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Greater Vancouver Water District

Water Supply System 2024 Annual Update

March 2025

Indigenous Territorial Acknowledgement

Metro Vancouver acknowledges that the region's residents live, work, and learn on the shared territories of many Indigenous peoples, including 10 local First Nations: qiċəẏ (Katzie), qʷɑ:ńƛəń (Kwantlen), kʷikʷəƛəm (Kwikwetlem), máthxwi (Matsqui), xʷməθkʷəẏəm (Musqueam), qiqéyt (Qayqayt), Semiahmoo, Sḵwx̱wú7mesh Úxwumixw (Squamish), scəẃaθən məsteyəxʷ (Tsawwassen), and səlilwətaɬ (Tsleil-Waututh).

Metro Vancouver respects the diverse and distinct histories, languages, and cultures of First Nations, Métis, and Inuit, which collectively enrich our lives and the region.

About Metro Vancouver

Metro Vancouver is a diverse organization that plans for and delivers regional utility services, including water, sewers and wastewater treatment, and solid waste management. It also regulates air quality, plans for urban growth, manages a regional parks system, provides affordable housing, and serves as a regional federation. The organization is a federation of 21 municipalities, one electoral area, and one treaty First Nation located in the region of the same name. The organization is governed by a Board of Directors of elected officials from each member jurisdiction.

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Cover: Jericho Reservoir

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EXECUTIVE SUMMARY

The *Greater Vancouver Water District Water Supply System 2024 Annual Update* report summarizes key initiatives undertaken in 2024 by the Greater Vancouver Water District, operating under the name Metro Vancouver. In 2024, Metro Vancouver undertook water system risk mitigation, water conservation, water quality sampling and testing, and maintenance activities to continue to meet service objectives. Capital projects were undertaken to maintain and upgrade the existing infrastructure, increase resiliency, and accommodate regional growth.

This report was prepared following the Ministry of Health's (the Ministry) *Guide for Communicating with Water Users*.

Background

The purpose of the report is to remain aligned with the communication requirements stipulated in the BC provincial *Drinking Water Protection Act* and *Drinking Water Protection Regulation*. As a water supplier regulated under this legislation, Metro Vancouver communicates with water users through this report on topics defined within the Ministry developed Guide for Communicating with Water Users. This report provides transparent and proactive communication with water users. It also promotes public awareness and involvement in the drinking water program, one of the six elements of Health Canada's **Multi-Barrier Approach to Safe Drinking Water**.

Summary

Metro Vancouver's drinking water comes from rainfall and snowmelt in three protected water supply areas. The water supply areas provide a source of drinking water to over 3 million residents in the region. Rain and melting snow flow into three main reservoirs: Capilano, Seymour, and Coquitlam. The water is then treated at either the Seymour Capilano Filtration Plant or the Coquitlam Water Treatment Plant and distributed, wholesale, to member jurisdictions within the region via over 520 kilometres of transmission mains, 19 pump stations, 27 in-system storage reservoirs, and eight rechlorination stations. Member jurisdictions then distribute the water to residents and businesses via their local distribution system. This water is tested throughout the transmission system to guarantee that high-quality drinking water is distributed to member jurisdictions. Metro Vancouver maintains, upgrades, and builds infrastructure to ensure its ability to continue providing high-quality drinking water to meet the current and future needs of a growing region.

Key initiatives undertaken by Metro Vancouver in 2024 included the following:

Water Quality Sampling and Testing:

- Conducting 169,127 tests of drinking water through the *Water Quality Monitoring and Reporting Plan for Metro Vancouver and Member Jurisdictions*; the results of which can be found in the *Greater Vancouver Water District 2024 Water Quality Annual Report*.

Water System Risk Mitigation:

- Auditing the *Quality Management System for Drinking Water Operational Plan* and conducting long-term water supply infrastructure planning to mitigate risks to the drinking water system.

Water Conservation:

- Tracking, monitoring, and analyzing drinking water demand for each of our members. The highest peak day consumption in the summer of 2024 was 1.54 billion litres (BL), which was recorded on Saturday, July 20, 2024.
- Promoting water conservation through the Water Conservation campaign and the Water Wagon program.
- Rolling out communication and education related to the *Drinking Water Conservation Plan (DWCP)*, which sets water use restrictions.
- Running of the Summer Support Program to assist member jurisdictions in the monitoring and enforcement of the DWCP.

Financial Planning:

- Total water sales of $367 million with seasonal bulk water rates intended to incentivize members to control demand in the high demand season.
- Implementing a new DCC framework with a 1 per cent assist factor to fund water infrastructure for future developments, ensuring long-term regional affordability and alignment with the 2025-2029 Financial Plan.

Water System Management:

- Conducting annual maintenance projects, including the cleaning of seven in-system reservoirs, completing 72 condition assessments, performing 4,084 preventative maintenance work orders, and conducting thousands of asset inspections, rehabilitation, and replacement activities to ensure the existing infrastructure continues to perform as required to meet service objectives.
- Completing the construction of the deep vertical shaft on the south side of the Fraser River and commencing the north shaft construction for the Annacis Water Supply Tunnel.
- Completing the installation of steel water mains inside the Second Narrows Water Supply Tunnel under Burrard Inlet, between North Vancouver and Burnaby, to increase the reliability of supply in the event of a major earthquake as well as to provide additional long-term supply capacity.
- Completing the seismic upgrade of the Pebble Hill Reservoir Units 1 and 2 to withstand and remain in operation during a major earthquake.Commencing construction of the Capilano Raw Water Backup Power system to maintain water delivery to the Seymour Capilano Filtration Plant in the event of a power outage.

Emergency Response:

- Undertaking training, tabletop exercises and functional emergency exercises to test and prepare for emergencies.
- Metro Vancouver was involved with repairing 31 leaks in 2024.

ACRONYMS

BC	British Columbia
BL	Billion Litres
CWTP	Coquitlam Water Treatment Plant
DCC	Development Cost Charge
DWCP	Drinking Water Conservation Plan
ERP	Emergency Response Plan
GVWD	Greater Vancouver Water District
ha	Hectares
km	Kilometres
m	Metres
ML	Million Litres
MLD	Million Litres per Day
QMSDW	Quality Management System for Drinking Water
SCFP	Seymour Capilano Filtration Plant
SSP	Summer Support Program
UOCG	Utility Operational Coordination Guide
UV	Ultraviolet
WSEMP	Water Services Emergency Management Plan

1. INTRODUCTION

1.1 Purpose

As a water supplier regulated under BC's *Drinking Water Protection Act* and *Drinking Water Protection Regulation*, Metro Vancouver is required to communicate with water users on various topics defined in the legislation. This report was prepared following guidance from the Ministry of Health's *Guide for Communicating with Water Users*.

The purpose of this report is to proactively communicate with member jurisdictions and the public by providing an annual update on the drinking water supply system. Through this report, Metro Vancouver seeks to promote public awareness of the drinking water program, which has been identified as one of the components of the *Multi-Barrier Approach to Safe Drinking Water* by Health Canada.

1.2 Greater Vancouver Water District

The *Greater Vancouver Water District* (GVWD), operating as Metro Vancouver, was created and constituted under the provincial statute, the *Greater Vancouver Water District Act*, to supply drinking water to member jurisdictions within the region. The GVWD is governed by an administration board (the Board) consisting of representatives from the member jurisdictions of the GVWD. The Board appoints a Commissioner (the GVWD Commissioner) who provides management and oversight of the activities of the GVWD.

The GVWD membership consists of 18 municipalities, one Electoral Area, and one Treaty First Nation. The GVWD, working together with its members, plans for and delivers regional-scale drinking water services to over 3 million people. Table 1 shows the list of member jurisdictions that are supplied water from the GVWD.

TABLE 1: GREATER VANCOUVER WATER DISTRICT MEMBER JURISDICTIONS

Greater Vancouver Water District Member Jurisdictions
Village of Anmore
Village of Belcarra
City of Burnaby
City of Coquitlam
City of Delta
Electoral Area A
City of Langley
Township of Langley
City of Maple Ridge
City of New Westminster
City of North Vancouver
District of North Vancouver
City of Pitt Meadows
City of Port Coquitlam
City of Port Moody
City of Richmond
City of Surrey
scəwaθən məsteyəxʷ (Tsawwassen First Nation)
City of Vancouver
District of West Vancouver

Metro Vancouver is responsible for the following:

- Protecting the water supply areas
- Storing, treating, and ensuring the quality of the water
- Supplying water to member jurisdictions
- Upgrading, maintaining, and expanding the system
- Promoting water conservation
- Planning for the future to meet the drinking water needs of the growing population
- Ensuring the region's resilience in the face of unpredictable annual impacts of climate change

Metro Vancouver and its members work together to supply high-quality drinking water to the region's businesses and over 3 million residents.

