City of Richmond

Agenda

Public Works and Transportation Committee
Electronic Meeting

Anderson Room, City Hall
6911 No. 3 Road

Wednesday, April 23, 2025
Immediately following the Planning Committee meetings

Pg. # ITEM

MINUTES

PWT-6 ***Motion to adopt the minutes of the meeting of the Public Works and Transportation Committee held on March 19, 2025.***

NEXT COMMITTEE MEETING DATE

May 21, 2025, (tentative date) at 4:00 p.m. in the Anderson Room.

AGENDA ADDITIONS AND DELETIONS

ENGINEERING AND PUBLIC WORKS DIVISION

1. **2025 NATIONAL PUBLIC WORKS WEEK - MAY 18 TO 24, 2025: PEOPLE, PURPOSE, PRESENCE**
(File Ref. No. 10-6000-01) (REDMS No. 8009637)

PWT-11 See Page **PWT-11** for full report

Designated Speaker: Bryan Shepherd

STAFF RECOMMENDATION

That the 2025 in-person event and virtual campaign to recognize National Public Works Week, as outlined in the staff report titled "2025 National Public Works Week - May 18 to 24, 2025: People, Purpose, Presence", dated March 24, 2025, from the Director, Public Works Operations, be received for information.

2. **RICHMOND WATER QUALITY AND CONSERVATION REPORT 2024**
(File Ref. No. 10-6175-03-03) (REDMS No. 8009692)

PWT-18

See Page **PWT-18** for full report

Designated Speaker: Bryan Shepherd

STAFF RECOMMENDATIONS

(1) That the annual report titled "Richmond Water Quality and Conservation Report 2024", dated March 18, 2025, from the Director, Public Works Operations, be:

(a) endorsed as the City's report to the public on water quality in Richmond; and

(b) provided to the Drinking Water Officer and Medical Health Officer as the City's plan for reporting water quality results; and

(2) That the "Richmond Water Quality and Conservation Report 2024" be made available to the community on the City's website and through various communication tools including social media channels.

3. **RIVER ROAD TRAFFIC ASSESSMENT**
(File Ref. No. 10-6450-09-01) (REDMS No. 7968572)

PWT-84

See Page **PWT-84** for full report

Designated Speaker: Sonali Hingorani

STAFF RECOMMENDATION

That the staff report titled "River Road – Traffic Assessment", dated March 17, 2025, from the Director, Transportation, be received for information.

4. **RECYCLING AND SOLID WASTE MANAGEMENT – REPORT 2024: EXPLORING NEW WAYS TO REDUCE WASTE**
(File Ref. No. 10-6370-01) (REDMS No. 7985755)

PWT-91

See Page **PWT-91** for full report

Designated Speaker: Kristina Grozdanich

STAFF RECOMMENDATIONS

(1) That the planned initiatives, as outlined in the report titled "Recycling and Solid Waste Management - Report 2024: Exploring New Ways to Reduce Waste", dated March 19, 2025, from the Director, Public Works Operations, be endorsed; and

(2) That the "Recycling and Solid Waste Management - Report 2024: Exploring New Ways to Reduce Waste", be made available to the community on the City's website and through various communication tools including social media channels and as part of community outreach initiatives.

5. **PUBLIC EV CHARGING NETWORK - ENERGY BASED USER FEES**
(File Ref. No. 10-6125-01) (REDMS No. 7920871)

PWT-162

See Page **PWT-162** for full report

Designated Speaker: Owen Sinclair

STAFF RECOMMENDATIONS

(1) That, as described in the staff report titled "Public EV Charging Network – Energy Based User Fees", dated March 19, 2025, from the Director, Climate & Environment, and Director, Public Works Operations, energy-based user fees be implemented for all city-owned public EV chargers;

(2) That the Chief Administrative Officer or General Manager, Engineering and Public Works be authorized to apply for Temporary Dispensation from Measurement Canada for the sale of electricity for EV charging; and

(3) That each of the following bylaws be introduced and given first, second and third readings in order to implement energy-based user fees, including ticketing provisions:

(a) Consolidated Fees Bylaw No. 8636, Amendment Bylaw No. 10657;

(b) Parking (Off-Street) Regulation Bylaw No. 7403, Amendment Bylaw No. 10658;

(c) Traffic Bylaw No. 5870, Amendment Bylaw No. 10659; and

(d) Notice of Bylaw Violation Dispute Adjudication Bylaw No. 8122, Amendment Bylaw No. 10660.

6. **2025 PROVINCIAL PESTICIDE USE PERMIT RENEWAL APPLICATION**
(File Ref. No. 10-6160-07-01) (REDMS No. 7984078)

PWT-175

See Page **PWT-175** for full report

Designated Speaker: Nadia Chan & Chad Paulin

STAFF RECOMMENDATION

That the comments regarding a provincial Pesticide Use Permit application to manage invasive cordgrass and perennial pepperweed outlined in the report titled "2025 Provincial Pesticide Use Permit Renewal Application", dated March 19, 2025, from the Director, Climate and Environment, be endorsed for submission to the provincial Ministry of Forests.

7. **2025 LIQUID WASTE MANAGEMENT PLAN BIENNIAL REPORT**
(File Ref. No. 10-6000-01) (REDMS No. 7930673)

PWT-180

See Page **PWT-180** for full report

Designated Speaker: Jason Ho

STAFF RECOMMENDATION

That the City's 2025 Liquid Waste Management Plan Biennial Report, as presented in Attachment 1 of the staff report titled "2025 Liquid Waste Management Plan Biennial Report", dated March 19, 2025, from the Director, Engineering, be submitted to Metro Vancouver.

8. **METRO VANCOUVER LIQUID WASTE MANAGEMENT PLAN UPDATE**
(File Ref. No. 10-6060-01) (REDMS No. 7962510)

PWT-194 See Page **PWT-194** for full report

Designated Speaker: Jason Ho

STAFF RECOMMENDATION

That the staff report titled "Metro Vancouver Liquid Waste Management Plan Update", dated March 19, 2025, from the Director, Engineering, be received for information.

COUNCILLOR CAROL DAY

9. **TRANSLINK PRESS RELEASE**
(File Ref. No.)

PWT-326 See Page **PWT-326** for materials

10. **MANAGER'S REPORT**

ADJOURNMENT

City of Richmond

Minutes

Public Works and Transportation Committee

Date:	Wednesday, March 19, 2025
Place:	Anderson Room Richmond City Hall
Present:	Councillor Carol Day, Chair Mayor Malcolm Brodie Councillor Michael Wolfe Councillor Chak Au Councillor Kash Heed Councillor Alexa Loo (by teleconference)
Also Present:	Councillor Lauria Gillanders Councillor Bill McNulty
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 Public Works and Transportation Committee held on February 19, 2025, be adopted as circulated.

