



**General Purposes Committee
Electronic Meeting**

**Council Chambers, City Hall
6911 No. 3 Road**

**Monday, July 17, 2023
4:00 p.m.**

Pg. # ITEM

MINUTES

GP-3 *Motion to adopt the **minutes** of the meeting of the General Purposes Committee held on July 4, 2023.*



ENGINEERING AND PUBLIC WORKS DIVISION

**1. FRASER RIVER FRESHET AND FLOOD PROTECTION UPDATE
2023**

(File Ref. No. 10-6060-01) (REDMS No. 7184720)

GP-6 **See Page GP-6 for full report**

Designated Speaker: Eric Sparolin

STAFF RECOMMENDATION

That the staff report titled "Fraser River Freshet and Flood Protection Update 2023", dated June 9, 2023, from the Director, Engineering be received for information.



2. **ELECTRIC VEHICLE CHARGING INFRASTRUCTURE REQUIREMENTS FOR NEW NON- RESIDENTIAL BUILDINGS**

(File Ref. No. 10-6125-07-02) (REDMS No. 7198349)

GP-16

See Page GP-16 for full report

Designated Speaker: Norm Connolly

STAFF RECOMMENDATION

- (1) *That Richmond Zoning Bylaw 8500, Amendment Bylaw No. 10463, which amends Sections 3.4 Use and Term Definitions, and 7.15 Electric Vehicle Charging Infrastructure be introduced and given first reading, and;*
- (2) *That an owner would be permitted to submit a Building Permit application in compliance with prior requirements if:*
 - (a) *A Development Permit was issued by Council prior to adoption of Amendment Bylaw No. 10463; or,*
 - (b) *A Development Permit has not yet been issued, be permitted to proceed in accordance with existing Zoning Bylaw provisions if the Development Permit is issued by Council within one year of the adoption of Amendment Bylaw No. 10463, and an acceptable Building Permit application has also been submitted to the City within this timeframe.*

☐

ADJOURNMENT

☐



General Purposes Committee

Date: Tuesday, July 4, 2023

Place: Council Chambers
Richmond City Hall

Present: Mayor Malcolm D. Brodie, Chair
Councillor Chak Au
Councillor Carol Day
Councillor Laura Gillanders
Councillor Kash Heed
Councillor Andy Hobbs
Councillor Alexa Loo
Councillor Bill McNulty
Councillor Michael Wolfe

Call to Order: The Chair called the meeting to order at 4:00 p.m.

MINUTES

It was moved and seconded

That the minutes of the meeting of the General Purposes Committee held on June 19, 2023, be adopted as circulated.

CARRIED

DELEGATION

1. Yannick Simovich, Board Chair, Tourism Richmond, and Nancy Small, CEO, Tourism Richmond, with the aid of a PowerPoint presentation (Copy of File, City Clerk's Office) provided an update on the tourism industry in Richmond, and Tourism Richmond's plans and initiatives. The following was highlighted:
 - as anticipated, the tourism industry rebounded following the COVID pandemic, with Richmond having an outstanding second half in 2022;

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- Many of the challenges reported previously with supply chain, labour, inflation, air travel and more, are in a better place than a year ago;
- the Steveston Spot Prawn and Seafood Festival event, initiated in 2022, is a great example of the Richmond Tourism mandate to support the industry, restaurants and adding to the vibrancy of Steveston;
- the Richmond night market continues to be one of the most popular destinations April through October, which also saw one of the Amazing Race Canada challenges take place last year, resulting in national coverage and identifying Richmond as a tourist destination; and
- in addition to social media and other promotional initiatives, billboard advertising is underway targeting markets in Washington, Alberta, Ontario and the rest of BC.

In response to queries from the Committee, the delegation noted:

- the life of the destination marketer has changed as a result of the data available through subscribed research, identifying the number of visitors to Richmond, where they are from, etc., providing opportunities for targeting advertising; and
- With respect to the vacancy/occupancy rate, this year has been fantastic, with Richmond outperforming Vancouver occupancy however, following statistics from the US, the tourism industry anticipates a minor recession within the next 6-8 months.

CAO'S OFFICE

2. **2023 UBCM COMMUNITY EXCELLENCE AWARDS PROGRAM**

(File Ref. No. 01-0005-01) (REDMS No. 7244893)

It was moved and seconded

That the City of Richmond's submissions to the Union of BC Municipalities (UBCM) Community Excellence Awards program be endorsed, including:

- (1) *Excellence in Governance: Flood Protection Public Engagement Campaign;*
- (2) *Excellence in Service Delivery: MyBusiness Online Business Licence System; and*
- (3) *Excellence in Asset Management: Ageing Infrastructure Analysis.*

CARRIED

2.

General Purposes Committee

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ADJOURNMENT

It was moved and seconded

That the meeting adjourn (4:23 p.m.).

CARRIED

Certified a true and correct copy of the Minutes of the meeting of the General Purposes Committee of the Council of the City of Richmond held on Tuesday, July 4, 2023.

Mayor Malcolm D. Brodie
Chair

Lorraine Anderson
Legislative Services Associate



City of Richmond

Report to Committee

To: General Purposes Committee
From: Milton Chan, P.Eng
Director, Engineering
Date: June 9, 2023
File: 10-6060-01/2023-Vol
01
Re: Fraser River Freshet and Flood Protection Update 2023

Staff Recommendation

That the staff report titled "Fraser River Freshet and Flood Protection Update 2023", dated June 9, 2023, from the Director, Engineering be received for information.

Milton Chan, P.Eng
Director, Engineering
(604-276-4377)

Att. 2

REPORT CONCURRENCE		
ROUTED TO: Public Works	CONCURRENCE <input checked="" type="checkbox"/>	CONCURRENCE OF GENERAL MANAGER
SENIOR STAFF REPORT REVIEW	INITIALS: 	APPROVED BY CAO

Staff Report

Origin

As detailed in the Flood Protection Management Strategy 2019, the City of Richmond is situated approximately 1.0 metre above sea level and flood protection is integral to protecting the health, safety, and economic viability of the City. Richmond is protected from flooding by infrastructure that includes 49 kilometers of dikes, 595 kilometers of drainage pipes, 61 kilometers of box culverts, 155 kilometers of watercourses and 39 drainage pump stations.

This report provides Council with a summary of the 2023 Fraser River freshet, along with an update on 2022 rainfall statistics and ongoing works regarding the City's Flood Protection Program.

This report supports Council's Strategic Plan 2022-2026 Focus Area #3 A Safe and Prepared Community:

Community safety and preparedness through effective planning, strategic partnerships and proactive programs.

3.1 Advance proactive, sustainable, and accelerated flood protection in collaboration with other governments and agencies.

3.3 Ensure the community is collectively prepared for emergencies and potential disasters.

3.4 Ensure civic infrastructure, assets and resources are effectively maintained and continue to meet the needs of the community as it grows.

Analysis

2023 Fraser River Freshet

May 2023 was the hottest May on record for B.C. and generated extremely rapid melt of the provincial snow pack resulting in an early onset of the spring Freshet. The peak Fraser River flow measured at Hope was 9,130 m³/s, which is between a 2-year and a 5-year return period event (peaks in 2019, 2020, 2021, and 2022 were 7,200 m³/s, 10,800 m³/s, 9,800 m³/s, and 10,400 m³/s, respectively). Fraser River water levels began receding on May 21, 2023 and have attenuated since.

The City's diking system is built to withstand a 500-year return period freshet event and there was no danger of flooding in Richmond during the 2023 freshet. The City continues to be a leader in flood protection planning and mitigation through Council-endorsed capital projects and the annual dike maintenance program. Predicted climate change impacts, which include more extreme weather events, could result in an increased variability in freshet flows in the future, reinforcing the need for the City's continued flood protection upgrade program.