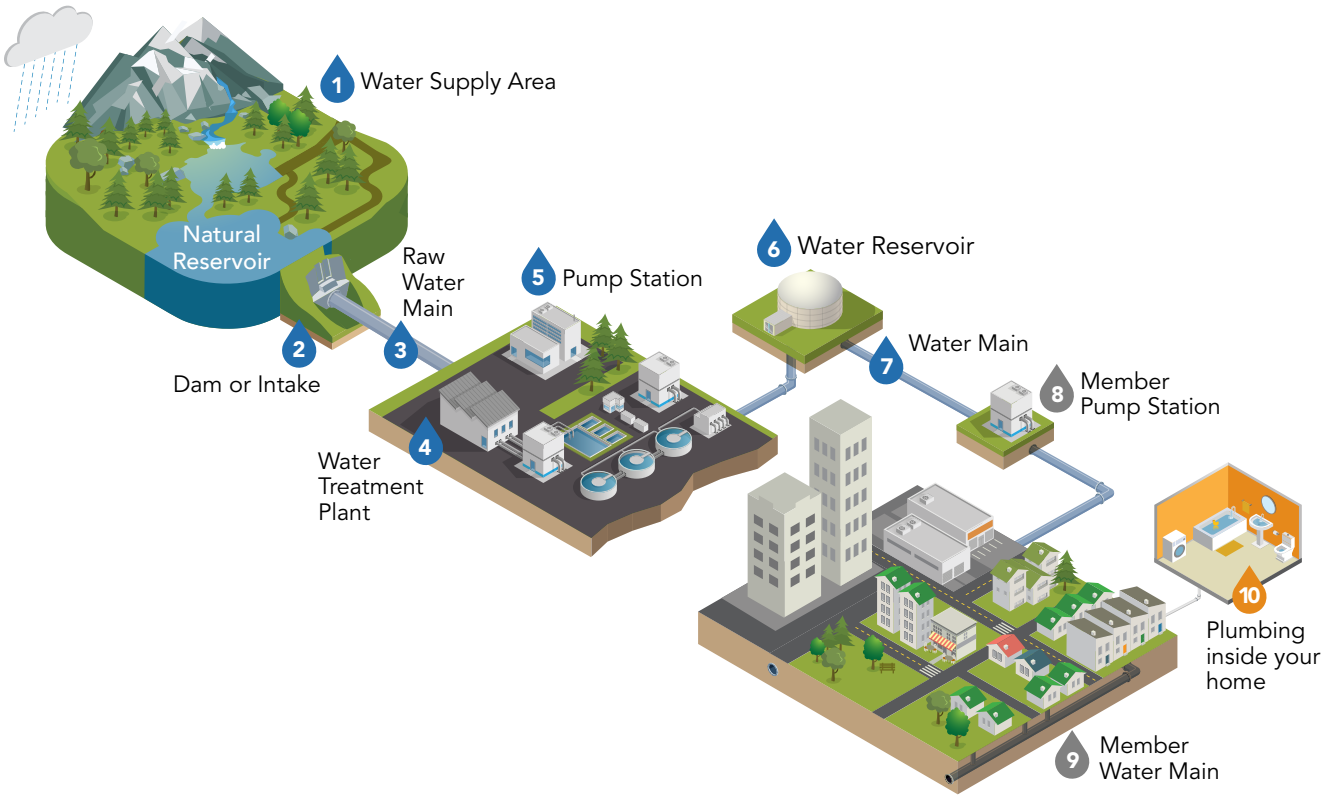

Figure 1: Metro Vancouver Drinking Water System Overview

2. DRINKING WATER SYSTEM OVERVIEW

Metro Vancouver's drinking water comes from rainfall and snowmelt stored in three protected reservoirs: Capilano, Seymour, and Coquitlam. Three alpine lakes, Loch Lomond, Burwell Lake, and Palisade Lake, provide additional water storage. To control water storage in the reservoirs, Metro Vancouver operates and maintains the Cleveland, Seymour Falls, and alpine lake dams, while the Coquitlam Dam is owned and operated by BC Hydro. Water is collected, stored, treated, and distributed to member jurisdictions through a network of dams, treatment plants, transmission mains, pump stations, and in-system storage reservoirs located throughout the region. The entire water system, including the water supply areas, encompasses a total land area of 2,860 square kilometres. Figure 2 provides an overview of the Metro Vancouver water supply system.

Figure 2: Metro Vancouver Drinking Water System Map

2.1 Source Water

Metro Vancouver's water supply areas and the Lower Seymour Conservation Reserve total approximately 60,000 hectares (ha) of protected lands north of the metropolitan area. The three water supply areas are, in order from west to east, Capilano (19,535 ha), Seymour (12,375 ha), and Coquitlam (20,461 ha). Access to the water supply areas is controlled and limited through the *Watershed Access Policy*. Protecting the water supply areas by restricting access is a fundamental component of the *Multi-Barrier Approach to Safe Drinking Water*, as outlined by Health Canada.

The Capilano water supply area is the most western of Metro Vancouver's water supply areas. The Cleveland Dam and Capilano Reservoir created behind it is located on the Capilano River. The Cleveland Dam is a concrete dam built in 1954. The Capilano water supply area has one additional storage reservoir, Palisade Lake, with an annually usable storage capacity of 10 BL.

The Seymour Falls Dam and the Seymour Reservoir created behind it are located on the Seymour River and is at the highest elevation of the three water system supply sources. The Seymour Falls Dam was built in 1961 to replace the original dam that was built in 1927. Also within the Seymour water supply area are two dammed alpine lakes, Burwell Lake and Loch Lomond, which have storage capacities of 12 BL and 7 BL, respectively. Water from the alpine lakes is typically used only during high-demand periods in the summer.

Metro Vancouver's most eastern water supply is the Coquitlam Reservoir. The water in Coquitlam Reservoir is governed by the Province of BC and is allocated through licenses to BC Hydro for power generation and Metro Vancouver for drinking water. BC Hydro owns and operates the Coquitlam Dam and is also responsible for releasing environmental flows into the Coquitlam River for fish and wildlife. Metro Vancouver has agreements with BC Hydro to access additional drinking water supply from the reservoir by buying a portion of the water currently allocated to power generation. The province licenses Metro Vancouver to use 451 billion litres (BL) of water per year. Every year, additional water is purchased from BC Hydro by Metro Vancouver for drinking water. In 2024, Metro Vancouver purchased an additional 60.2 BL.

2.2 Water Treatment Facilities

Metro Vancouver's source water is required by the Ministry to be treated to meet the *Drinking Water Treatment Objectives (Microbiological) for Surface Water Supplies in British Columbia.* In addition, Metro Vancouver's treated water meets the requirements for physical and chemical parameters listed in the federal *Guidelines for Canadian Drinking Water Quality*. Metro Vancouver's water is treated at either the Seymour Capilano Filtration Plant (SCFP) or the Coquitlam Water Treatment Plant (CWTP).

2.21 Seymour Capilano Filtration Plant

The SCFP facility receives good-quality raw water from the Seymour and Capilano Reservoirs. Twin tunnels transport both raw and treated water over 7 km between the Capilano Reservoir and SCFP. This provides the ability to blend or separately treat each source if raw water quality conditions require it. Raw water is pumped from Capilano Reservoir for treatment at SCFP. Since the SCFP is at a higher elevation than the Capilano Reservoir, excess pressure is available from the returning treated water, for which an energy recovery system is utilized. The recovered energy partially offsets the power requirements for the Capilano Raw Water Pump Station.

The treatment processes at the facility include direct filtration, including granular media (fine sand and anthracite), after coagulation, and flocculation processes. The ultraviolet (UV) is used for primary disinfection, and sodium hypochlorite is used for secondary disinfection. An added benefit of filtration is that less chlorine is required to maintain a residual in the transmission and distribution systems. The final step is treatment with lime and carbonic acid for corrosion control. Dewatered residuals as the final dry material of the backwash water treatment are transported to a concrete plant for reuse in concrete production or to a landfill when the concrete plant is temporarily shut down for maintenance." Figure 3 describes the individual treatment processes. In 2024, SCFP treated an average of 695 million litres per day (MLD) and a maximum of 994 MLD; the plant is designed to treat up to 1,800 MLD. For more information see Seymour Capilano Filtration Plant Brochure (metrovancouver.org).