CARRIED

AGENDA ADDITIONS AND DELETIONS

It was moved and seconded
That Parking at Minoru Centre for Active Living be added to the Public Works and Transportation Agenda as Item No. 2A, Russ Baker Way Bus/HOV Lane Traffic be considered as Item No. 2B, Verbal Update on Blundell Overpass Collision be considered as Item No. 2C, and State of the Environment Report be considered as Item No. 2D.

CARRIED

ENGINEERING AND PUBLIC WORKS DIVISION

1. **REVIEW OF ROADS NEAR THE SOUTH DYKE TRAIL**
(File Ref. No. 10-6450-10-01) (REDMS No. 7938107)

Staff reported the 30km/h speed limit has been implemented in the London/Princess neighbourhood.

In response to queries from Committee, staff advised (i) on the results of the road assessment for the section of Finn Road from No. 3 Road to Garden City Road, noting that the geometry of the existing pavement width is very narrow, (ii) that installation of the three speed humps will be completed by Q2 and feedback from the community will be monitored, (iii) that the new 30 km/h signs are in the Princess neighbourhood, London Road, Princess Street and Princess Lane, and a 30 km/h section on Finn Road, while all other roads within the study area remain at 50 km/h, and (iv) the typical process for speed management on local roads is community data driven and current collision and speed data does not warrant any changes at this time.

It was moved and seconded

(1) That staff monitor the traffic operations and community feedback regarding vehicle speed on Dyke Road, as described in the staff report titled "Review of Roads Near the South Dyke Trail", dated February 26, 2025, from the Director, Transportation; and

(2) That staff be directed to consult with residents regarding speed limits and other traffic calming needed in the section between Andrews Road and London Road.

CARRIED

2. **RECOMMENDATION TO AWARD CONTRACT 8398Q - SUPPLY AND INSTALLATION OF CONDUITS AND WATER SERVICE PIPES USING TRENCHLESS TECHNOLOGY AND OTHER RELATED CIVIL WORKS**
(File Ref. No. 02-0745-01) (REDMS No. 7963627)

It was moved and seconded

(1) That Contract 8398Q - Supply and Installation of Conduits and Water Service Pipes using Trenchless Technology and Other Related Civil Works, be awarded to Ulmer Contracting Limited for an initial three-year term estimated at $7,653,189 exclusive of taxes, as described in the staff report titled "Recommendation to Award Contract 8398Q–Supply and Installation of Conduits and Water Service Pipes using Trenchless Technology and Other Related Civil Works", dated February 13, 2025, from the Director, Transportation;

(2) *That the Chief Administrative Officer and General Manager, Engineering and Public Works, be authorized to extend the initial three-year term, up to the maximum total term of five years, for the maximum total amount of $13,144,353 exclusive of taxes, as described in the staff report titled "Recommendation to Award Contract 8398Q – Supply and Installation of Conduits and Water Service Pipes using Trenchless Technology and Other Related Civil Works", dated February 13, 2025, from the Director, Transportation; and*

(3) *That the Chief Administrative Officer and General Manager, Engineering and Public Works, be authorized to execute the contract with Ulmer Contracting Limited.*

CARRIED

2A. PARKING AT MINORU CENTRE FOR ACTIVE LIVING

Discussion took place on limited parking at the Minoru Centre for Active Living, noting overcapacity and challenges for seniors accessing parking close to the facility.

Discussion ensued with respect to parking alternatives and Committee requested additional information on the status of parking behind Minoru Arena and the street parking marked specifically for pool patrons.

As a result of the discussion, the following **referral motion** was introduced:

It was moved and seconded
That staff analyse the current parking at Minoru Centre for Active Living and Minoru Arena areas and report back with options to facilitate parking needs.

CARRIED

2B. RUSS BAKER WAY BUS/HOV LANE TRAFFIC

Discussion took place on the bus and HOV only lane on Russ Baker Way, specifically the signage, road markings and lack of enforcement related to the bus lane and HOV lane during the morning rush hour on Russ Baker Way.

Staff advised they have contacted the Vancouver Airport Authority to review the condition of pavement markings, assess signage and HOV markings, and determine timing for a refresh. Additionally, staff have consulted with Richmond RCMP regarding HOV enforcement.

It was requested that staff provide a memorandum to update Council.

2C. VERBAL UPDATE: BLUNDELL OVERPASS COLLISION

Staff provided a brief overview of the transport unit collision with the Blundell overpass that occurred on March 19, 2025, noted that (i) it was heading southbound on Highway 99 (ii) the scattered debris on the road was quickly cleaned up, (iii) Ministry of Transportation and Transit (MTT) staff responded along with the RCMP, (iv) there appears to be limited damage underneath the Blundell overpass and it remains open, (v) once MTT have completed their assessment an update will be provided to Council.

2D. STATE OF THE ENVIRONMENT

Discussion took place on a 1998 and 2001 State of the Environment Report and the availability of a similar document to align data as part of the Official Community Plan (OCP) Review.

Staff noted that (i) the State of the Environment report has evolved, (ii) the Sustainable Progress report, introduced in 2014, tracks different information, and (iii) there are no current plans to align the sustainability report with the OCP, but future opportunities for alignment may be considered.

3. MANAGER'S REPORT

(i) Metro Vancouver Gilbert Road Sewer

Staff advised construction on the south section of Gilbert Road, from Steveston Highway going south, is nearly completed, and the south section will be completed in spring 2025. Staff noted that the remaining section is between Steveston Highway and Blundell Road, with current works being some main line work between Francis Road and Blundell Road.

Staff noted upcoming Metro Vancouver activities at the Francis Road-Gilbert Road intersection, including mailed newsletters to residents and updates on the MV and possibly the City's website. Staff also mentioned ongoing work from Steveston Highway to Blundell Road, with construction expected to finish by winter 2026.

(ii) Commemorative Veterans Crosswalk

Staff provided and update on the request for a commemorative veteran's crosswalk near the cenotaph on No. 3 Road and as part of the review, community members and stakeholders involved in the Remembrance Day ceremony have been invited to an Open House at City Hall on April 1, 2025, to provide feedback on design options. Staff advised that recommendations will be presented to Council in June, allowing time for implementation before the 2025 Remembrance Day memorial.

ADJOURNMENT

It was moved and seconded
That the meeting adjourn (4:45 p.m.).