2022 Rainfall

Significant Rainfall Events

Attachment 1 identifies the total annual rainfall over the last 10 years. Rainfall highlights for 2022 include the following:

- The City received approximately 1,192 mm of rainfall in 2022, which is 5% lower than the average annual rainfall (over the last 10 years);
- January was the wettest month of the year, with 238 mm of rainfall at Hamilton Community Centre and 207 mm of rainfall at Fire Hall No. 7. This accounts for 18% and 26% of the total annual rainfall at Hamilton Community Centre and Fire Hall No. 7, respectively;
- A total of 14 significant events with statistical return periods of two years or more were recorded in 2022. Seven of these were a two year return period event. The total number of significant events in 2020 and 2021 were 11 and 8, respectively.

The City's drainage system is designed to withstand a 10 year return period rain event. The drainage system performed well during 2022 rainfall events.

November 2021 'Atmospheric River' Initiatives

Since the November 2021 'Atmospheric River Event', staff have undertaken a number of initiatives to assess and improve the City's drainage system based on observations from the event. Some of the completed initiatives include the following:

- Development and distribution of communications material to provide residents with information on how to better protect their property during extreme rain events and how to properly maintain private drainage infrastructure.
- Coordination with the Ministry of Transportation and Infrastructure (MoTI) to facilitate drainage infrastructure maintenance, including drainage canal cleaning and removal of beaver dam blockages along the Highway 99 corridor.

Some of the ongoing initiatives include the following:

- Assessment of the need for a new drainage pump station at Steveston Highway and Shell Road to further improve drainage in the Horseshoe Slough catchment. A temporary pump station is ready to be deployed ahead of future rainfall events, as necessary.
- Survey and assessment of the drainage infrastructure at the Highway 99/91 interchange to identify drainage patterns and potential capacity issues.
- Development of an operational work plan for future extreme rainfall events.

- Continued coordination with MoTI on preventative maintenance of the interconnected City-MoTI drainage infrastructure and identifying opportunities for drainage upgrades as part of the Fraser River Tunnel Project.

Continuing to invest in upgrades to the drainage and flood protection system will help ensure that the City can withstand these future storms.

Drainage System Performance

361 service requests related to drainage issues were recorded by Public Works in 2022. The requests are consistent with the average annual number of service requests received over the past 10 years, as identified in Attachment 2.

2022/2023 Winter Storm Events

December 2022 King Tide Event

On December 27, 2022, water levels surrounding Richmond reached close to record high levels as a result of a king tide combined with a significant storm surge event. The City also received over 25 mm of rain on that day. Water levels measured by the Steveston tide gauge that day came within 30 mm of the highest recorded water level in this location from December 1982.

Lulu Island

Overall, Lulu Island's flood protection system performed well. However, some localized flooding occurred in low lying areas located outside of the City's dike, including London Landing, marinas near the Moray Channel Bridge, and waterfront properties along 17000 and 18000 block River Road. Water levels remained below the City's dike elevation throughout the event and emergency flood protection measures were not required on Lulu Island or Sea Island.

Mitchell Island

On Mitchell Island, a section of Mitchell Road and several low-lying properties flooded during the event. The peak tide elevations were higher than the land elevations of some of the low-lying private properties to the east of the north/south segment of Mitchell Road, resulting in water flowing onto the island through these private properties. The southern end of Mitchell Road and the City's drainage pump station remained above river levels and the pump station was not impacted.

Staff were deployed to clear the impacted area and sandbags were set up along the Mitchell Road as a temporary measure to prevent any future instances of flooding during the storm season. Subsequently, a survey of Mitchell Road and perimeter of the impacted properties was completed by the City to better understand the ground elevations and prepare for flood protection measures. The City also installed a camera overlooking the Fraser River to monitor the river levels. Staff are also working directly with the property owners impacted by this incident to identify solutions and encourage construction of private flood protection infrastructure on low-lying properties.

The perimeter of Mitchell Island is primarily private property. There is no perimeter dike and the City does not have access rights to construct a dike or similar flood protection measures around the island perimeter. The City's Dike Master Plan Phase 5, endorsed by Council in 2019, identifies raising roadways to a 4.7 metre dike elevation to provide an emergency egress, acquiring rights-of-ways along the river bank through redevelopment, and establishing policies to require land raising and construction of a superdike on Mitchell Island through development as a part of the long term flood protection program for Mitchell Island. Long-term flood protection upgrades, including road raising across Mitchell Island, will be assessed and implemented through future capital and development-related projects.

Infrastructure Improvements

The City's flood protection system has a replacement value of \$2.2 billion, comprised of an extensive drainage network and 49 kilometers of perimeter dike. Staff are continuously upgrading and improving the system to address the impacts of infrastructure age and growth, and climate change.

Capital Dike Upgrades

Current climate change science estimates that sea level will rise approximately 1.0 m by the year 2100 and 0.2 m of land subsidence is forecasted over the same time period. The City's Flood Protection Management Strategy is the guiding framework for continual upgrades and improvements to the City's flood protection system. A key action identified in the City's Flood Protection Management Strategy involves continuing to raise the City's perimeter dike to 4.7 m in order to stay ahead of climate change induced sea level rise.

Currently approved dike improvement projects include the following:

- Design of North dike upgrades between Lynas Lane and No. 2 Road.
- Design of South dike upgrade between No. 4 Road and No. 5 Road.
- Design of South dike upgrade between No. 2 Road and Gilbert Road.

Funding to construct these dike upgrades will be secured through future capital projects which will be brought forward for Council consideration as part of the annual budget process.

Additionally, the preliminary design for the Steveston Island Dike was endorsed by Council for public and stakeholder engagement at the Regular Council Meeting on March 27, 2023 through the staff report titled "Steveston Island Dike Preliminary Design - Public and Stakeholder Engagement," dated February 8, 2023, from the Director, Engineering.

Dike Rehabilitation

Staff maintain annual inspection and maintenance programs to ensure that the City's dikes are well-protected against issues such as erosion and seepage. Notable inspection and maintenance work completed this year include the following:

- Enhancement of the flood patrol system with better defined thresholds for High Water Events and improved reporting processes in alignment with the Canadian Incident Command System (ICS).
- Responded to 11 high water events totalling 29 days of patrols during the winter storm and spring freshet seasons.
- Improved emergency accessibility to the dike by upgrading surface materials.
- Installed new steel gates at dike access points that were previously obstructed by concrete barricades and worn out wooden bollards, improving access to the dike during routine maintenance, dike patrols and emergency situations.
- Conducted vegetation removal along the dike slope in order to prevent unwanted growth which would otherwise compromise the structural integrity of the diking system.
- Acquired and stockpiled 3000 tonnes of emergency rip rap.
- Resurfaced 1000 meters of dike crest, improving usability and accessibility of the dike trails for residents.

Pump Station Upgrades

Significant progress has been made in upgrading the City's drainage pump stations to accommodate growth and climate change. The total capacity of the City's drainage pump stations has increased by 30% since 2005.

Over the last 20 years, since the City introduced the Drainage and Diking Utility, now the Flood Protection Utility, the City has rebuilt or upgraded 19 of its 39 drainage pump stations. The upcoming drainage pump station upgrade projects include No. 6 Road South, No. 9 Road, and Ewen Road pump stations.

During extreme events, a number of older pump stations operate near full capacity. These stations have been identified to require upgrades through capacity analysis. Projects to upgrade or replace these stations are either included in current capital program or will be brought forward for Council consideration as part of future capital program.