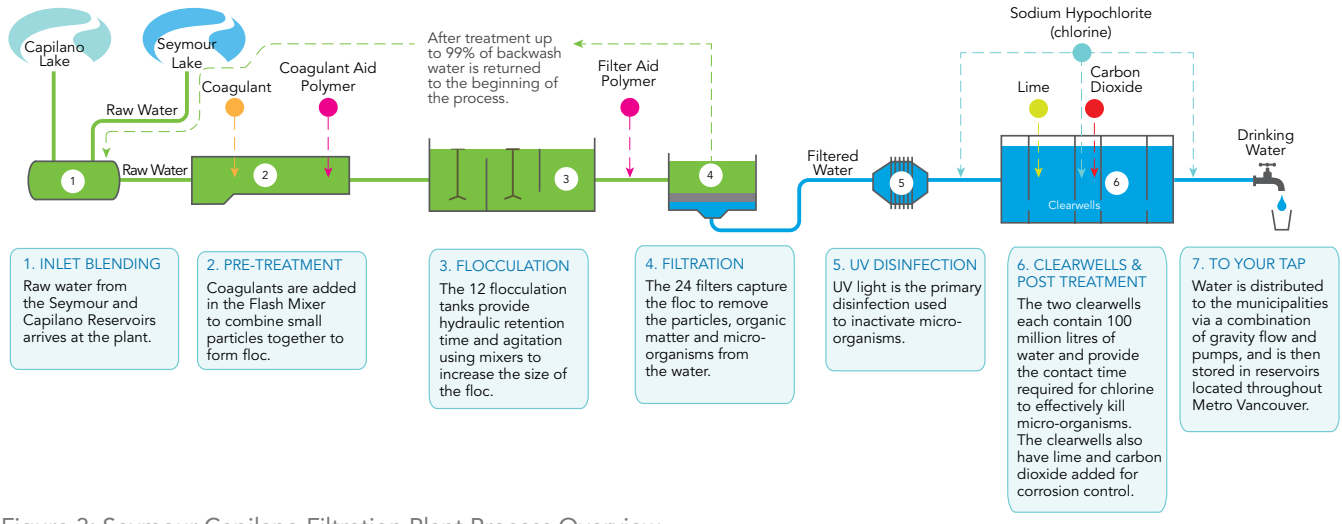

Figure 3: Seymour Capilano Filtration Plant Process Overview

2.22 Coquitlam Water Treatment Plant

The CWTP is located within the City of Coquitlam's northern boundary and treats water from the Coquitlam Reservoir. In 2024, CWTP treated an average of 392 MLD and a maximum of 834 MLD; the plant is designed to treat a maximum of 1,200 MLD.

The Coquitlam Water Supply Area is of different geology than the Seymour and Capilano Water Supply Areas. The water is typically less turbid even during heavy rain events, and as such, this system relies on different forms of treatment than SCFP. At CWTP, ozone is used as a pretreatment to help break down organics and reduce the production of disinfection by-products (DBPs). DBPs are chemicals that can be formed when chlorine is used for disinfecting drinking water. The primary treatment is UV disinfection followed by sodium hypochlorite (chlorination) for disinfection. The pH and alkalinity are adjusted using a combination of soda ash (sodium carbonate) and carbon dioxide before it enters the transmission system. Figure 4 shows the process flow diagram for CWTP. For more information see coquitlam-ultraviolet-fact-sheet-update.pdf (metrovancouver.org)

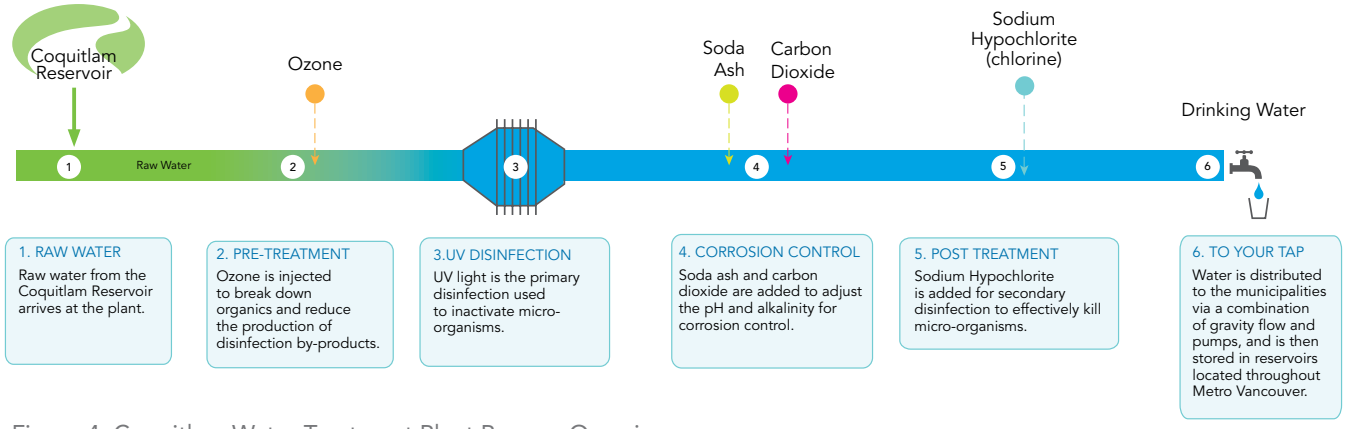

Figure 4: Coquitlam Water Treatment Plant Process Overview

2.3 Transmission System

Metro Vancouver supplies approximately 1 BL of drinking water each day, rising to over 1.5 BL in the summer, to member jurisdictions through a network of 19 pump stations, 27 in-system storage reservoirs, eight secondary disinfection facilities, and over 520 km of transmission water mains ranging from 0.35 to 3 m in diameter. Thousands of kilometres of additional local distribution mains deliver water directly to residents and businesses.

Water transmission from the Capilano and Seymour sources cross under Burrard Inlet via the First Narrows and Second Narrows marine crossings. The Coquitlam supply is conveyed south without immediately crossing major waterways. From these points, the conveyance of water is predominantly in a north-to-south direction, with interconnecting east-west transmission mains and pump stations.

When water demands are relatively low, the geography of the region provides, in large part, conveyance supported by gravity due to the higher elevation of the water treatment plants for much of the region. However, when water demand is high during the summer months or if portions of the system are out of service for construction or maintenance work, pumping is required at many locations as gravity flow capacity alone is insufficient.

3. WATER QUALITY SAMPLING PROGRAM

Metro Vancouver conducts daily tests on the drinking water. In 2024, Metro Vancouver conducted 169,127 tests on the water; the results of which are published in ***Water Quality Annual Reports*** available on the Metro Vancouver website. The *Greater Vancouver Water District 2024 Water Quality Annual Report* will be available in late April 2024. The Water Quality Annual Report summarizes the water quality analysis results for source, treated, and distributed water.

The *Water Quality Monitoring and Reporting Plan for Metro Vancouver (GVWD)* and Member Jurisdictions is currently being updated from its 2018 edition and will be completed in early 2025.

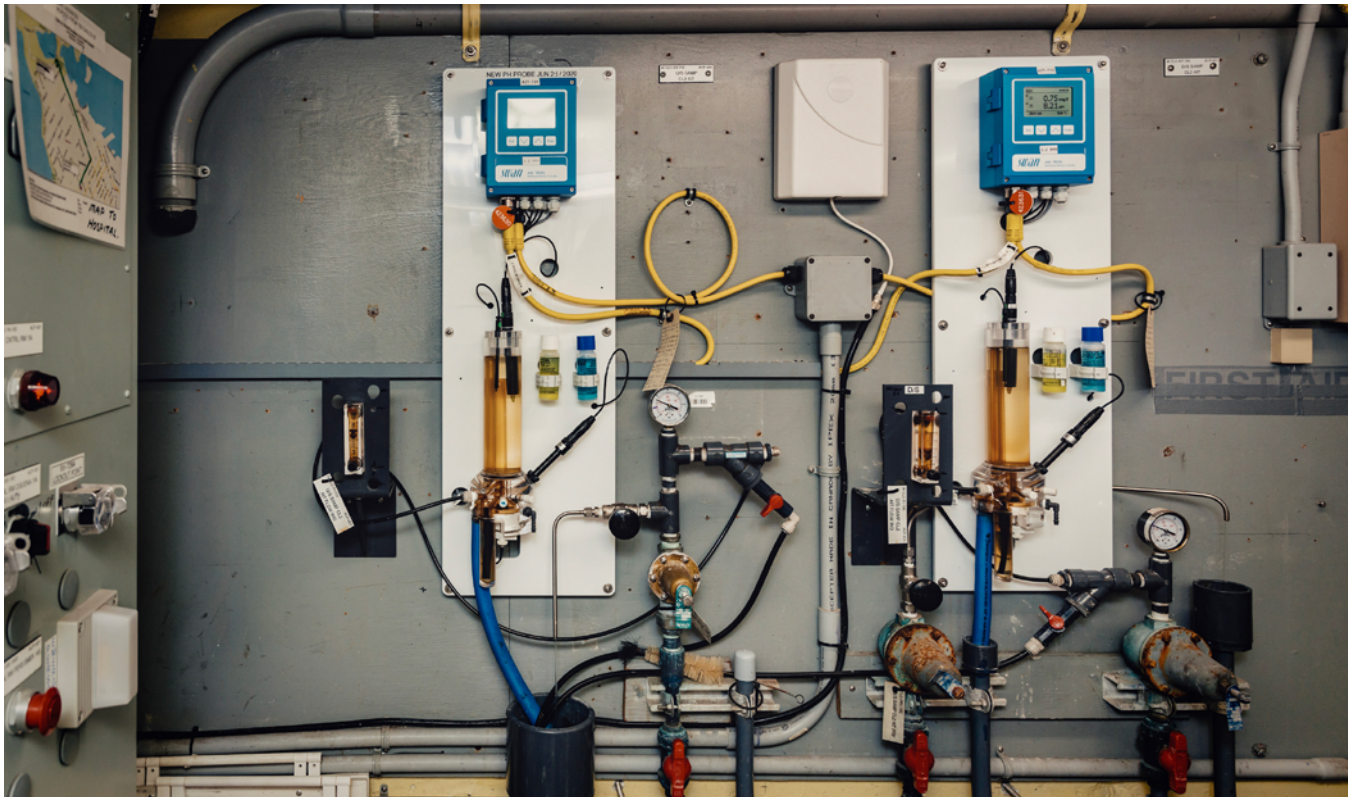

Figure 5: Water sampling to test for water quality in Metro Vancouver at Chilco and Alberni Secondary Disinfection Station