CARRIED

Certified a true and correct copy of the Minutes of the meeting of the Public Works and Transportation Committee of the Council of the City of Richmond held on Wednesday, March 19, 2025.

Councillor Carol Day
Chair

Lorraine Anderson
Legislative Services Associate

City of Richmond

Report to Committee

To:	Public Works and Transportation Committee	**Date:**	March 24, 2025
From:	Suzanne Bycraft Director, Public Works Operations	**File:**	10-6000-01/2025-Vol 01
Re:	**2025 National Public Works Week - May 18 to 24, 2025: People, Purpose, Presence**		

Staff Recommendation

That the 2025 in-person event and virtual campaign to recognize National Public Works Week, as outlined in the staff report titled "2025 National Public Works Week - May 18 to 24, 2025: People, Purpose, Presence", dated March 24, 2025, from the Director, Public Works Operations, be received for information.

Suzanne Bycraft
Director, Public Works Operations
(604-233-3338)

Att. 1

REPORT CONCURRENCE		
ROUTED TO:	**CONCURRENCE**	**CONCURRENCE OF GENERAL MANAGER**
Parks Services	☑	
SENIOR STAFF REPORT REVIEW	**INITIALS:**	**APPROVED BY CAO**

Staff Report

Origin

This report presents the City's annual program activities and awareness campaign in support of National Public Works Week being recognized May 18 to 24, 2025 with this year's theme of "People, Purpose, Presence".This report supports Council's Strategic Plan 2022-2026 Focus Area #1 Proactive in Stakeholder and Civic Engagement:

> *Proactive stakeholder and civic engagement to foster understanding and involvement and advance Richmond's interests.*
>
> *1.3 Increase the reach of communication and engagement efforts to connect with Richmond's diverse community.*

This report supports Council's Strategic Plan 2022-2026 Focus Area #6 A Vibrant, Resilient and Active Community:

> *Vibrant, resilient and active communities supported by a wide variety of opportunities to get involved, build relationships and access resources.*
>
> *6.3 Foster intercultural harmony, community belonging, and social connections.*

Analysis

The Canadian National Public Works Association's annual National Public Works Week is from May 18 to 24, 2025. Traditionally, the City marked this week with in-person events aimed at recognizing the contributions of Public Works staff and fostering community engagement. In 2021, a virtual campaign component was added.

In celebration of the 2025 National Public Works Week, the City will continue to incorporate in-person events along with a virtual campaign. Staff will host two educational events at the Works Yard for Richmond students and the public. These events will feature engineering exhibits, interactive stations and displays of public works and parks equipment.

Additionally, the City will promote National Public Works Week with a virtual campaign, similar to the strategy developed during the pandemic. The campaign will include social media content, community engagement highlights and an interactive map of capital projects throughout the City.

Both in-person and virtual campaigns are outlined in this report.

Each May, National Public Works Week honours individuals committed to serving their communities through careers in public works. The week aims to engage and educate the public about the vital role of public works in their everyday lives. The City recognizes National Public Works Week through a proclamation outlining the following areas:

- Public Works services provided in the community are an integral part of Richmond citizens' everyday lives;
- the support of an understanding and informed citizenry is vital to the efficient operation of Public Works systems, parks services and programs such as water, sewer, roads, public buildings, recycling and solid waste collection;
- the health, safety and comfort of this community greatly depend on these facilities and services;
- the quality and effectiveness of these facilities, as well as their planning, design and construction, is vitally dependent upon the efforts and skills of Public Works officials; and
- the efficiency of qualified and dedicated personnel who staff the Public Works Departments is materially influenced by the people's attitude and understanding of the importance of the work they perform.

2025 Campaign Theme and Components

This year's National Public Works Week theme is "People, Purpose, Presence". The City's 2025 campaign will highlight how Public Works staff exemplify this theme by operating, maintaining and upgrading City infrastructure; promoting environmental stewardship through initiatives like water conservation and recycling programs; conducting community engagement events and programs; preparing for emergencies and extreme weather events; and adopting innovation and technology for efficient service delivery.

The City will recognize National Public Works Week in two phases: by hosting two in-person events that will take place during the week of May 4 and by producing a virtual campaign that will launch on May 18 and will continue for the duration of National Public Works Week.

In-Person Events

Project WET

Project WET, the City's annual water education program developed in partnership with the Richmond School District, will be held on May 6 and 7. The program will be presented to eight elementary school classes, with approximately 215 students and teachers expected to attend. This interactive program teaches elementary school students the importance of water consumption, conservation, quality and supply. Students will also learn about the City's emergency water treatment trailer, recycling programs, dikes, pump stations, and sanitary sewers. This event serves to educate younger generations and establish a relationship between the City and its future leaders.

Public Works Open House

The annual Public Works Open House will take place on Saturday, May 10, from 11:00 a.m. to 3:00 p.m. at the Works Yard. The free event offers residents the chance to engage with City staff, gaining insight into their roles and the programs they oversee. Attendees can also explore various booths, participate in interactive displays, eat at one of the local food vendor trucks, and enjoy live entertainment.

Our most popular station, *Big Dig*, featuring mini-excavators, is expanding. We are increasing the number of mini-excavators from three to five. In addition to the mini-excavators, we now have two static excavators available for photo opportunities, allowing children to strike a pose on their favourite construction vehicle. To alleviate long lines, we have implemented a "Crew Pass" system that designates time slots for Crew Pass ticket holders. These passes will be issued at specific times throughout the event to ensure everyone has a fair chance to experience Big Dig.

Favourites such as the cement-building zone, Kidstruction, Sign Shop paint station, Big Blue Blocks imagination station, crafts, games, play areas, nature and environmental sustainability displays and Richmond Fire-Rescue and emergency displays will return this year. To ensure traffic flows smoothly and minimize interruptions, there will be traffic control personnel working on Lynas Lane from 9:00 a.m. to 4:30 p.m.

Additional parking will be available at four nearby parking lots: the Austria Vancouver Club, Blair Elementary School, JN Burnett Secondary School and Thompson Elementary School. Shuttles will be provided between the overflow parking lot at Burnett Secondary and the Works Yard during the event. Attendees will also be encouraged to take public transit, carpool or ride bikes or scooters.

This event relies on numerous staff at the Works Yard, other areas across the organization, and volunteers to deliver a well-coordinated event. In 2024, over 280 staff volunteered to successfully deliver the event.

Virtual Campaign

Social Media

The public will be invited to celebrate this year's National Public Works Week by visiting the City's social media channels daily from May 18 to May 24. The channels will feature pictures and videos of different Public Works staff and services including a ditch rehabilitation project, a student visit to a drainage pump station, crews working on soil compacting for a sanitary trench, and finally an aerial view of the Recycling Depot.