Box Culvert Repair and Preventative Maintenance

The City has approximately 61 km of box culverts, the majority of which are 40 to 50 years in age. Although the box culverts have a design life of 100 years, premature failure of some joints has been observed in recent years.

The City has a box culvert preventative maintenance program to inspect the condition of box culverts and identify sections that require repair or replacement executed in a 7-year cycle. Staff are proactively managing the condition of box culverts by identifying and repairing deteriorating joints before they cause significant damage. Repair of significant defects identified through the program are presented to Council for consideration as part of the capital program.

Staff inspected 5.0 km of box culvert within 12 drainage catchments in 2022. Results of each inspection are documented through written reports as well as images and video records, allowing staff to monitor changes to the condition of the box culverts, better informing long-term decision making. In 2022, no significant defects were encountered. Minor defects have been identified and remediated.

The City is currently working on the design and procurement for the rehabilitation of the No. 4 Road box culvert from Granville Avenue to Alderbridge Way. The rehabilitation will use conventional methods along with injection grouting to stop infiltration into the box and fill potential voids along the outside of the culvert.

The Gilbert Road North, Cambie Road, Shell Road North, and No. 2 Road South drainage catchment areas are scheduled for inspection in 2023.

Flood Protection Improvement Financing

Improvements to the City's flood protection system to address the needs of ageing infrastructure and climate change are funded through three main funding sources: Drainage and Diking Utility, Senior Government Grant Funding, and Development.

Flood Protection Utility

The Flood Protection Utility was established by Council in 2000 and currently generates \$18.0 million annually to maintain and upgrade Richmond's flood protection infrastructure. Staff are continuously monitoring regional and global climate change science to inform the City's Flood Protection Program.

At the April 12, 2021 Regular Council meeting, Council endorsed a target annual revenue level of \$30 million by 2031 for the Flood Protection Utility in order to support a 50 year implementation period to improve the City's flood protection infrastructure well in advance of anticipated climate change impacts.

To support this target, implementation of the new utility rates were included in the 2023 Utility Budgets and Rates report and endorsed by Council as a part of the annual budget process. The annual utility rate will continue to increase gradually until the target annual revenue is reached by 2031.

Senior Government Grant Funding

The City's Flood Protection Management Strategy aims to acquire senior government funding for a wide range of flood prevention and protection research, monitoring, studies, planning and improvements. As a result of proactive flood protection planning efforts, the City has been successful in securing approximately \$42 million in senior government grants since 2010 that helped fund over \$72 million of dike upgrades, pump station improvements and master planning updates. Since 2010, the City has completed approximately \$130 million in flood protection works.

Development

The City has successfully partnered with developers to secure dike upgrades through development. In particular, the City is actively pursuing opportunities to construct superdikes, where land supporting development behind the dike is filled to the same elevation as the dike crest. This eliminates visual impacts of a raised dike structure on waterfront views while providing an enhanced flood protection structure for the City.

Superdikes constructed through development to date include sections near the Richmond Olympic Oval, along the north dike near No. 4 Road, along the south dike at Riverport Way, and in Steveston. Superdike construction is underway by Western-Citimark and Vancouver Airport Fuel Facility Corporation.

Financial Impact

None.

Conclusion

The City observed the seventh highest annual rainfall over the last 10 years in 2022 and average freshet flows in the spring of 2023. The drainage and flood protection system performed well, with negligible freshet flood risk and an average number of drainage-related service requests.

Demands on the drainage and flood protection system will continue to increase as a result of climate change and development. The Flood Protection Management Strategy guides the City to proactively forecast, plan, and improve the City's flood protection system to meet long-term requirements. Through capital improvements and investment in preventative maintenance programs, the City is able to manage flooding risks and maintain a high level of service to Richmond's residents. Significant progress continues to be made in advancing the City's dike planning efforts and implementing infrastructure improvements to the City's flood protection system.



Eric Sparolin, P.Eng.
Manager, Engineering Planning
(604-247-4915)



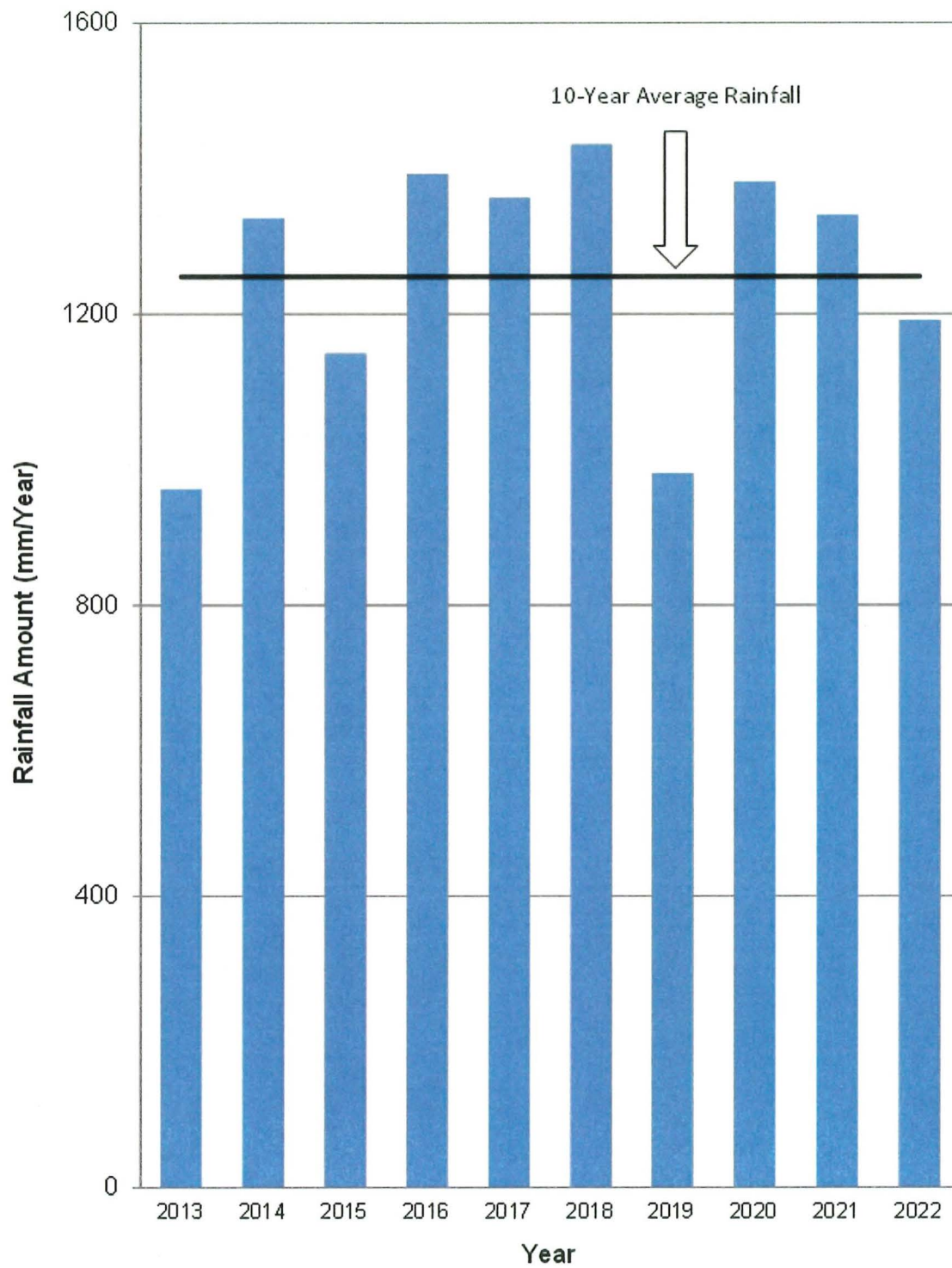
Angelica Quiring, EIT
Project Manager, Engineering Planning
(604-276-4026)