4. EVOLVING GUIDELINES

The *Guidelines for Canadian Drinking Water Quality* are developed by the Federal-Provincial-Territorial Committee on Drinking Water and published by Health Canada. BC's Ministry of Health is responsible for adopting these guidelines as water quality objectives, as well as publishing their own BC-specific guidance in the Drinking Water Officers' Guide. As new guidelines are developed and implemented, Metro Vancouver proactively reviews the water supply system and ensures that the system is capable of meeting the latest guidelines or identifies and plans for treatment systems or other upgrades as required.

5. WATER SYSTEM RISKS AND MITIGATION

Metro Vancouver follows the *Quality Management System for Drinking Water* (QMSDW) *Operational Plan*, which includes risk assessment outcomes and implementation of critical control measures. Risk assessment is a fundamental part of the QMSDW **Operational Plan** process. It forms the foundation for building a set of specific prioritized actions to safeguard drinking water and aid in strategic decision making, planning, and resource allocation. The analysis includes identifying, assessing, controlling, and mitigating the risks of the hazardous events that may occur in Metro Vancouver's drinking water system. The QMSDW has an annual audit requirement, and the 2024 audit was completed.

5.1 Water Supply Area Risks and Mitigation

Metro Vancouver's water supply areas have restricted access to minimize human-caused pollution, environmental damage, and wildfires. A changing climate continues to pose significant risk to water quality and quantity in the water supply areas. Climate models predict more frequent and intense precipitation events through the winter and spring and hotter, drier summers and falls. This shift in weather patterns may increase landslide and wildfire activity, which could result in turbidity events capable of overwhelming current treatment systems.

A reduction in snowpack accumulation is also anticipated with the warming climate which will reduce the inflow to the reservoirs due to snowmelt during spring and summer and potentially increase wildfire risk at higher elevations. Increased turbidity and changes in precipitation patterns that may impact source supply volumes have been considered in long-term water supply infrastructure planning through filtration pretreatment, changes in intake location, and treatment designs. Additional mitigation measures are underway including enhanced snowpack monitoring and wildfire risk planning.

5.2 Treatment System Risks and Mitigation

The source water quality at Coquitlam Reservoir and treated water quality at CWTP meet the current federal and provincial objectives for filtration exemption, and on this basis, CWTP was designed to include ozone, UV, and chlorine disinfection. Although the source water quality in Coquitlam Reservoir is good, turbidity events do occur at the existing intake location, and more frequent events are expected to occur in the future due to climate change. Therefore, filtration of water from the Coquitlam Reservoir may be required in the future to comply with regulatory requirements as well as to increase the resiliency of the CWTP to the anticipated impacts of climate change that would affect water quality.

Turbidity is just one water quality parameter among other parameters that would require filtration of the Coquitlam source water in the future. Filtration removes turbidity including (a portion of) naturally occurring organics. Organics reduction has several benefits, including reducing the amount of chlorination required to maintain adequate residual levels in the transmission and distribution systems. Reduced chlorination and organics also lowers the levels of disinfection by-products, which are health-regulated parameters under the federal *Guidelines for Canadian Drinking Water Quality*. Filtration provides resiliency and risk mitigation against changing future regulations and emerging contaminants. The past decision to filter the Capilano and Seymour sources was based on similar considerations. Metro Vancouver is in the early works of designing a new water supply intake, water supply tunnel, and filtration plant for the Coquitlam source water.

5.3 Transmission System Risks and Mitigation

Some of the risks that Metro Vancouver faces in the transmission system include potential seismic events, power outages, aging infrastructure, and strain on the system during peak day demand.

SEISMIC

In 2021, Metro Vancouver completed the *Regional Water Supply System Lifeline Study: Seismic Vulnerability Assessment*. This study investigated Metro Vancouver's water mains' seismic vulnerabilities and all other facilities, excluding dams. This study accounted for the Metro Vancouver's Seismic Design Criteria and 2020 National Building Code of Canada requirements. The study is part of Metro Vancouver's approach to periodically assess the seismic resiliency of the drinking water supply system and identify any required upgrades.

Metro Vancouver has completed a series of seismic upgrades over the past 30 years and has over $1.2 billion worth of planned resiliency projects in the next 10 years, including seismic upgrades to pump stations and reservoirs, marine crossing replacements, and water main renewals.

The results of this study will be used to develop resiliency and emergency response plans for the water supply system that will address how basic service can be provided to the region after a major seismic event that results in significant damage. Further studies will be required to determine potential resiliency measures for infrastructure deemed most at risk from damage or failure after a seismic event. Resiliency measures will be prioritized and incorporated in future capital projects.

POWER OUTAGES

Power outages can cause operational issues in the transmission system, particularly at pump stations. Backup power is in place at most critical sites to ensure a robust water supply system. Additional backup power is being implemented to ensure continued operation of key water supply facilities during planned and unplanned power outages.

AGING INFRASTRUCTURE

Aging infrastructure poses a risk to the transmission system with leakage and disrupted services. Metro Vancouver has an *Asset Management for Water Services Policy* that requires condition assessments of assets to be carried out, which may lead to repair and replacement projects. See Section 9.0 for more information on the Asset Management Program for the regional water utility.

PEAK DAY DEMAND

Peak day is defined as that day of the year when the highest volume of water is drawn from the region's three water supply sources. The transmission system is at risk of being strained during this time. Peak day water use is responsive to summer weather conditions. The annual outdoor watering restrictions, in combination with strong education and enforcement programs, encourage increased drinking water conservation and helps minimize peak day demand.

6. WATER USE AND CONSERVATION

6.1 Water Availability and Use Trends

Metro Vancouver's reservoirs get filled every winter and spring by precipitation and snowmelt, and that water needs to last through the summer and into the fall. In 2024, Metro Vancouver's snowpack was below historical average during the winter months. However, the region experienced more typical weather conditions through the summer. The water supply areas received near-normal precipitation for the period of May 1 to October 15 with a series of well-timed storms each month that benefited the water supply areas by relieving local drought conditions and reducing wildfire danger. The source reservoirs were proactively managed through the spring and early summer to capture the incoming streamflow to ensure the Capilano and Seymour Reservoirs reached their full pool water levels which happened on May 4 and June 14 respectively.

As shown in Figure 6, the peak day consumption in the summer of 2024 was 1.54 BL/d, recorded on Saturday, July 20. The 2023 peak day consumption was 1.56 BL/d, which occurred on Wednesday, July 5.