Video: "National Public Works Week 2025: Purpose"

For National Public Works Week (NPWW), the City is creating a short video highlighting the "Purpose" aspect of this year's theme: *People, Purpose, and Presence* will be created. This video will feature short interviews with Public Works staff, capturing their perspectives on what "purpose" means to them in their roles at the City. By compiling these candid insights, the goal is to showcase the dedication, impact and essential contributions of Public Works professionals, while also promoting awareness and appreciation of their work within the community.

Interactive Article: Power washing our Pipes:

This article, Attachment 1, outlines how Richmond maintains high-quality drinking water through unidirectional flushing, a process that power washes pipes to remove contaminants and extend infrastructure lifespan. Crews work overnight to minimize disruption, ensuring clean, safe water while preventing costly pipe deterioration. This proactive maintenance keeps Richmond's water system reliable and efficient.

Interactive Map

A link to the "2025 Capital Projects Highlights: Engineering and Public Works" interactive map will be included in the promotion page for National Public Works Week. The map shows planned or ongoing projects for the year and provides information on each project.

Together, these initiatives emphasize the connection between Public Works and the community, demonstrating the department's commitment to service, education and infrastructure excellence. By engaging residents through informative and engaging content, we continue to build awareness and appreciation for the essential work that keeps Richmond thriving. These efforts embody key Richmond core values, People and Excellence, by highlighting the dedication of our staff, the high standards of service we uphold, the leadership in proactive maintenance, the teamwork that drives our success, and the Innovative approaches we take to enhance the City's infrastructure and quality of life.

Financial Impact

Costs associated with this event include items such as materials, equipment, and other ancillary costs, funded within current departmental budgets and/or by external parties who participate in the event.

Conclusion

The Canadian National Public Works Association's annual National Public Works Week is from May 18 to 24, 2025, and the City plays an active role in celebrating it. Two in-person events and a virtual campaign will be held to recognize and highlight the people who provide, operate and maintain the infrastructure services known as public works. The Public Works Open House highlight event will take place on Saturday, May 10, from 11:00 a.m. to 3:00 p.m. The second event, Project WET will be held over two days on May 6 and 7. Both of these events will be held at the Public Works Yard. Cities across Canada participate by raising awareness of public works contributions and encourage community support for these dedicated employees who consistently improve the quality of life for residents.

Nicholas Siu
Project Manager, Water Services
(604-244-1224)

NS:ns

Att. 1: "Power Washing our Pipes" article

Power washing our PIPES

THE SHORT EXPLANATION FOR UNIDIRECTIONAL FLUSHING:

A LOT OF WATER AND A LOT OF PRESSURE EQUALS CLEAN PIPES AND SAFE DRINKING WATER.

When Richmond residents turn on their taps, they're getting clean, fresh, world class water thanks in large part to the efforts of City workers who power wash the pipes using a practice called unidirectional flushing.

WHAT IS UNIDIRECTIONAL FLUSHING?

- Unidirectional flushing is a best practice used by local governments as part of regular maintenance to "power wash" pipes by forcing water in a single direction through a specific route by closing or opening valves in a strategic way.
- Forcing the water in a single direction increases the velocity of the water flow and ensures that the insides of the pipes are being scoured while the water is safely flushed out of the watermain network.
- The water is then drained through hydrants at the end of the flushing sequence to remove the debris from the system.
- Cleaning pipes is important because it prevents bacterial growth and removes sediment – the tiny solids that occur naturally in water and gradually build up on the bottom of the watermain.
- Staff control the flow of water during flushing. When practical, the water that is flushed is captured to be reused for irrigation.

Richmond

Annual watermain flushing enhances drinking water quality.

But it's even more complex than that, says Todd Smithers, a supervisor in Richmond's Water Services, Hydrant and Valves Division, who explains that scheduling and conducting the work must take into account safety for workers, road users and residents as well as potential disruption for homes and businesses while addressing the overarching issue: water quality.

And it's no small job, since Richmond has more than 600 km of watermains that deliver more than 30 million cubic metres of water to customers each year.

The work is done once a year at night to minimize disruption, explains Smithers, a City employee since 1997, with crews working 10-hour shifts. The target is for each crew member to cover two kilometres per shift, and they typically leapfrog one another, moving from hydrant to hydrant along the specified route as clean water at pressures up to 80 pounds per square inch (PSI) pushes out contaminants such as biofilm and organic matter. They flush the water across roads and into ditches, and diffusers are used to mitigate the pressure while temporary berms can be used to protect properties.

It takes between five and eight weeks to complete, and throughout this process, water at each hydrant is tested for cleanliness and turbidity (that refers to suspended particles in the water, which result in cloudy water) before and after each flush to ensure the end users – residents, businesses, institutions – get the safest possible water.

"We always have a good source of high-quality water from Metro Vancouver, and we're constantly flushing the pipes to help maintain that water quality for our residents so they don't have to worry about it," says Derek Gardner, another veteran of Richmond's water staff. "Our whole department, we take pride in that."

He also notes the steps taken to protect workers and the public while the work is underway, from lights to traffic control. "It's safety first all the time."

Hydrant mechanic Dylan McQuistin, who has been with the City for eight years, says many water customers don't understand what crews are doing late at night. "Some people think we're wasting water but the reality is, we're cleaning out the entire pipe. It ends up in a huge water quality improvement in the long run."

It makes financial sense, too, says Smithers. If sediment is allowed to build up in pipes, it would decrease capacity, resulting in the need to upsize the pipes more often, and could also cause the pipes to deteriorate more quickly. "Without flushing, our mains wouldn't last as long," he says. "So, not only is it ensuring the mains last longer, by doing this maintenance, the water quality is extremely high. And it keeps all of that debris from showing up in tap water.

"It's money well spent. The numbers don't lie. We know how good our system is with all the testing we do."

And it's a group effort, says Carly Smith, a 19-year Richmond employee. "It takes a lot of leadership and just being a team. Our crews thrive on working together, and it makes everything go smoother. It helps us cover more ground."

Deborah Prystay, Richmond Water Services Project Manager, echoes Smith's comments and applauds the work of water crews.

"They're a very dedicated crew, and they are passionate about what we do in Water Services," she says. "By working through the night, they not only ensure we have high-quality drinking water, they also help to minimize impacts on our residents."

Adds Prystay: "They understand the importance of the program and the water we deliver to Richmond residents."