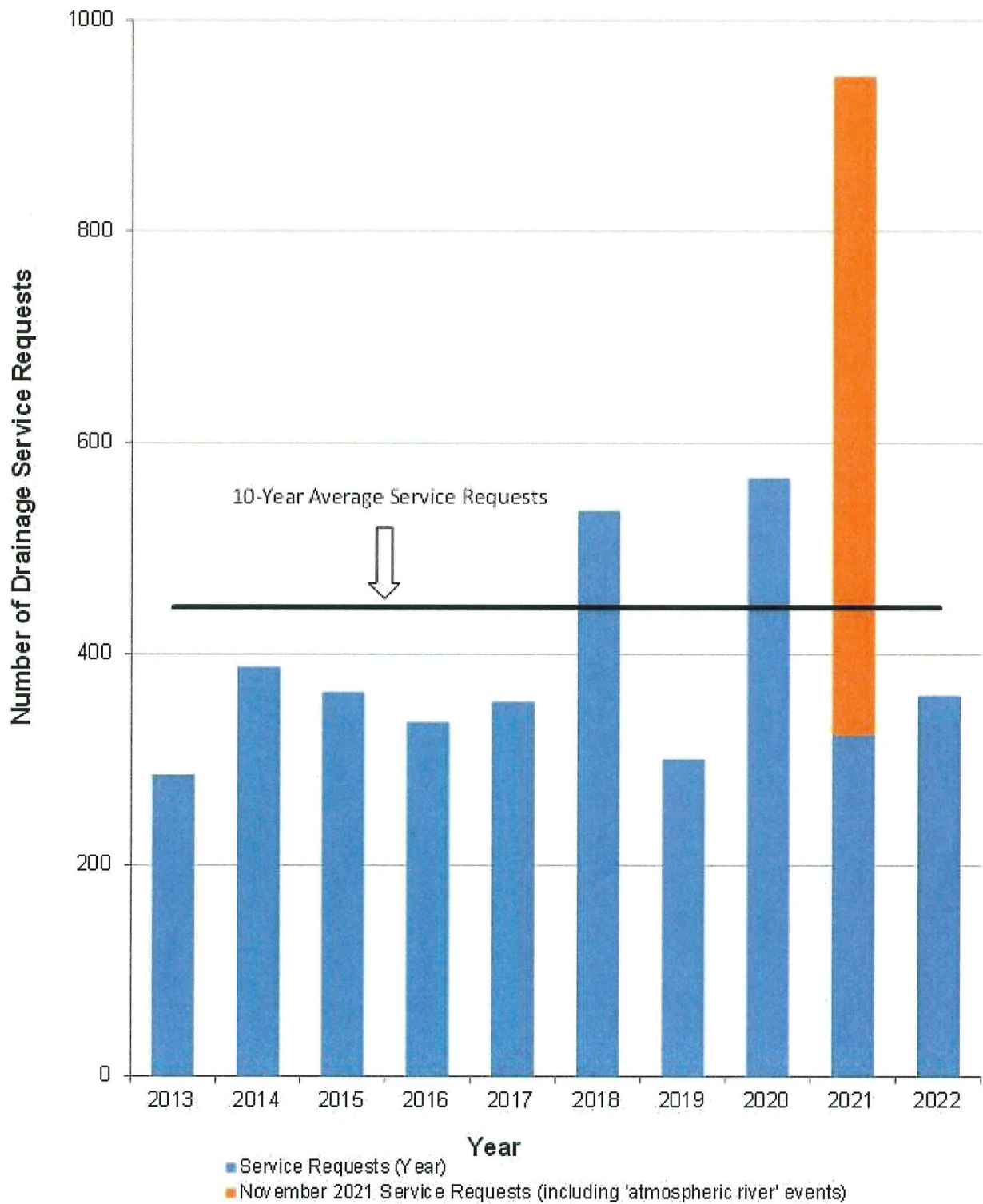
Ridhi Dalla, EIT
Project Manager, Engineering Planning
(604-204-8521)

- Att. 1: Annual Rainfall Data 2013 – 2022
2: Annual Drainage Service Requests 2013 – 2022

Annual Rainfall Data 2013-2022



Annual Drainage Service Requests 2013-2022





City of Richmond

Report to Committee




To: General Purposes Committee **Date:** July 4, 2023
From: Peter Russell **File:** 10-6125-07-02/2023-
Director, Sustainability and District Energy Vol 01
Re: **Electric Vehicle Charging Infrastructure Requirements for New Non-Residential Buildings**

Staff Recommendations

1. That Richmond Zoning Bylaw 8500, Amendment Bylaw No. 10463, which amends Sections 3.4 Use and Term Definitions, and 7.15 Electric Vehicle Charging Infrastructure be introduced and given first reading, and;
2. That an owner would be permitted to submit a Building Permit application in compliance with prior requirements if:
 - a. A Development Permit was issued by Council prior to adoption of Amendment Bylaw No. 10463; or,
 - b. An in-stream Development Permit application in accordance with existing Zoning Bylaw provisions is issued by Council within one year of the adoption of Amendment Bylaw No. 10463, and an acceptable Building Permit application has also been submitted to the City within this timeframe.

Peter Russell
Director, Sustainability and District Energy
(604-276-4130)

Att. 2

REPORT CONCURRENCE		
ROUTED TO:	CONCURRENCE	CONCURRENCE OF GENERAL MANAGER
Law	<input checked="" type="checkbox"/>	 <hr/>
Building Approvals	<input checked="" type="checkbox"/>	
Development Applications	<input checked="" type="checkbox"/>	
Policy Planning	<input checked="" type="checkbox"/>	
Transportation	<input checked="" type="checkbox"/>	
Facilities and Project Development	<input checked="" type="checkbox"/>	
SENIOR STAFF REPORT REVIEW	INITIALS: 	APPROVED BY CAO 

Staff Report

Origin

At the Regular Council meeting of June 8, 2020, City Council resolved that:

That staff examine the requirements for increasing the capacity for electric vehicle charging stations for non-residential projects, including a review of rooftop solar panels and rooftop agricultural uses, and report back.

This report responds to the electric vehicle component in the above resolution and recommends an amendment to the City's Zoning Bylaw 8500 that would introduce electric vehicle charging infrastructure requirements for non-residential parking spaces in new development. With regard to rooftop solar panels, on July 25, 2022, Council endorsed stakeholder engagement in the report titled "Technical and Economic Considerations for Rooftop Solar Energy Systems for New Buildings", which presented findings from analysis of annual energy generation potential from rooftop solar photovoltaic panel arrays situated on residential, commercial and industrial buildings. Regarding rooftop agricultural uses, the City's ability to encourage onsite agricultural uses and other locally-developed building standards through bylaw was explicitly removed with the passage of the provincial Building Act, which entered into force on December 15, 2017.

This report supports Council's Strategic Plan 2022-2026, Focus Area #2 Strategic and Sustainable Community Growth:

Strategic and sustainable growth that supports long-term community needs and a well-planned and prosperous city.

2.3 Ensure that both built and natural infrastructure supports sustainable development throughout the city.

This report also supports Focus Area #5 A Leader in Environmental Sustainability:

Leadership in environmental sustainability through innovative, sustainable and proactive solutions that mitigate climate change and other environmental impacts.