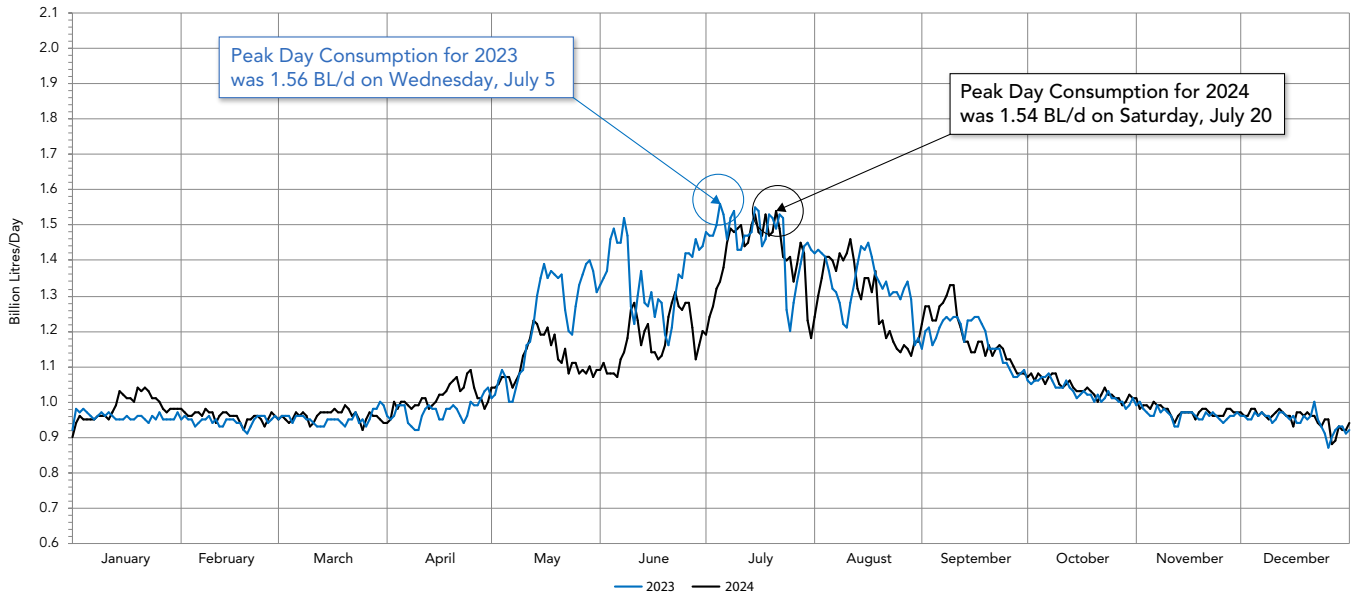

Figure 6: 2023 and 2024 Daily Water Consumption

The average 2024 summer daily demands were lower than at the same time in 2023. Overall, in terms of volume, the region used about 5 per cent less water during the entire high demand season of 2024 (205.0 BL) than that of 2023 (216.0 BL). The reduction in water use in 2024 could be attributed to having a wetter summer season, receiving over 105 per cent of normal precipitation from May 1 to October 15, while in 2023 the region received only 50 per cent of the normal precipitation.

Between 1999 and 2024, Metro Vancouver's service population has grown by 967,000 people at an annual growth rate of approximately 1.65 per cent. Despite the population growth, average daily water demand has remained relatively constant over the past 25 years, as shown in Figure 7. Thus, per capita water use has been declining over the past 25 years, as shown in Figure 8, which is often attributed to more efficient plumbing fixtures, densification, increasing public awareness about water conservation, and increasingly stringent watering restrictions.

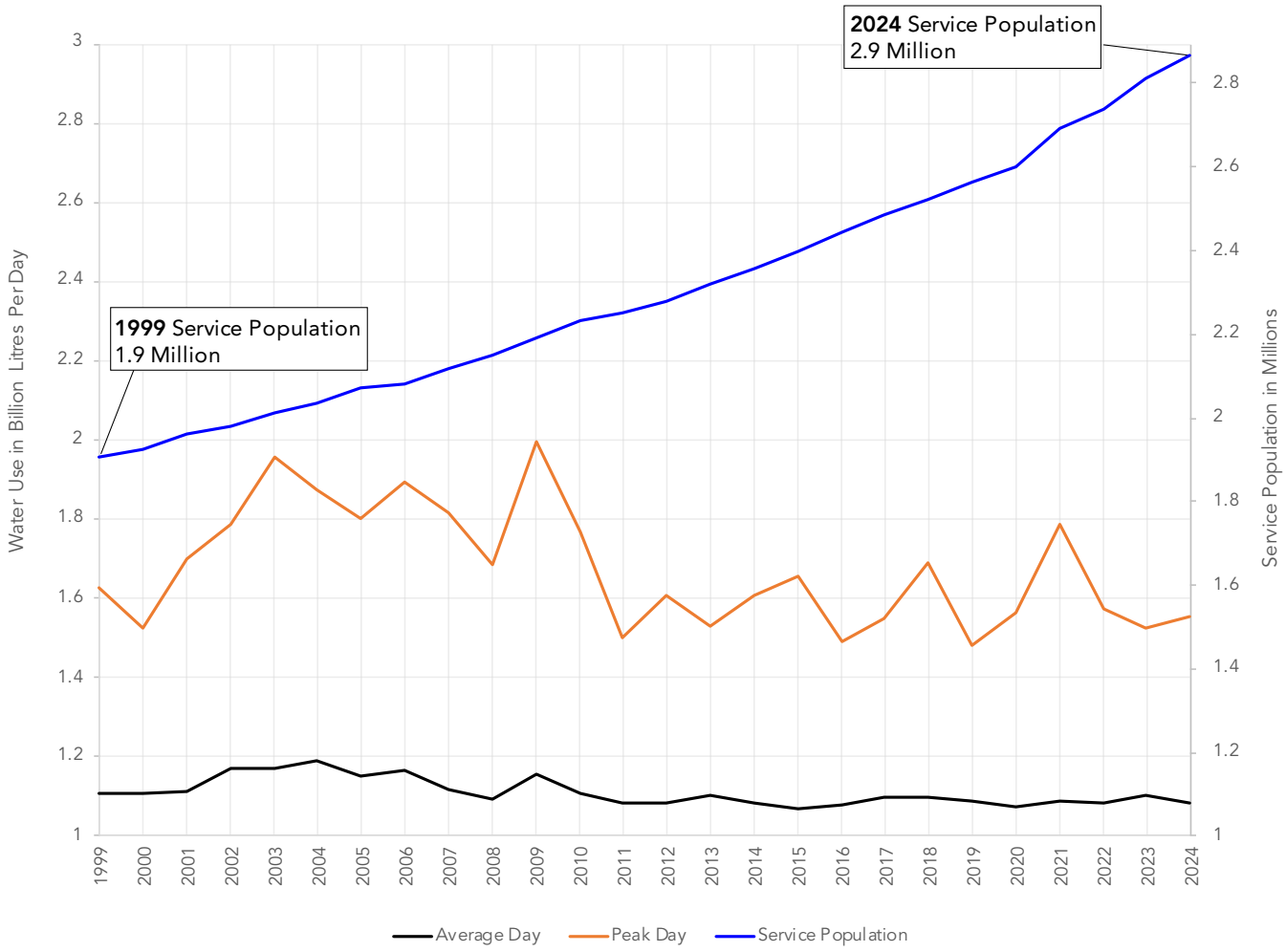

Figure 7: Regional Population and Water Use from 1999 to 2024

To ensure the region's collective needs for drinking water are met affordably and sustainably now and, in the future, the Drinking Water Conservation Plan (DWCP) was developed by Metro Vancouver with member jurisdictions. The DWCP is a regional policy developed to manage the use of drinking water during periods of high demand, mostly during late spring to early fall, and during periods of water shortages and emergencies. Figure 8 shows the regional per capita water use graphs from 1999 to 2024, together with the major milestones of the DWCP during this period.