The end result of late nights, teams working together and the power of water at high velocity is a network of clean pipes that deliver safe, reliable and high-quality drinking water to Richmond residents.

City of Richmond

Report to Committee

To:	Public Works and Transportation Committee	**Date:**	March 18, 2025
From:	Suzanne Bycraft Director, Public Works Operations	**File:**	10-6175-03-03/2025-Vol 01
Re:	**Richmond Water Quality and Conservation Report 2024**		

Staff Recommendations

1. That the annual report titled "Richmond Water Quality and Conservation Report 2024", dated March 18, 2025, from the Director, Public Works Operations, be:

    a. endorsed as the City's report to the public on water quality in Richmond; and

    b. provided to the Drinking Water Officer and Medical Health Officer as the City's plan for reporting water quality results; and

2. That the "Richmond Water Quality and Conservation Report 2024" be made available to the community on the City's website and through various communication tools including social media channels.

Suzanne Bycraft
Director, Public Works Operations
(604-233-3338)

Att. 1

REPORT CONCURRENCE		
ROUTED TO:	**CONCURRENCE**	**CONCURRENCE OF GENERAL MANAGER**
Engineering	☑	
SENIOR STAFF REPORT REVIEW	**INITIALS:**	**APPROVED BY CAO**

Staff Report

Origin

In 2001, the Province of British Columbia enacted the Drinking Water Protection Act, which gave authority to the Minister of Health to implement and enforce standards for water supply systems in British Columbia. In May 2003, regulations to be implemented under the Act were adopted by the legislature as the Drinking Water Protection Regulation. These Acts were updated on April 29, 2014, under Bill 18 – 2014: the Water Sustainability Act. These regulations are designed to ensure the safe supply of drinking water.

This report presents the City's "Richmond Water Quality and Conservation Report 2024" (the Report), which enables the City to meet its obligations for public reporting to comply with applicable requirements in accordance with these regulations. The City ensured the safe and adequate supply of essential water services throughout 2024. The Report also provides information on the City's water system and water conservation efforts. The Report is presented as Attachment 1.

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

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

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

> *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.*

This report supports Council's Strategic Plan 2022-2026 Focus Area #5 A Leader in Environmental Sustainability:

> *5.3 Encourage waste reduction and sustainable choices in the City and community.*

This report supports Council's Strategic Plan 2022-2026 Focus Area #6 A Vibrant, Resilient and Active Community:

> *6.1 Advance a variety of program, services, and community amenities to support diverse needs and interests and activate the community.*

Analysis

The Drinking Water Protection Regulation requires water purveyors in BC to possess an operating permit, which confirms the Drinking Water Officer for the area has approved the water supply. Vancouver Coastal Health is responsible for the placement and function of the Drinking

Water Officer, who has the authority to monitor water purveyors to ensure they are providing safe drinking water through compliance with the British Columbia Drinking Water Protection Regulation, and any other conditions of the operating permit.

Under the Regulation, the City of Richmond is required to:

- Develop and maintain a process to notify the Drinking Water Officer and the Medical Health Officer of situations or conditions that could render unsafe drinking water;
- Implement and maintain a plan for collecting, shipping and analyzing water samples that adequately represent all areas within the City, in compliance with the direction set by the Drinking Water Officer; and
- Implement and maintain a plan for reporting results to the Drinking Water Officer and to water users.

Richmond thrives on its ability to provide water to residents and businesses, and water for fire protection services. All water supplied is from Metro Vancouver, to ensure a consistent supply, the Capital Construction Watermain Replacement program and the Pressure Management program are in place as proactive approaches to reduce the risk of watermain breaks. These approaches have been proven to be reliable and valuable tools in water distribution management. The Capital Construction program replaces aging infrastructure that is susceptible to breaks and the Pressure Management program lowers the strain on existing infrastructure to make it less likely to develop leaks and breaks. The City's Leak Detection Program is another proactive approach that helps quickly identify leaks and reduce the number of breaks and water loss. By scanning the City's system, crews can detect non-visible leaks before they surface. In 2024, through our Leak Detection Program, City crews repaired 54 leaks. These leaks were quickly repaired, tested, and put back into service without compromising the integrity of the water distribution system. These three proactive programs are essential for minimizing costs with water losses and ensuring minimal disruptions to water quality and supply.

Water conservation is an important aspect of Richmond's Water Services operations. Climate change, extreme heat events and increasingly dry summers in recent years have emphasized a critical need for city-wide water conservation efforts. The City, through its Water Use Restriction Bylaw No. 7784, collaborates with Metro Vancouver to align water restrictions and various programs to promote the conservation of water and to minimize the wastage of potable water. Richmond's various water conservation programs are outlined in the Report.

Highlights of the Report include:

- Through 636 kilometres of total watermain, the City, delivered 34.2M cubic metres of water to 239,389 residents, businesses and other institutions.
- The water met all drinking water quality guidelines and Richmond residents and visitors enjoyed high quality, safe and reliable drinking water.
- 2,046 water samples were collected to ensure water quality and each passed with exceptional results.
- Compared to the year that Richmond's water metering program started in 2003, the City's total water usage in 2024 decreased by 14%, from 39.7M cubic in 2003 to 34.2M cubic

metres in 2024, despite a population increase of 34% from 178,319 to 239,389 residents over the same period.
- Richmond's 39 outdoor water fountains found in parks and other public areas provided potable water to the public while promoting tap water consumption as an alternative to bottled water.
- City staff completed three watermain replacement projects, replacing a total of five kilometres; and installed 29 multi-family meters.
- Water Conservation campaign will be launched in 2025.

In addition to these highlights, the City is continuously evaluating and improving proactive maintenance and detection programs to ensure safe and uninterrupted water service to the community.

These and many other initiatives are detailed in the Report.

Proposed Communication

Subject to Council's approval, the Report will be posted on the City's website and made available through various communication tools including social media channels and as part of community outreach activities.

Financial Impact

None.

Conclusion

The Report outlines the methods in which the City manages its water system to ensure compliance with applicable provincial requirements under the Drinking Water Protection Act. In 2024, the City's water quality met and exceeded the required standards to ensure residents enjoyed high quality, reliable and safe drinking water.

This report will be reviewed and endorsed by the Medical Health Officer of Vancouver Coastal Health Authority as part of the City's reporting obligations.

Bryan Shepherd
Manager, Water Services
(604-233-3334)

BS:ns

Att. 1: Richmond Water Quality and Conservation Report 2024

Richmond **Water Quality and Conservation Report** 2024

Richmond

PWT – 22

PWT – 23

Contents

1.0 Year in Review

1.1 Delivering Richmond's "water of choice"

The City Richmond is dedicated to making tap water the "water of choice" in our community.