5.1 Continue to demonstrate leadership in proactive climate action and environmental sustainability.

This report supports the implementation of Community Energy and Emissions Plan 2050 and related Official Community Plan emission reduction policies through:

Strategic Direction: *Transition to Zero Emission Vehicles*

Actions:

- ☒ *Extend current residential EV charging requirements to include visitor and car-share parking stalls*
- ☒ *Establish light-duty EV charging requirements for parking stalls in new commercial and industrial development*

Analysis

Role of Zero Emission Mobility in Achieving Richmond's 2030 and 2050 Emission Targets

Council adopted targets in Richmond's Community Energy and Emissions Plan 2050 (CEEP) in 2022 to reduce community greenhouse gas (GHG) emissions 50% below 2007 levels by 2030, and to achieve net-zero emissions by 2050. Transportation accounts for over half of annual GHG emissions in Richmond, representing 57% of total community emissions from the most recent provincial inventory in 2017. Modeling undertaken as part of the CEEP indicated Richmond's 2050 emissions reduction targets can only be achieved with the near-universal adoption of zero emissions personal vehicles by the 2040s, in tandem with increasing proportion of daily trips made by transit, walking, bicycling and rolling.

Richmond was the first municipality in North America to require that 100% of new residential parking spaces be provided with a Level 2 energized outlet to facilitate ease of charging an electric vehicle (EV) at home. Enacting these 'EV Ready' requirements also encouraged other municipalities in the region and elsewhere in the province to adopt similar bylaw requirements for new residential buildings. Transitioning to EVs is particularly effective as a GHG reduction measure for vehicular transportation because approximately 97% of all electrical generation in BC is from renewable sources (hydroelectric, wind, biomass and solar generation).

This report focuses on implementing EV Ready requirements for non-residential parking spaces in new developments.

Growth Trend for Electric Vehicle Sales in Richmond

The number of EVs in BC and Richmond is increasing at an accelerating rate, reflecting growing market interest in purchasing battery-electric vehicles, and the transition away from internal combustion engine (ICE) vehicles. In 2022, EVs comprised 22.5% of new light-duty vehicles sold within Metro Vancouver, and 18.1% of all light-duty vehicles sold in BC.¹ At the beginning of 2022, over 3% of all light-duty vehicles registered in Richmond were EVs, and based upon current trends, staff expects this figure to exceed 5% by the end of 2023.²

Provincial and Federal incentives for the purchase of EVs have helped accelerate demand within BC, and in 2019, the Province adopted the Zero-Emission Vehicles Act³ (ZEV Act) requiring that ZEVs comprise progressively larger percentages of total annual light duty vehicle sales and leases. In summer 2022, the Province consulted on proposed amendments to the ZEV Act Regulation, which included advancing the date of the requirement (from 2040 to 2035) that all new light-duty vehicle sales in BC are ZEVs.

The new EV sales targets for BC would greatly assist the City's efforts in closing the gap between current provincial requirements and accelerated EV adoption targets reflected in the

¹ S&P Global Mobility. <https://cdn.ihsmarket.com/www/prot/pdf/0223/EV-Canadian-Newsletter-Q4-2022-.pdf>

² ICBC vehicle population data for January 1, 2022 (from ICBC's Open Data Licence). <https://public.tableau.com/app/profile/icbc/viz/VehiclePopulationIntroPage/VehiclePopulationData>

³ In BC, "Class A" ZEVs include long-range plug-in hybrid electric vehicles and fuel cell vehicles as well as battery electric vehicles. There were 33 fuel cell vehicles registered in Richmond as of January 1, 2022.

CEEP. However, provincial policy alone is insufficient in reaching the City's 2030 emission reduction target, since convenient access to EV charging is an essential consideration in purchasing a plug-in electric vehicle. For more information on the importance of accessing convenient EV charging at home, at work and "on the go", see Attachment 1.

Based on projected growth of EVs within Richmond's vehicle fleet, and the projected percentage of Richmond households without ready access to charging at home (referred to as 'EV orphans'), analysis indicates that 35% of parking spaces be considered a lower boundary for an EV Ready charging infrastructure requirement. For more information on this analysis, see Attachment 2.

Considerations for EV Ready Zoning Bylaw Requirements for Non-Residential Parking Spaces

Staff identified the following objectives when developing recommendations for EV Ready Zoning Bylaw Requirements for Non-Residential Parking Spaces:

- **Sufficiency:** Ensure that the requirements enable the level of GHG emission reductions required to achieve the City's 2030 and 2050 targets.
- **Equity:** Maximize access to convenient EV charging for potential EV purchasers who do not have the option to charge their vehicle at home, addressing equity concerns and minimizing a crucial barrier to broader ZEV adoption.
- **Cost-effectiveness:** Leverage the cost savings for the building owner that result from installing EV charging infrastructure during initial construction (relative to post-construction retrofits). Allow property owners to phase installation of EVSE according to user need and market demand, and recoup associated capital and operating costs.
- **Performance:** Consider allowing implementation of customized solutions tailored to specific characteristics of a development and its intended users, while still meeting the overall EV charging performance objective of the proposed regulation.
- **Consistency:** Favour consistency with application of similar requirements by other local governments, where this does not compromise City objectives.

Using the above objectives, staff recommend implementation of the following requirements for non-residential parking spaces at new developments. These requirements would be secured through a proposed amendment to Zoning Bylaw 8500, included in this report.

1. General requirement for employee, customer, residential visitor and unclassified parking spaces:

- 35% of parking spaces are to have EV charging infrastructure installed capable of supporting a charging capacity of at least 1.66 kW at all times, suitable for longer duration parking.
- In addition, 10% of parking spaces (with a minimum of one parking space) are to have EV charging infrastructure installed capable of supporting a charging capacity of at least 6.66 kW at all times, suitable for short duration parking.

2. Alternate compliance pathway for employee, customer, residential visitor and unclassified parking spaces:

- The total installed capacity of required charging infrastructure must exceed 1.25 kW multiplied by the total number of employee, customer, residential visitor and unclassified parking spaces. This alternate compliance pathway is intended to provide an equivalent total installed EV charging capacity as the general requirement.⁴

3. Accessible parking spaces:

- For on-site parking areas that contain accessible parking spaces (i.e. accessible spaces or van-accessible spaces), the requirements set out in the General Requirement shall apply proportionately to the total number of accessible parking spaces within the parking area.

4. Hotel guest parking spaces:

- 100% of parking spaces designated for use by hotel or dormitory guests are to be installed with EV charging infrastructure as per the residential EV charging requirement.

Note: The use case by hotel guests is very similar to that of residential dwelling units, and are thus well served by the same EV Ready requirement.

5. Shared vehicle parking spaces:

- 100% of designated shared vehicle parking spaces (i.e. for vehicles operated by a shared vehicle organization) are to be installed with a dedicated Level 2 circuit as well as a fully-installed and operating EV charger.

Note: This is the only parking space designation for which staff recommend an EV charger be installed as a condition of approval for occupancy.

Exemptions

The following parking spaces are exempt from the proposed Bylaw requirement:

- 1) Private sector vehicle fleet spaces; and
- 2) Commercial loading spaces.

In-Stream Provisions for Development Applications

New EV Ready requirements may affect the amount of electrical service capacity required by a development, the optimal size and/or placement of electrical rooms, or the dimensions of some parking spaces, thus influencing the design of some projects. As a result, staff recommend that applications with advanced designs be provided with a time-limited exemption consistent with the approach taken when the most recent Energy Step Code requirements were adopted.

Specifically, an owner would be permitted to submit a Building Permit application in compliance with prior requirements if:

⁴ The alternate compliance pathway requirement can be met using a tailored mix of dedicated and shared Level 2, and/or fast charging circuits that best meet the needs of the specific development and its intended users.