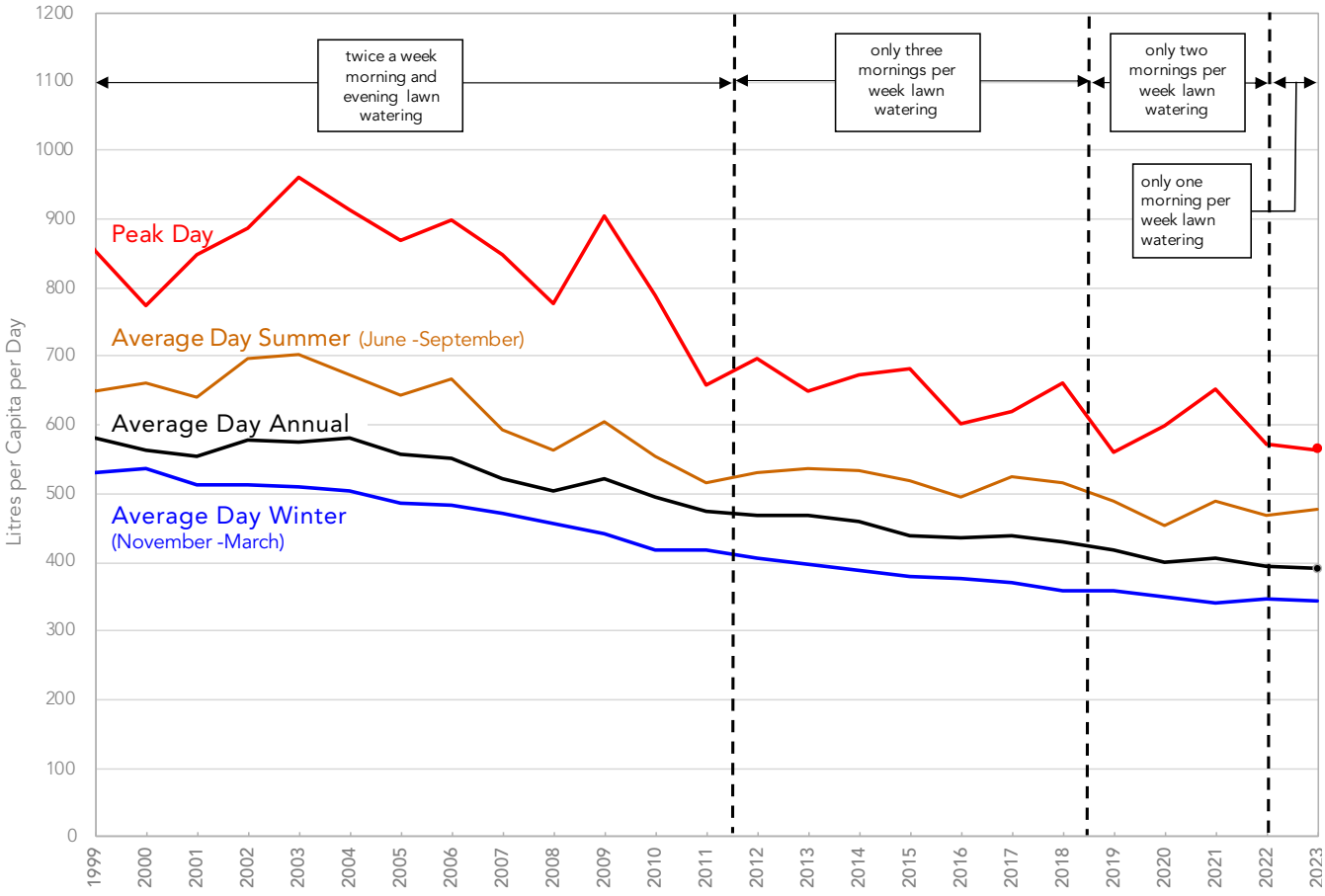

Figure 8: Regional Per Capita Water Use from 1999 to 2024

6.2 Water Conservation Measures

Metro Vancouver promotes water conservation through the following key initiatives:

WATER COMMUNICATIONS AND PUBLIC OUTREACH

Metro Vancouver undertakes several communication initiatives annually to promote the efficient use of drinking water resources throughout the region.

In 2024, Metro Vancouver educated residents on the value of drinking water and supported drinking water conservation through four communications initiatives: the watering restrictions promotion, the Water Conservation campaign, the Water Wagon program, and the 100th Anniversary of the Greater Vancouver Water District celebration. Figure 9 shows examples from the 2024 watering restrictions promotion.

Figure 9: Example of 2024 Lawn watering restrictions communication material (a) Post card front and back, (b) Rack card front and back (c) Social media story image

The creative direction for the watering restrictions promotion and the water conservation campaign was updated in response to focus group findings and to make a stronger connectionbetween the two programs. The key message and tagline were "Water one hour a week for a healthy lawn" and "It's all drinking water." Water conservation tips were woven throughout the creative. Figure 10 shows 2024 water conservation campaign materials.

Figure 10: Example of 2024 water conservation campaign materials

The promotional strategies for these initiatives in 2024 included region-wide reach through television, radio, multicultural print, direct mail, online, outdoor digital billboards, and social media. These broadcast and digital promotions delivered a combined total of 68.5 million impressions. Earned media resulted in a total potential combined reach and impressions of $324 million with an ad value equivalent of $10.3 million. The Water Wagon program resulted in 8,227 water bottle refills and fountain uses and 2,931 engagements with residents about drinking water conservation and quality.

In 2024, the 100th anniversary of the Greater Vancouver Water District was celebrated using communications that aimed to increase awareness of Metro Vancouver's role in delivering high-quality drinking water. Launching with a media release on January 11, the anniversary was highlighted on the website, social media (Facebook, Instagram, Twitter/X, YouTube), the PNE Fair showcase, Water Wagon, and at Metro Vancouver construction projects. An outdoor celebration event was held on July 20 in the Lower Seymour Conservation Reserve.

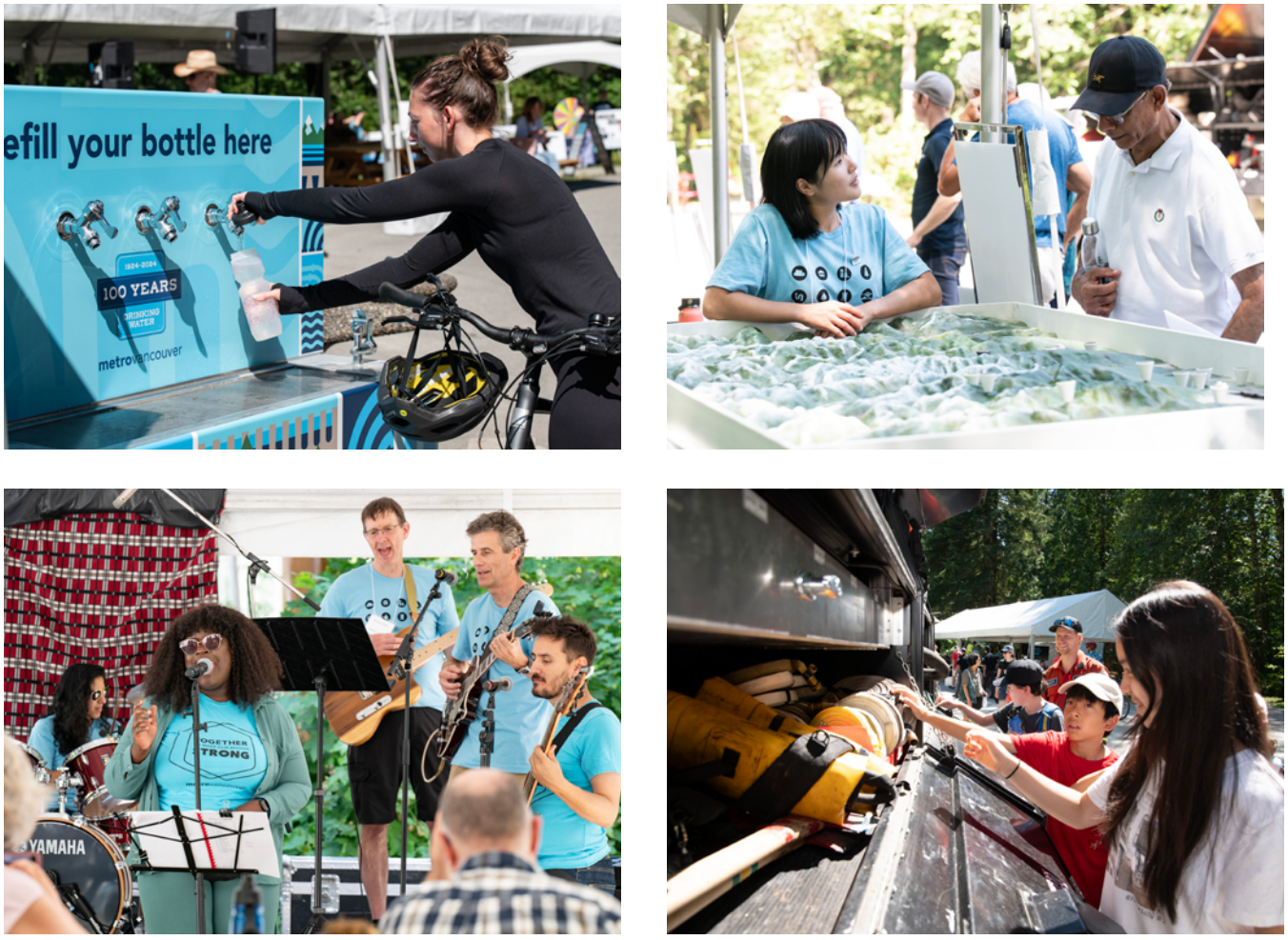

Figure 11: Images from the Water 100th Anniversary Celebration event

SUMMER SUPPORT PROGRAM

Metro Vancouver also delivered DWCP Summer Support Program (SSP) to assist member jurisdictions with promoting and monitoring the regional watering restrictions outlined in the DWCP from July to August 2024. Data indicates that non-compliant watering is more prevalent in the early morning and increased non-compliant lawn watering happens during the hotter and drier periods, as expected. Enforcement of watering restrictions bylaws is, and remains, a member jurisdiction's responsibility with the SPP noted as being beneficial and supportive of local education and enforcement efforts. This was the last year the program was offered to member jurisdictions.

7. SOURCE WATER PROTECTION

Metro Vancouver's approach to source water protection is to protect the water supply areas for drinking water and to restrict public access.

Access to the water supply areas is managed and enforced by Metro Vancouver staff. Regular patrols are conducted to intercept trespassers and inspect approved work activities to assure compliance with the requirements of the *GVWD Watershed Regulations*.

Figure 12: Metro Vancouver's wildfire crew

In addition, Metro Vancouver has its own dedicated wildfire crews, maintains a resource sharing agreement with the BC Wildfire Service, and partners with municipal fire departments to plan for and respond to wildfires in the water supply areas and adjacent lands.

Figure 13: Metro Vancouver's Watershed Security

8. EMERGENCY RESPONSE AND CONTINGENCY PLAN SUMMARY

8.1 Water Services Emergency Management Plan Summary

The *Water Services Emergency Management Plan* (WSEMP) covers all aspects of the Water Services Emergency Management structure. The WSEMP comprises a suite of documents: an overarching *Emergency Management Plan* and ten emergency response plans (ERPs) that cover the different components of the water supply system. These plans are updated on an annual basis with the last updated plan issued in 2024.