Our rigorous commitments to deliver safe, high quality drinking water ensure Richmond remains one of the healthiest cities in Canada. Municipal drinking water is also the best choice for the environment, relying on a sustainably managed, natural supply source and reducing the use of plastic water bottles.

Our commitment to water quality is bolstered by a comprehensive testing program. The City collects water samples on a weekly basis at 40 dedicated sampling sites strategically located throughout the community. Water samples are taken to Metro Vancouver laboratories for analysis. Sample results are reviewed to ensure the drinking water meets the standards and parameters outlined in the British Columbia Drinking Water Protection Regulations. In addition to testing water to look for contaminants, water is monitored for taste, odour, temperature and appearance to ensure our water meets aesthetic standards, as well as public health requirements. In 2024, 2,046 water samples were collected and analyzed. All samples met or exceeded public health standards.

The maintenance of a reliable distribution system is also critical to ensuring water quality. The City is constantly replacing and upgrading its water distribution infrastructure, which includes 636 kilometres of watermains. This includes replacing older watermains with new, more dependable material, which supports reliability of service and reduces chances of leaks or breaks in the system, that can lead to water contamination. In 2024, we completed installation of just over 5 kilometres of new PVC watermain in a number of areas across the city, including the Burkeville and Sealord neighbourhoods, and segments of No. 2 and No. 7 Roads. Other key infrastructure improvements in 2024 included the installation of 16 new compression fire hydrants, increasing the reliability of water supply for the fire safety components of our network.

Quick detection and response to watermain leaks and breaks is also important to keep our drinking water safe and clean.

Tap water provides the best value for our residents and businesses, costing just pennies per litre.

In 2024, 2,046 water samples were collected and analyzed.

The City strives to ensure our water distribution system is highly efficient and provides good value to taxpayers.

Whenever there is a watermain break, the system can experience a loss of pressure within the watermain, which can lead to contamination by allowing groundwater into the system. The Leak Detection and Pressure Management programs help reduce watermain breaks and minimize weak spots in the distribution system where ground water can get into the pipes. As part of this program, staff used acoustic equipment to inspect 475 kilometres of watermains, an increase of 47% from 2023. Crews identified and repaired 54 leaks in 2024.

To further support water quality, 24-hour patrols respond quickly to service requests such as watermain breaks and other service disruptions. Quick response time limits service disruptions and crews take steps to ensure that the water remains safe to drink. This also minimizes any water loss or damages from leaks and breaks. In 2024, patrol staff responded to more than 1,100 service requests.

A key component of making tap water the water of choice is affordability. The City strives to ensure our water distribution system is highly efficient and provides good value to taxpayers.

The cost of municipal water remains one of the best values around. Richmond tap water costs just $1.66 per cubic metre, which is equivalent to 1,000 litres. By comparison, in a recent price check, a package of 40 500-millilitre bottes of water at a major local retailer cost $4.79. The same volume water from a Richmond tap costs just three cents ($0.03).

The affordability of water is also supported by the expertise of our own staff, who complete many of our new construction and maintenance programs. City crews have a comprehensive understanding of Richmond's water system, the expertise to complete the projects and the ability to deliver projects at a competitive price, which reduces the use of external contractors and provides added value to taxpayers.

The City is also committed to using innovation to maintain water quality, increase efficiency and provide further enhanced value to our water system users. In 2024, this included an upgrade to our water flushing infrastructure and enhanced wireless monitoring technology for both water flushing and water meter tracking.

The City has also empowered residents to control their water costs though our water metering program. With water meters, customers only pay for the water they use and they can reduce their overall costs for water by taking simple steps to reduce their use. All single-family homes, as well as commercial, industrial and institutional users in Richmond, are now on water meters. More than half of our multi-family residential complexes are also on water meters and the remainder will be transitioned to water meters over the the next 15 years. Last year, a new water conservation campaign was developed that will further support users in helping to conserve water supply and reduce their own costs. This program will be launched to the public in 2025.

As we move into 2025, the City will continue its focus on providing safe and reliable tap water to the community, while continuing to provide outstanding value to taxpayers.

Water is an important part of our daily lives, wherever we are.

That's why the City is committed to ensuring residents and visitors have access to tap water throughout Richmond. We have **39 permanent drinking water fountains** across the community, which operate seasonally during warmer months. In 2023, the City began a multi-year program to upgrade our water fountains to improve customer service and experience. These improvements include installing new fountains with bottle fillers and ground-level drinking bowls for pets. In 2024, we completed the upgrade of four additional permanent water fountains.

The City also continues to develop our growing inventory of portable water fountains. These fountains are used at community events and other locations to provide the public with safe, free drinking water and reduce the use of plastic water bottles. In 2024, the public used our larger mobile water fountains to consume about 27 cubic metres of water, equivalent to 54,000 500-millilitre plastic water bottles.

2024 Top Accomplishments

This report showcases some key Water Services achievements in the past year, along with our ongoing commitment to excellence and innovation in service delivery.

1 Safe delivery of water

Delivered 34.2 million cubic metres of water and tested 2,046 water samples that all met the drinking water quality guidelines.

2 Watermain replacement

Replaced five kilometres of asbestos cement watermain with new PVC pipes.

3 Leak detection and repair

Used acoustic equipment to inspect 475 kilometres of watermains and repaired 54 leaks.

4 Expanded water metering

Installed 29 multi-family meters as part of a universal water metering program, which supports water conservation.

5 Promoted water conservation

Provided 299 rebates to residents who purchased low-flow toilets. Residents also purchased 191 rain barrels to support water conservation.

6 Upgraded flushing infrastructure

Upgraded four existing flushing stations to keep watermains clean and silt-free, and enhanced flushing automation.

7 Enhanced monitoring technology

Replaced 526 Neptune V3 Water Meter Registers for better monitoring capacity.

8 Upgraded fire hydrants

Replaced an additional 16 slide-gate hydrants with compression hydrants to reduce property damage due to motor vehicle accidents.

9 Efficient service response

Crews responded to 1,112 service requests in 2024, including leaks and watermain breaks, with round-the-clock response.

10 Upgraded water fountains

Completed upgrades of four permanent drinking fountains to include dog bowls and backflow preventers.

1.2 Year in Review Highlight

Power washing our PIPES

When Richmond residents turn on their taps, they're getting clean, fresh, world class water thanks in large part to the efforts of City workers who power wash the pipes using a practice called unidirectional flushing.

PM 1.2

WHAT IS UNIDIRECTIONAL FLUSHING?