- a) a Development Permit was issued by Council prior to adoption of Amendment Bylaw No. 10463; or
- b) An in-stream Development Permit application in accordance with existing Zoning Bylaw provisions is issued by Council within one year of the adoption of Amendment Bylaw No. 10463, and an acceptable Building Permit application has also been submitted to the City within this timeframe.

Projected Costs for Implementing EV Ready Charging Infrastructure

Based on cost modelling, staff anticipate that the cost to developers of implementing the proposed requirements will be modest, ranging from \$400 to \$700 per parking stall, over a wide range of building types and lot sizes.⁵ These costs will be much lower than the cost required to retrofit the same parking space with EV Ready charging capability at a later date.

Following building completion, the property owner will determine the timing and phasing for the installation of EV service equipment (EVSE), which includes charging unit, related load management and user billing software. The property owner may choose to install EVSE in stages, in consideration of rising demand for onsite EV charging and pace of market growth over time, so as to best meet the needs of the visitors, guests, and employees frequenting that specific development. In terms of recouping cost of EVSE, the owner may charge users for electrical energy used during a charging session, as well as a portion of the overall EVSE capital cost.

Consultation

In March 2023, staff held an engagement and feedback session with members of Urban Development Institute (UDI) and the Vancouver Chapter of the Commercial Real Estate Development Association (known as NAIOP⁶) regarding the draft recommendations for non-residential EV charging infrastructure requirements.

Participants did not object to the proposed general requirement, and expressed interest in the alternate compliance pathway. They also suggested that the City allow use of an alternate compliance pathway for Level 2 charging solutions outright, and require approval by the Director of Building Approvals only for those proposals incorporating high capacity Level 3, DC fast charging. Staff accepted this suggestion, which was incorporated into the recommendations.

Should the General Purposes Committee endorse the proposed amendment to the City's Zoning Bylaw 8500, and Council grant first reading to the amendment bylaw, the bylaw will be forwarded to a Public Hearing, where any member of the public will have the opportunity to comment. Public notification for the Public Hearing will be provided as per the Local Government Act and the City's Zoning Bylaw 8500.

⁵ Dunsky Climate and Energy technical report to City of Richmond staff, February 2023. Per stall costs for EV Ready charging infrastructure are calculated in terms of the total number of parking stalls required within a given development.

⁶ NAIOP does not generally use the long version of this acronym (i.e., National Association for Industrial and Office Parks).

Considerations for Implementation

Implementation of EV Ready requirements may require development of new or updated guidance in the form of City bulletins for non-residential building applications. This work would ensue following adoption of the proposed amendment to Zoning Bylaw 8500. The proposed amendment would standardize the provision of EV charging in all non-residential building applications, ensuring consistency while simplifying administrative and regulatory procedures for staff.

During the Plan Review stage, staff will need to confirm that the required number of electrical circuits serving vehicle parking spaces are documented in the Building Permit electrical plans, and that accessible parking stalls are properly sized to accommodate the post-occupancy installation of an EV charging device. During construction, the Building Official will require applicants to provide certification that the circuits have been properly installed according to all applicable standards. Additionally, applicants will need to consider the spatial implications and placement of EV charging infrastructure within the parking area. Confirmation of parking dimensions (standard, small and accessible stalls) will also be required prior to occupancy. Applicants should note that if required parking stall dimensions (per Zoning Bylaw 8500) cannot be achieved with activation of EV charging at a stall, then that stall should not be provided with EV Ready infrastructure.

Staff will also develop guidelines on recommended dimensions for standard, small and accessible EV Ready parking spaces in order to accommodate the post-occupancy installation of EV chargers, with the intent of having guidance available to applicants when the proposed EV Ready requirements enter into force. These guidelines will also inform a future amendment to Zoning Bylaw 8500 with respect to parking stall dimensions.

Financial Impact

The proposed Bylaw amendment will increase capital costs for new civic buildings. This includes capital costs related to incremental electrical panel capacity and circuits, wiring and junction box at the time of construction. Capital costs would also be incurred with purchase and installation of EV charging equipment serving designated parking stalls. Operating and replacement costs of EV chargers installed at civic buildings will be covered by customer revenue, as new public chargers are subject to current Bylaw provisions and rates approved by Council in March 2020.

Conclusion

Implementing a bylaw setting out standard EV Ready requirements for non-residential parking spaces in new development should, over time, greatly increase access to workplace charging opportunities for local residents without access to charging at home. Additionally, opportunities for 'on the go' opportunity charging will be created in new office, retail, restaurant, entertainment, leisure and institutional uses. In developing the policy approach and proposed Zoning Bylaw Amendment, staff considered the objectives of sufficiency, equity, cost-effectiveness, performance and consistency in identifying recommended EV Ready requirements for non-residential parking stalls within new developments.



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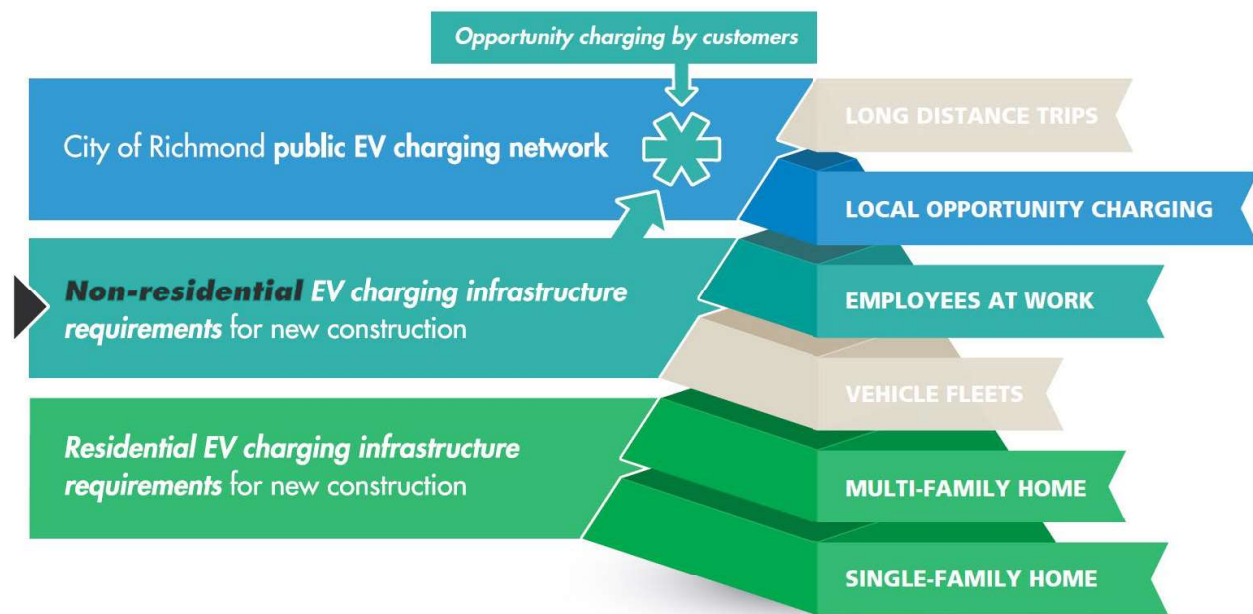
- Att. 1: Optimizing EV charging infrastructure for different parking space uses
2: Long-term demand for EV Ready workplace and opportunity parking spaces

Optimizing EV charging infrastructure for different parking space uses

Home, workplace and “on the go” charging all advance the transition to electric vehicles (EVs)

Charging at home is the most convenient way for EV owners to charge, as these vehicles are typically parked and available for charging over an extended period of time (i.e. 8-12 hours per day). At present, charging at home accounts for the majority of EV charging, forming the base of the ‘charging pyramid’ shown in the following figure.