Together with the *Corporate Emergency Management Plan*, Emergency Management Standard, business continuity plans, and ERPs, all activities related to emergencies that may affect water supply are addressed. The WSEMP is intended to meet all requirements of the *Emergency and Disaster Management Act and the Drinking Water Protection Act and Regulation for an Emergency Response and Contingency Plan*. Similarly, this summary of the WSEMP is intended to meet the *Drinking Water Protection Regulation* Section 13 (4), which requires water suppliers to make public a summary to the water users.

Water system operations and emergency management are shared responsibilities between Metro Vancouver and its member jurisdictions. The overall purpose of the WSEMP is to provide general guidance to Metro Vancouver in preparing for, responding to, and recovering from an emergency. Emergencies may include but are not limited to earthquakes, floods, wildland and interface fire, and severe weather. The WSEMP defines Water Services' roles and responsibilities during incidents, emergencies, and disasters.

A Utility Operational Coordination Guide (UOCG) guides the operational-level interactions between Metro Vancouver and local government partners when responding to an emergency. Overall guidance during a major emergency is provided by the regional and local government Emergency Operations Centres.

In the case of significant damage to the Metro Vancouver portion of the water supply system, Water Services will make drinking water available to the affected member at the closest practical supply point in the undamaged part of the system to enable the member jurisdictions to distribute by temporary line, water truck or other means as identified by their emergency plan.

Ultimately, Metro Vancouver will endeavour to maintain the continuity of drinking water delivery to member jurisdictions. In an emergency, Metro Vancouver's priorities for water supply are:

1. Deliver drinking water whenever possible to members for consumption and/or firefighting.
2. Protect the integrity of water in its system for public health.

In meeting these priorities, Metro Vancouver subscribes to the following response objectives, in this order of priority:

1. Ensure the safety and health of all responders and Metro Vancouver staff
2. Save lives
3. Reduce suffering
4. Protect the public
5. Protect critical infrastructure
6. Protect property
7. Protect the environment
8. Reduce social and economic losses

8.2 Emergency Repairs

Metro Vancouver was involved with 31 leak repairs in 2024. See Table 2 for a summary of leaks.

TABLE 2: SUMMARY OF WATER MAIN LEAKS

Name	Location	Date of Leak	Flowrate of Discharge	Impact on Residents
UEL Main No.2	Vancouver	9-Jan-24	5	No
SCFP Drain Line	North Vancouver (District)	17-Jan-24	120	No
Seymour Capilano Treated Water Tunnel	North Vancouver (District)	23-Jan-24	900	No
Douglas Road Main	Burnaby	31-Jan-24	N/A[1]	No
UEL Main No.1	Vancouver	1-Feb-24	5	No
Prospect Avenue Pipeline	North Vancouver (District)	7-Feb-24	10 - 240	No
Capilano Main No. 7	North Vancouver (District)	9-Feb-24	0.5 - 1	No
Grandview Main	Surrey	12-Feb-24	1	No
North Road Main	Burnaby	17-Feb-24	100	No
Haney Main No. 3	Pitt Meadows	22-Mar-24	100	No
Central Park Main No. 2	Burnaby	5-Apr-24	200-500	No
Tilbury Main (River Rd)	Richmond	4-May-24	180	Yes, leaked to private property. Restoration provided by MV.
Tilbury Main (Bridgeport Rd)	Richmond	18-May-24	180	No
Tilbury Main (Cambie Rd)	Richmond	8-Jun-24	500	No
Seymour Main No. 3	North Vancouver (District)	18-Jun-24	15	No

Name	Location	Date of Leak	Flowrate of Discharge	Impact on Residents
Annacis Main No. 2	Surrey	25-Jun-24	12 - 20	No
Sapperton Main No. 1	Coquitlam	10-Jul-24	30	No
North Burnaby Main	Burnaby	24-Jul-24	150	No
Capilano Main No. 4	Vancouver	5-Aug-24	300	No
North Burnaby Main (Burnwood Dr)	Burnaby	8-Aug-24	100	No
Mathers Avenue Main	West Vancouver	20-Aug-24	50 - 100	No
North Burnaby Main (Howard Ave)	Burnaby	31-Aug-24	180	No
Annacis Main No. 2 (86 Ave)	Delta	7-Sep-24	150	No
Capilano Main No. 4 (Capilano Rd)	North Vancouver (District)	8-Sep-24	2 - 1200	No
Douglas Road Main	Burnaby	23-Oct-24	3	No
Surrey Hickleton Main	Surrey	25-Oct-24	100	No
Mathers Avenue Main (1086 Mathers)	West Vancouver (District)	4-Nov-24	2 - 5	No
North Burnaby Main (Glynde Ave)	Burnaby	7-Nov-24	5	No
Annacis Main No. 4 (Boundary Rd.)	Richmond	28-Nov-24	100	No
CWTP Service Water (connected to Coquitlam Main No. 3)	Coquitlam	9-Dec-24	N/A[1]	No
Haney Main No. 3	Pitt Meadows	11-Dec-24	50	No

1 Flow rate could not be estimated.

9. WATER SYSTEM MANAGEMENT

9.1 Asset Management Program

Metro Vancouver's asset management program ensures that assets are managed in a manner that minimizes asset failure risks and optimizes the lifecycle value of assets to meet asset performance targets. In 2019, the Board approved the ***Asset Management for Water Services Policy***. This policy establishes asset management principles and a framework to balance asset performance, risk, and cost to deliver Metro Vancouver water services. As part of the Asset Management Program, in 2022, Metro Vancouver produced and presented the ***State of the Assets Report – Water Services*** to the Board.

9.2 Operations and Maintenance Program

Repairs and upgrades required for the drinking water system are identified through the Operation and Maintenance Program. These repairs and improvements are undertaken as ongoing maintenance projects or as replacement/upgrade projects. Annual maintenance is an essential component of the asset management program and identifies the need for replacement or refurbishment of existing infrastructure to ensure that it continues to perform as required to meet service objectives.

Metro Vancouver undertakes system maintenance daily through scheduled work orders performed by certified trades staff to ensure that existing equipment and facilities are kept in a good state of repair and to identify when additional maintenance or replacement is needed.

Notable maintenance projects that took place in 2024 included the following:

Condition assessments

These follow the *Asset Management for Water Services Policy*, improve understanding of the water system's overall condition, and can lead to asset repair and replacement projects. In 2024, Metro Vancouver completed condition assessments of 125 chambers, four sections of water mains, three pump stations, and four reservoirs.

Reservoir cleaning

Metro Vancouver's in-system water storage reservoirs are periodically isolated and drained for interior cleaning, inspection, and repair or upgrade. In 2024, seven reservoirs were isolated, drained, and cleaned using high-pressure water spray. Each reservoir was disinfected as per *AWWA C652-19 Disinfection of Water Storage Facilities* and tested prior to being returned to service.

Figure 14: a. Inside Clayton Reservoir – prior to cleaning April 2023 b. Inside Clayton Reservoir – post cleaning February 2024

Valve exercising program

Metro Vancouver's water transmission system contains over 7,000 valves. Valves are used to regulate and isolate the water flow through the water transmission system. Commencing in 2022, a pilot program was launched to formalize exercising critical valves and to collect comprehensive data for the valves and chambers. The program assesses the condition of these assets and conducts proactive maintenance as a strategy to reduce reactive and emergency mobilizations to repair or replace failed valves. Two pilot phases were completed in 2023 and 2024, focusing on exercising critical water mains in alignment with line maintenance projects. During the pilots for the selected water mains, field data were collected and verified. Our resources included Enterprise Asset Management, GIS, and engineering drawings. The next phase will focus on integrating the valve exercising program with the line maintenance priorities, with the ultimate goal of establishing the program and ensuring all critical valves in the system are exercised over a three-year cycle.

Valve replacement program

Metro Vancouver is continually reviewing the water transmission system to ensure valves are in good working order through condition assessments and isolation tests and has identified that there is a need for a more formalized approach to valve maintenance, including valve replacement. Metro Vancouver staff began developing a formal valve replacement program in 2022 and created a risk ranking matrix for critical valves in 2023. In 2024, Metro Vancouver has initiated, the replacement of four critical valves. The goal is to replace high-risk valves annually through the Minor Capital Program.

Submerged water main crossings

Metro Vancouver continues to inspect and protect submerged water main crossings that are subject to hydraulic scour. Staff conduct annual monitoring of all major submerged water main crossings to assess if maintenance of existing scour protection or additional scour protection is required. In 2024, Metro Vancouver initiated feasibility studies to conduct Close Interval Potential Survey and Direct Current Voltage Gradient surveys on three water mains at water crossings to assess pipeline integrity. The pipelines include the Capilano Main No. 7 at the crossing with Mosquito Creek, Port Moody Main No. 1 at the crossing with Pinnacle Pond, and the First Narrows Pressure Tunnel at the First Narrows crossing.