- Unidirectional flushing is a best practice used by local governments as part of regular maintenance to "power wash" pipes by forcing water in a single direction through a specific route by closing or opening valves in a strategic way.
- Forcing the water in a single direction increases the velocity of the water flow and ensures that the insides of the pipes are being scoured while the water is safely flushed out of the watermain network.
- The water is then drained through hydrants at the end of the flushing sequence to remove the debris from the system.
- Cleaning pipes is important because it prevents bacterial growth and removes sediment – the tiny solids that occur naturally in water and gradually build up on the bottom of the watermain.
- Staff control the flow of water during flushing. When practical, the water that is flushed is captured to be reused for irrigation.

THE SHORT EXPLANATION FOR UNIDIRECTIONAL FLUSHING:

A LOT OF WATER AND A LOT OF PRESSURE EQUALS CLEAN PIPES AND SAFE DRINKING WATER.

Annual watermain flushing enhances drinking water quality.

But it's even more complex than that, says Todd Smithers, a supervisor in Richmond's Water Services, Hydrant and Valves Division, who explains that scheduling and conducting the work must take into account safety for workers, road users and residents as well as potential disruption for homes and businesses while addressing the overarching issue: water quality.

And it's no small job, since Richmond has more than 600 km of watermains that deliver more than 30 million cubic metres of water to customers each year.

The work is done once a year at night to minimize disruption, explains Smithers, a City employee since 1997, with crews working 10-hour shifts. The target is for each crew member to cover two kilometres per shift, and they typically leapfrog one another, moving from hydrant to hydrant along the specified route as clean water at pressures up to 80 pounds per square inch (PSI) pushes out contaminants such as biofilm and organic matter. They flush the water across roads and into ditches, and diffusers are used to mitigate the pressure while temporary berms can be used to protect properties.

It takes between five and eight weeks to complete, and throughout this process, water at each hydrant is tested for cleanliness and turbidity (that refers to suspended particles in the water, which result in cloudy water) before and after each flush to ensure the end users – residents, businesses, institutions – get the safest possible water.

"We always have a good source of high-quality water from Metro Vancouver, and we're constantly flushing the pipes to help maintain that water quality for our residents so they don't have to worry about it," says Derek Gardner, another veteran of Richmond's water staff. "Our whole department, we take pride in that."

He also notes the steps taken to protect workers and the public while the work is underway, from lights to traffic control. "It's safety first all the time."

Hydrant mechanic Dylan McQuistin, who has been with the City for eight years, says many water customers don't understand what crews are doing late at night. "Some people think we're wasting water but the reality is, we're cleaning out the entire pipe. It ends up in a huge water quality improvement in the long run."

It makes financial sense, too, says Smithers. If sediment is allowed to build up in pipes, it would decrease capacity, resulting in the need to upsize the pipes more often, and could also cause the pipes to deteriorate more quickly. "Without flushing, our mains wouldn't last as long," he says. "So, not only is it ensuring the mains last longer, by doing this maintenance, the water quality is extremely high. And it keeps all of that debris from showing up in tap water.

"It's money well spent. The numbers don't lie. We know how good our system is with all the testing we do."

And it's a group effort, says Carly Smith, a 19-year Richmond employee. "It takes a lot of leadership and just being a team. Our crews thrive on working together, and it makes everything go smoother. It helps us cover more ground."

Deborah Prystay, Richmond Water Services Project Manager, echoes Smith's comments and applauds the work of water crews.

"They're a very dedicated crew, and they are passionate about what we do in Water Services," she says. "By working through the night, they not only ensure we have high-quality drinking water, they also help to minimize impacts on our residents."

Adds Prystay: "They understand the importance of the program and the water we deliver to Richmond residents."

The end result of late nights, teams working together and the power of water at high velocity is a network of clean pipes that deliver safe, reliable and high-quality drinking water to Richmond residents.

1.3 Setting Goals and Objectives

The goals for Water Services are to provide clean and high-quality tap water to Richmond residents; ensure adequate supply of water to meet demand; apply innovative technology, equipment and operational practices as part of continuous improvement to secure water quality and support water conservation; provide 24/7 emergency response support to residents experiencing water service leaks or disruptions; and improve water conservation in the community through outreach, education and programs.

The objectives listed opposite support achieving our goals.

1. Water quality
Continue to maintain a high level of quality water with no positive results of contamination within the water system.

2. Water Conservation Education
Launch a water conservation awareness and education campaign.

3. Deliver Community Outreach
Conduct elementary school education through Project WET and community outreach at the Public Works Open House, and develop activities and materials for enhanced outreach in the community.

4. Expand water metering
Install 60 multi-family meters of various sizes.

5. Continue fire hydrant upgrades
Replace 40 slide-gate hydrants with compression hydrants to reduce property damage due to motor vehicle accidents.

6. Watermain replacement
Upgrade five kilometres of City watermains with new PVC pipes to replace outdated asbestos cement pipes.

7. Enhance water meter monitoring
Replace an additional 750 Neptune V3 Water Meter Registers to better monitor and read through the City's fixed base towers.

8. Enhance emergency response
Upgrade lay-flat watermain hose system to provide water to properties in emergencies or during watermain shut-offs. Maintain emergency mobile trailer, which can provide temporary water supply when regular service is disrupted.

9. Improve service through innovation
Transition the Work Control Water tasks to a fully digital workflow, aiming to reduce paper usage and streamline operations.

1.4 Tracking Our Progress

As part of tracking its progress, the City collects data across a broad spectrum of programs, services and activities. This data shows how Richmond meets its mandates for reliable delivery of safe drinking water and water conservation.

The mix of data reported reflects the effectiveness of Water Services' many programs and its commitment to excellence and innovation.

PWT – 29

WATER QUALITY TESTING

Every week, Water Services collects water samples for analysis from multiple locations across Richmond.

In 2024, there were no key contaminants found in the water supply.

100%
All tested samples were free of key contaminants

2,046 water samples tested

40 testing locations

WATER SUPPLY AND USAGE

Since the water metering program started in 2003, water use has declined by 14%. This is despite the fact that the City's population has grown by 34% (61,141 people) since 2003 for a total of 239,389 residents in 2024. Our individual and collective efforts have made a huge difference.

2024 TOTAL WATER USE
34.2 million cubic metres*

2024 WATER USE PER PERSON
142.9 cubic metres*

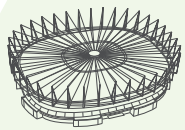
REDUCTION IN ANNUAL WATER USE per person **SINCE 2003**
80 cubic metres*

*One cubic metre = 1,000 litres

14% water use reduction
in annual volume use in 2024 compared to 2003

36% water use reduction
per capita use in 2024 compared to 2003

5.5 million cubic metres*
Reduction in total annual water use in 2024 compared to 2003 (by volume)



6x
That's enough water to fill BC PLACE STADIUM six times.

