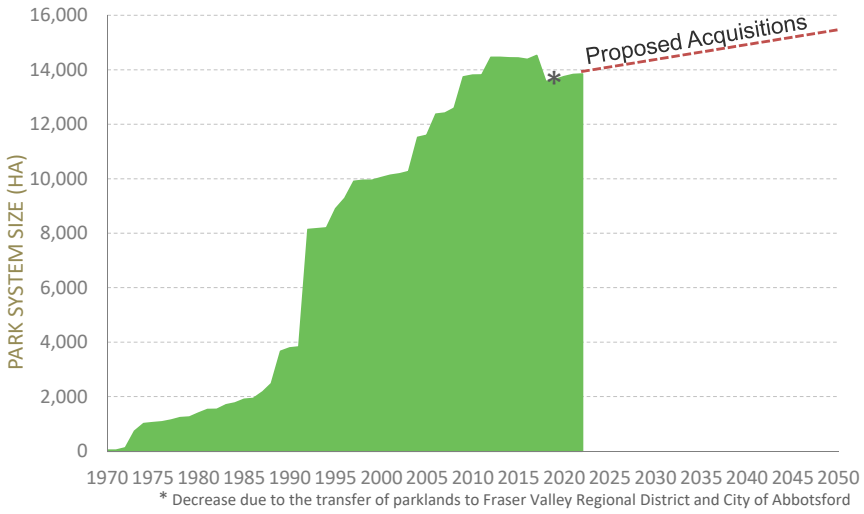


PROPOSED DCC FUNDED REGIONAL PARKLAND ACQUISITIONS (2024-2050)

1,797 hectares

$446,900/ha
(assessed 2023 value)

$803M



PROPOSED RATES – PARKLAND DCC

DWELLING	EXISTING	STEP 1 75% Jan 1, 2025	STEP 2 50% Jan 1, 2026	STEP 3 1% Jan 1, 2027
Single Family	-	$491	$981	$1,943
Townhouse	-	$442	$884	$1,751
Apartment	-	$303	$606	$1,199
Non-Residential (per ft^2 of floor area)	-	$0.24	$0.48	$0.94

PROPOSED RATES – TOTAL DCCS

VSA	Existing	STEP 1	STEP 2	STEP 3
Single Family	$10,027	$21,941	$29,196	$34,133
Townhouse	$8,679	$19,874	$26,406	$30,861
Apartment	$6,249	$13,392	$17,873	$20,906
Non-Res (per ft² flr area)	$5.02	$10.84	$14.37	$16.78

NSSA	Existing	STEP 1	STEP 2	STEP 3
Single Family	$9,992	$21,203	$28,385	$33,214
Townhouse	$8,482	$19,277	$25,748	$30,113
Apartment	$6,291	$13,099	$17,548	$20,533
Non-Res (per ft² flr area)	$5.06	$10.54	$14.04	$16.40

LIWSA	Existing	STEP 1	STEP 2	STEP 3
Single Family	$10,005	$17,126	$24,058	$28,512
Townhouse	$8,452	$15,208	$21,423	$25,404
Apartment	$6,303	$10,610	$14,906	$17,663
Non-Res (per ft² flr area)	$4.93	$8.09	$11.43	$13.56

FSA	Existing	STEP 1	STEP 2	STEP 3
Single Family	$12,946	$22,886	$30,218	$35,270
Townhouse	$11,086	$20,296	$26,865	$31,375
Apartment	$8,530	$14,396	$18,956	$22,108
Non-Res (per ft² flr area)	$6.69	$10.95	$14.49	$16.91

EXPERT ADVICE - COMPARATIVE ANALYSIS

Scope:

- Retained Coriolis Consulting to compare the potential financial impacts of the proposed DCC rate increases on land values, profit margins, or end unit prices with recent changes in other market variables that impact development projects
- Analysis is high level and focusses on residential development projects (not non-residential projects)

EXPERT ADVICE - COMPARATIVE ANALYSIS

Findings:

- The proposed DCC rate increases are significant and will add to the cost of new construction.
- The estimated potential financial impact of the proposed DCC rate increases on land values, profit margins, or end unit prices is:
  - Similar to impact from latest 12 month change in financing rates
  - Less than one-half the latest 12 month change in hard construction costs
  - Less than one-half the latest 12 month change in unit prices (and rents)

DCC BYLAWS

Request Finance Committee to recommend the following:

That the GVWD, GVS&DD and MVRD Board:

- Give first, second and third reading to the *Greater Vancouver Sewerage and Drainage District Development Cost Charge Bylaw No. 371, 2023; and*
- Give first, second and third reading to the *Greater Vancouver Water District Development Cost Charge Amendment Bylaw No. 260,* 2023; and
- Give first, second and third reading to the *Metro Vancouver Regional District Development Cost Charge Bylaw No. 1369, 2023*; and
- Direct staff to forward to the Inspector of Municipalities for approval

New Westminster

Thank you. Questions or Comments?

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Together we make our region strong