Aerial water main crossings

Metro Vancouver continues to inspect and maintain aerial water main crossings that are suspended over water bodies. Staff completed condition assessments for two water mains in 2024 which include the East Burnaby Main at the crossing over Stoney Creek and North Road Main at the crossing over the BNSF Railway. Identified repairs are currently underway, preventing costly failures from occurring.

Mechanical, instrumentation, and electrical maintenance

In 2024, the maintenance team performed 4,084 preventative maintenance work orders. Examples of maintenance work include seven pump rebuilds at various water pump stations.

9.3 Capital Program

The 2024 – 2028 Water Services capital budget included $ 424.9 million for capital projects in 2024 and a total of $3.0 billion over five years. In 2024, there were 143 projects on the five-year capital plan. These projects are driven by system expansion requirements to meet the needs of a growing population, upgrades to improve system resiliency, and maintenance of aging infrastructure. Capital investments addressing population growth are the largest component of the budget, representing slightly more than 50 per cent of spending between 2024 – 2028.

In 2024, many major projects reached significant milestones, including the following key projects:

Capilano Raw Water Backup Power Project

A new backup power system is being constructed for the Capilano Raw Water Pump Station to maintain water delivery to the Seymour Capilano Filtration Plant in the event of a power outage. The backup power system includes an underground fuel vault and a new powerhouse. Construction is currently underway and is expected to be complete in 2025.

Seymour Capilano Filtration Plant Dry Polymer Upgrade

The purpose of this project is to improve the Filter Aid Polymer and Wash Water Recovery processes at the plant and consists of replacing the existing oil-emulsion based polymer systems with dry polymer make-up systems. The dry polymer system is simpler, more robust, and is easier to transport and recycle. The dry polymer system is successfully commissioned in the summer of 2024.

Stanley Park Water Supply Tunnel

This 1.4 km long steel water main, in a tunnel, will replace the existing Capilano Main No. 4 through Stanley Park which is at the end of its service life. The new water main will meet growing water demand and provide increased system resiliency. Procurement for the construction contractor is complete. Construction started in late 2024 and is expected to be substantially complete by 2029. For more information, see Stanley Park Water Supply Tunnel | Metro Vancouver

Second Narrows Water Supply Tunnel

This project comprises a 1.1 km long, 6.5 m diameter water supply tunnel under the Burrard Inlet, between North Vancouver and Burnaby, to increase the reliability of supply in the event of a major earthquake as well as to provide additional long-term supply capacity. Construction of this new tunnel infrastructure commenced in 2019 and is scheduled to be completed early 2025. The three new water mains will be tied into the drinking water system over the next few winters and are expected to be in service by 2028.

Metro Vancouver's Second Narrows Water Supply Tunnel received the 2024 Canadian Project of the Year Under $300 Million Award from the Tunnelling Association of Canada. For more information, see Second Narrows Water Supply Tunnel | Metro Vancouver.

Figure 16: Second Narrows Water Supply Tunnel – valve chamber construction and south shaft

Annacis Water Supply Tunnel

A 2.3 km long, 4.5-metre diameter water supply tunnel is required under the Fraser River between the City of New Westminster and the City of Surrey to meet growing water demand south of the Fraser River and to provide increased system resiliency. Construction commenced in early 2022 and the new tunnel is scheduled to be completed and in service by 2028. For more information, see Annacis Water Supply Tunnel | Metro Vancouver

Coquitlam Lake Water Supply Project (CLWSP)

A new water supply intake, tunnel, and treatment plant is proposed to increase the capacity to treat and deliver drinking water from the Coquitam source to meet the demand of our growing region. The project is currently in the permitting and regulatory phase, focusing on engagement with First Nations, the City of Coquitlam, regulators, and stakeholders. A program management firm has been retained. Planning of the treatment pilot testing facilities is underway and are anticipated to be installed by the second quarter of 2025. For more information, see Coquitlam Lake Water Supply Project | Metro Vancouver

Figure 15: Annacis Water Supply Tunnel - Tunnel boring machine

Coquitlam Water Main No. 4

This 12 km long steel water main will increase the transmission capacity from the Coquitlam source to the Cape Horn Pump Station and Reservoir in the City of Coquitlam. This project is required to optimize the capacity of the existing Coquitlam supply system and also provide additional capacity for the future Coquitlam Lake Water Supply Project. Construction of the first section, Robson to Guildford, is underway with 500 m of 3.2 m diameter steel pipe installed and is scheduled to be completed in 2026. The remaining three sections are in detailed design. For more information, see Coquitlam Water Main | Metro Vancouver

Newton Pump Station No. 2

This project, located at 6287 128 Street in the City of Surrey, consists of replacing the existing Newton Pump Station and includes full backup power redundancy, connections to existing and future infrastructure, and installation of new outlets to the existing Newton Reservoir. In 2024, the construction of the new reservoir outlets was completed. Design of the new pump station and backup power was also completed and the procurement for construction was issued to the prequalified contractors. Construction is planned to commence in mid-2025 with completion anticipated in 2028. For more information, see Newton Pump Station No. 2 | Metro Vancouver

Figure 17 : Rendering of Newton Pump Station No. 2 – View from 128 Street

Kennedy Newton Water Main

This 1.8 m diameter, 8 km long water main will connect the Newton Reservoir to the Kennedy Reservoir in the City of Surrey and is being built to meet growing water demand south of the Fraser River. The work includes the construction of line valve chambers, cross-over chambers, air release valves, and blow down valves. Construction the first two of three phases is complete. The final phase of the project commenced in 2022 and is expected to be complete in 2026. For more information, see Kennedy Newton Water Main | Metro Vancouver

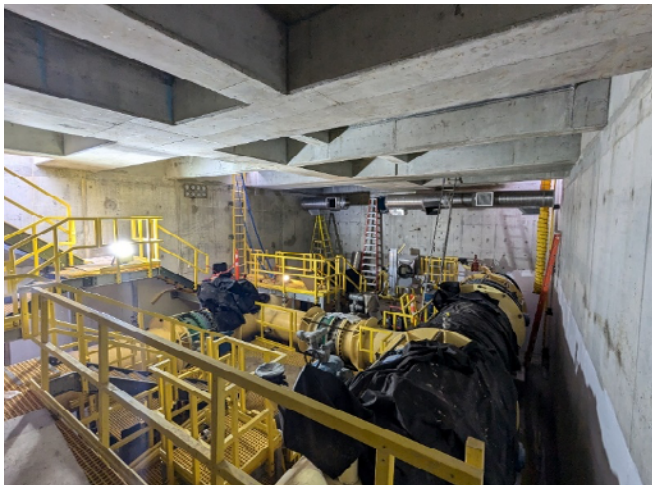

Figure 18: Kennedy Newton Water Main – Installation of Piping and Valves within the Large Underground Valve Chamber

Figure 19: Kennedy Newton Water Main – Installation of 1.8m Diameter Water Main

Pebble Hill Seismic Upgrade

Located in the City of Delta's Pebble Hill Park, this project involves the seismic upgrade of Pebble Hill Reservoir Unit 1 and Unit 2 to withstand and remain in operation following a major earthquake. Construction of the upgrade works completed in 2024. Final restoration takes place in spring 2025. For more information, see Pebble Hill Reservoir Seismic Upgrade | Metro Vancouver

Cambie-Richmond Water Supply Tunnel (Preliminary Design)

This is a 1.1 km long, 4.5 m diameter crossing under the Fraser River from Vancouver to Richmond. The project consists of a tunnel and deep vertical shafts located on each side of the river to facilitate the installation of a 2.1 m diameter welded steel water main. Each shaft site will also include the construction of underground valve chambers to facilitate water control functions. The conceptual design phase of the project was completed in 2022. The preliminary design phase began in September 2024 following procurement. Construction is set to start in 2029 and is expected to take about five years to complete. For more information, see Cambie-Richmond Water Supply Tunnel| Metro Vancouver

9.4 Financial Review

Metro Vancouver had 2024 total water sales revenues of approximately $367 million, with higher summer wholesale rates of $1.2537/$m^3$ for June through September and a wholesale rate of $0.7119/$m^3$ applying for the rest of the year (equating to an average water rate of $0.9333/$m^3$). The differential rates are intended to incentivize conservation efforts by member jurisdictions. Each member jurisdiction determines the specific way they collect fees to cover the cost of water purchased from Metro Vancouver.

Metro Vancouver has implemented a new development cost charge (DCC) for regional water infrastructure. Under this framework, Metro Vancouver collects DCCs from new residential and non-residential developments across the region to fund the water infrastructure required to support future occupants of these buildings. This initiative, guided by the 2025 - 2029 Metro Vancouver Financial Plan, includes a 1% assist factor. The concept of funding regional water infrastructure through development cost charges is a critical component of maintaining regional affordability in the long-term financial plan.


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