A Complete EV Charging System



Installing EV charging infrastructure and related equipment is relatively straightforward for homeowners living in single-detached and duplex homes, and for townhouses with enclosed garages and/or driveways, requiring only an electrical permit from Technical Safety BC. However, opportunities to charge an electric vehicle at home is currently much more limited for homeowners and renters within existing multi-unit rental and strata apartment buildings. In these buildings, EV owners must obtain consent from strata councils, building landlord and/or property manager in order to install EV chargers and charging infrastructure. Without access to charging at home, residents in apartments building may be dissuaded from switching to plug-in electric vehicles unless they can be assured they will have easy and frequent access to charging at work, or numerous opportunities exist to access vehicle charging in the course of making usual workplace, shopping, leisure and other standard trips.

Richmond has shown leadership by significantly expanding its city-wide network of public charging over the past three years. As of mid-2023, this network now includes 53 Level 2 and four Level 3 DCFC charging ports, located at 23 civic locations throughout Richmond. During

the first four months of 2023, the City provided 148 MWh of public EV charging to customers, sufficient to power one million kilometers of near-zero emission mobility.¹

Workplace charging supports an accelerated transition to electric vehicles for employees that do not have access to charging at home, while also providing an amenity for those who already have EV charging at home. Workplace charging can also position the employer / business owner as forward thinking and supportive of zero emission mobility, and may positively contribute to employee retention. Typical dwell times for electric vehicles parked at the workplace are expected to range from about 4 to 9 hours for half-day and full-time work shifts respectively. Installation of electric vehicle energy management systems or ‘smart chargers’ that enable the simultaneous charging of two or four vehicles using a single 240-208V 40A circuit² is appropriate for part-time and full-time employees respectively, as these chargers would provide an average EV with at least 50 km of vehicle range per charging session, sufficient to meet the commuting needs of most employees.

The proposed Zoning Bylaw Amendment would standardize the provision of EV charging in all non-residential building applications, ensuring consistency while simplifying administrative and regulatory procedures for staff.

Opportunity charging allows EV drivers to charge their vehicles while parked during shopping trips, restaurant meals, office appointments, or visits to the City’s community centres and cultural venues. These trips tend to be shorter in duration than those to a workplace, ranging from a quick visit to a convenience store or fast-food outlet, to a multi-hour stop at a shopping mall. As such, EV chargers in these locations need to have a higher capacity if they are to deliver equivalent utility (i.e. ≥ 50 km of added range per charging session). Installation of dedicated Level 2 chargers (i.e. a 240-208V 40A circuit serving a single parking space³) or potentially DC fast chargers in locations with rapid turnover would be appropriate for opportunity charging. Although the cost per serviced stall is higher for these applications, the shorter dwell times at the stall means this type of charging can serve a comparatively larger number of vehicles per day.

City staff have previously negotiated inclusion of EV charging infrastructure for opportunity charging through the Rezoning and Development Permit application processes. The proposed Zoning Bylaw Amendment would standardize provision of EV charging for all non-residential building applications, ensuring consistency while simplifying administrative and regulatory procedures for staff.

¹ Jan – Apr 2023: $194.8 \text{ MWh} \times 5 \text{ km} / \text{kWh} = 974,000 \text{ km}$ [and 208.8 MWh (1,044,000 km) with fleet charging included]

² Equivalent to minimum charging capacities of 3.33 and 1.66 kW respectively.

³ Equivalent to a minimum charging capacity of 6.66 kW.

There is a wide range of uses for non-residential parking spaces

The use of non-residential parking stalls varies according to the specific activity or use within a development. Some parking stalls could be expected to have a quick turnover, while other stalls could be occupied up to 8-9 hours a day by a single vehicle, as illustrated in the table below.

	0.25 hr	1 hr.	3 hrs.	8 hrs.
Convenience store	↔			
Grocery store	↔			
Restaurant		↔		
Shopping mall		↔		
Part-time work shift			↔	
Full-time work shift				↔

The scenarios in the table above indicate that the delivered charging capacity for rapid-turnover parking spaces should be higher than that provided to stalls where vehicles will be parked for several hours or longer.

Regional stats from 2017 suggest that on average, light duty vehicles in Metro Vancouver were driven around 250 km each week. For Richmond, the average vehicle round-trip is 18 km. Given that a useful EV charging session would provide, at minimum, several times more range than was expended during the trip to obtain the charge, staff suggest that 40 km of range (or 10 kW of charge) be used as the minimum intended outcome for an average charging session in a parking space provided with charging infrastructure.

EV charging infrastructure approaches to support a wide range of uses

There is also a broad range of charging capacities available across different EV charging technologies, making it possible to match charging infrastructure to various parking space uses. Providing a dedicated Level 2 charging circuit would enable the average EV vehicle to add 40 km of range in just over an hour, making this approach a good match for most customer parking spaces. Alternately, the needs of full-time employees could be amply met if their parking spaces were served with a 4-way split on a Level 2 circuit, as this would provide 67 km of range over an 8-hour charging cycle, even if all three of the other chargers served by the same circuit were also fully occupied (as shown in the following table).

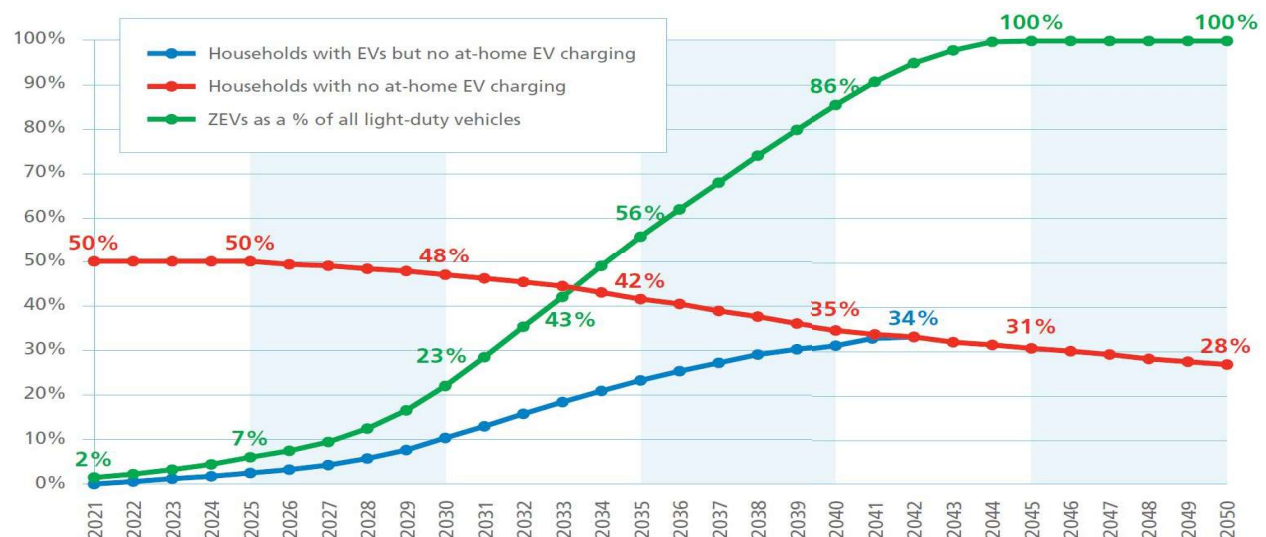
	Capacity	0.25 hr.	1 hr.	3 hrs.	8 hrs.
Level 3 [DCFC]					
e.g. 480 V x 50 A	24.0 kW	24 km	96 km	288 km	768 km
Level 2					
Dedicated circuit	6.66 kW	8 km	33 km	100 km	266 km
2-way split circuit	3.33 kW	4 km	17 km	50 km	133 km
4-way split circuit	1.67 kW	2 km	8 km	25 km	67 km

Level 3 chargers (direct current fast charging or DCFC) are much more expensive to install and maintain, but enable EV drivers to recharge their vehicle quickly, particularly when using DCFC rated at 75 kW capacity or more. However, DCFC units are larger than Level 2 chargers, and are not well suited for applications where vehicle dwell times exceed two or three hours, as no additional charging occurs once battery recharge capacity has been reached.

Long-term demand for EV Ready workplace and opportunity charging

Based upon the latest available data, staff have projected the growth of BC's zero emission vehicle (ZEV)⁴ fleet as a percentage of all light-duty vehicles, between 2021 and 2050, as shown in the figure below. This is compared against the projected percentage of Richmond households without ready access to EV charging at home. By combining these two trends, staff derived a forecast of the percentage of households projected to own an EV, but likely lacking access to at-home charging. As EV ownership increases in BC, by the early 2040s up to 34% of Richmond households will need to recharge their electric vehicles at work, or via public charging.

ZEV drivers in BC reliant on Workplace and/or Opportunity Charging



Staff suggest that 35% be considered a lower boundary for an EV-ready charging infrastructure requirement, given that parking spaces with EV chargers will not be utilized at 100% efficiency, and that many EV drivers with access to charging at home may also choose to make some use of these parking spaces, reducing availability for others. The percentage of Richmond households lacking access to home charging is projected to decline slowly after 2042, as increasing numbers of local residential apartments are retrofitted to provide at-home charging.

The non-residential EV charging infrastructure requirements already implemented by the City of Vancouver and the City of North Vancouver are very similar to Richmond's proposed requirements. Vancouver requires 45% of non-residential stalls be Level 2 EV Ready, of which 5% are to be served by dedicated Level 2 circuits for opportunity charging, while North Vancouver requires that 45% of non-residential stalls be Level 2 EV Ready, of which 10% are to have dedicated Level 2 circuits. Both cities allow the installation of EV charging infrastructure that enable simultaneous charging of up to four vehicles using a single 240-208V 40A circuit.⁵

⁴ The Province of BC defines ZEVs as all plug-in battery electric vehicles as well as plug-in hybrid electric vehicles.

⁵ 208V (minimum voltage) x 32A (i.e. maximum 80% loading) = 6.656 kW. The minimum charging capacity of at least 12 kW within an eight-hour period is more accurately defined as "more than (6.656 kW / 4 =) 1.66 kW."



**Richmond Zoning Bylaw 8500
Amendment Bylaw 10463
(Electric Vehicle Charging Infrastructure)**

The Council of the City of Richmond, in open meeting assembled, enacts as follows:

1. Richmond Zoning Bylaw 8500, as amended, is further amended at Section 3.4 [Use and Terms Definitions] by adding the following definitions in alphabetical order:

“DC fast charging means **electric vehicle supply equipment** that provides direct current (DC) power to a **vehicle** with an output voltage of 50-1000V and typically supplies output power between 25 and 400kW.

Opportunity charging means **Level 2 charging** (or higher) for an **electric vehicle** supported by a minimum 40A, dedicated electrical circuit for each **parking space**.

Shared vehicle means a four-wheeled automobile, van, or light truck operated by a **shared vehicle organization** which provides **vehicle-sharing** services to its members.

Shared vehicle organization means a legal entity whose principal business objective is to provide its members, for a fee, with a car-sharing service by which such members have access to a fleet of **shared vehicles** which they may reserve for use, and which the Director of Transportation has approved.”.

2. Richmond Zoning Bylaw 8500, as amended, is further amended at Section 3.4 [Use and Terms Definitions] by:

- a) deleting the definition for **“Electric vehicle energy management system”** and replacing it with the following:

“Electric vehicle energy management system means a system used to control **electric vehicle supply equipment** loads through the process of connecting, disconnecting, increasing, or reducing electric power to the loads and consisting of any of the following: a monitor(s), communications equipment, a controller(s), a timer(s), and other applicable device(s).”; and

- b) deleting the definition for “**Energized outlet**” and replacing it with the following:

“**Energized outlet** means a connected point in an electrical wiring installation at which current is taken and a source of voltage is connected to supply utilization equipment.”.

3. Richmond Zoning Bylaw 8500, as amended, is further amended by deleting the existing Section 7.15, and replacing it with a new Section 7.15 as follows:

“7.15 Provision of Electric Vehicle Charging Infrastructure

7.15.1 For new buildings, structures, and uses:

- a) 100% of residential **parking spaces**, excluding visitor **parking spaces**, shall feature an **energized outlet** capable of providing **Level 2 charging** or higher to the **parking space**;
- b) 100% of **parking spaces** associated with **hotel guest** sleeping rooms and **dormitory sleeping units** shall feature an **energized outlet** capable of providing **Level 2 charging** or higher to the **parking space**;
- c) 100% of **shared vehicle parking spaces** shall feature both **opportunity charging** and **electric vehicle supply equipment**; and
- d) for **parking spaces** associated with all **uses**, other than residential **uses** (except residential visitors), **hotel guest** sleeping rooms, **dormitory sleeping units**, and agricultural **uses**:
 - a. 35% of **parking spaces** shall feature an **energized outlet** capable of providing **Level 2 charging** or higher to the **parking space**; and
 - b. An additional 10% of **parking spaces** shall feature **opportunity charging**.

7.15.2 When the calculation of **parking spaces** requiring an **energized outlet** pursuant to this Section 7.15 results in a fractional figure, it shall be rounded upward to the nearest whole number.

7.15.3 Notwithstanding section 7.15.1.d):

- a) an alternate allocation of **energized outlets** may be provided if the total installed capacity of the electrical circuits for **Level 2 charging** meets or exceeds 1.25 kW multiplied by the total number of **parking spaces** subject to section 7.15.1.d); and

- b) **DC fast charging** infrastructure may be used to meet some or all of the requirements of 7.15.3.a) with the approval of the Director of Building Approvals.
- 7.15.4 For on-site parking areas that contain accessible **parking spaces** (i.e. accessible spaces or van-accessible spaces), the requirements set out in Section 7.15.1.d) shall apply proportionately to the total number of accessible **parking spaces** in the parking area.
- 7.15.5 For clarity, the requirements set out in Section 7.15.1 and 7.15.3 do not apply to **parking spaces** identified in Table 7.7.2.2 [Agricultural Use Parking Requirements], fleet vehicle **parking spaces**, or **loading spaces**.
- 7.15.6 **Energized outlets**, provided pursuant to section 7.15.1 and 7.15.3 above, shall be labeled for their intended use for **electric vehicle** charging.
- 7.15.7 Where an **electric vehicle energy management system** is to be implemented, the Director of Building Approvals may specify a minimum performance standard to ensure a sufficient rate of **electric vehicle** charging.
- 7.15.8 Where **electric vehicle supply equipment** is to be implemented, the Director of Building Approvals may specify a minimum performance standard to ensure a sufficient rate of **electric vehicle** charging.”.
4. This Bylaw may be cited as “**Richmond Zoning Bylaw 8500, Amendment Bylaw 10463**”, and is effective October 1, 2023.



FIRST READING

PUBLIC HEARING

SECOND READING

THIRD READING

ADOPTED

CITY OF RICHMOND	
APPROVED by	
APPROVED by Manager or Solicitor	

MAYOR_____
CORPORATE OFFICER