WATER METERS

Richmond's reductions in water use have been largely driven by the City's move toward universal water metering. All single-family homes and businesses are now on water meters. More than half of multi-family homes are now on meters as well.

100% Single-family homes + businesses have water meters

60% Multi-family properties have water meters

29 Multi-family water meters installed by City crews in 2024

83% of water use in Richmond is metered

PWT – 30

Type	Total Complexes	Metered Complexes	Percentage of Complexes Metered
2023 Totals	1,027	574	56%
2024 Totals	1,077	646	60%

WATER CONSERVATION PROGRAMS

In addition to water metering, the City has a number of ongoing programs to promote water conservation, from leak detection and repairs to rain barrel sales and a rebate program for the purchase of low-flow toilets.

191 Rain barrels sold

299 Rebates for low-flow toilet purchases

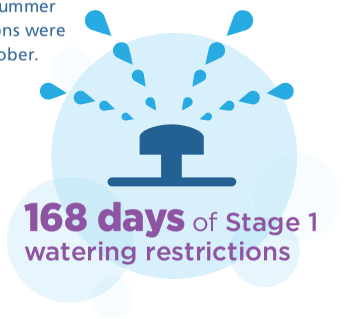
54 Water leaks detected and repaired

Lawn sprinkling causes a significant increase in water use during the high-demand months from May to October. Regional sprinkling limits are introduced annually to encourage people to use less water and water less often. However, despite those limits, summer consumption levels continue to place a strain on the water supply.

AVERAGE MONTHLY USE
2024 LOW-DEMAND MONTHS
2,496,184
cubic metres

AVERAGE MONTHLY USE
2024 HIGH-DEMAND MONTHS
3,203,717
cubic metres

Due to the water usage in the summer of 2024, Stage 1 water restrictions were in place from May 1 to mid-October.



168 days of Stage 1 watering restrictions

PWT – 31

WATER DISTRIBUTION NETWORK

The City has a comprehensive network of watermains, service connections, hydrants and other infrastructure to ensure reliable water delivery to its users. Through a series of pressure reducing valves, the City's network connects to Metro Vancouver's system, which delivers water across the region from its mountain reservoirs.

INFRASTRUCTURE

636 Total kilometres of City watermains

13 Pressure reducing valves

5,175 Fire hydrants

CONSTRUCTION AND MAINTENANCE

Annual maintenance and construction programs help to ensure Richmond's community has access to a reliable, high-quality water supply.

NEW CONSTRUCTION

5 KM of new watermain constructed

5 Capital construction projects completed

90 New service connection installations

MAINTENANCE

167 Service connection repairs

23 Watermain breaks repaired

526 Water meter heads replaced

1,112 Service requests received by patrollers

COMMUNITY SERVICE

As an added benefit to serve residents and visitors, Water Services provides both permanent and portable water fountains around the community and at events as well as misting stations during extreme heat periods.

27,100 Litres of water dispensed from mobile fountains

39 Permanent water fountains

4 Mobile water fountains

252 Days mobile water fountains in service

PWT – 32

To support work experience opportunities for local youth and provide increased capacity to perform seasonal work, the City hires extra staff for the summer. Some tasks performed by summer students included important fire hydrant maintenance.

915 Fire hydrants re-painted by summer students to improve visibility

2,555 Sites with improved access to fire hydrants thanks to work done to clear vegetation overgrowth around hydrants.

WATER COST COMPARISON

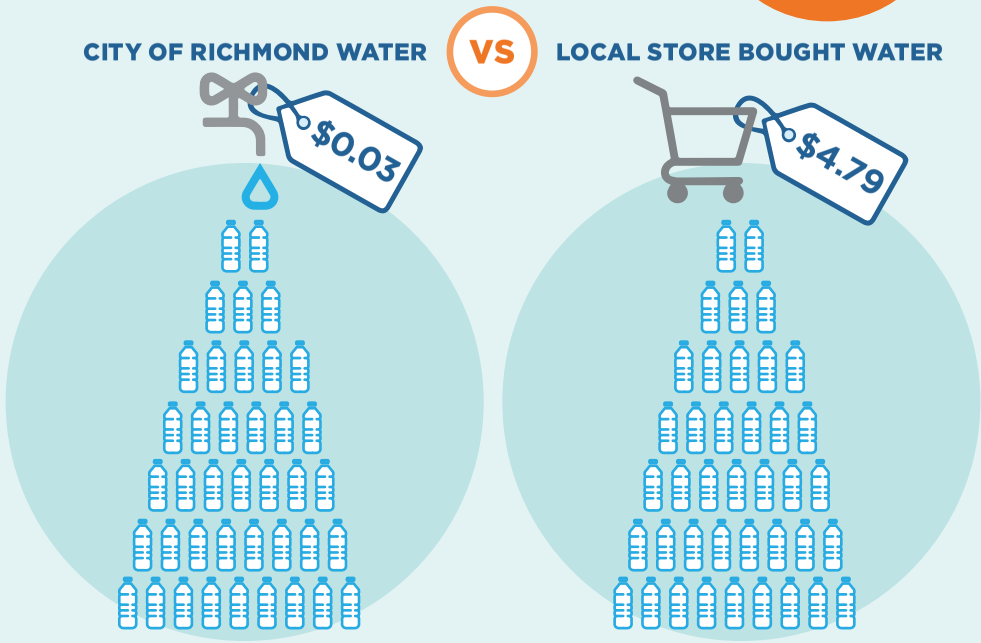
The cost of municipal water remains one of the best values around.

$1.66 AVERAGE METERED RATE for one cubic metre* *1,000 litres of water

$4.79 COST FOR ONE PACK OF 40 X 500 ml bottles of water at a local retailer

In the City of Richmond, the equivalent of 40 bottles of store-bought water (500 ml) costs just $0.03 (three cents) when it comes from your tap. The same amount of water at a major local retailer cost $4.79 in a recent price check.

Bottled water costs about 160 times more than the same amount from the tap.



2.0 Safe and Reliable Water Delivery

PWT – 33

2.1 Where Our Water Comes From

The City of Richmond's drinking water is supplied by Metro Vancouver via four large transmission mains. The water then enters the City's water distribution system through various connections and is delivered to residences and businesses through our system via service connections at each property.

The region's water supply originates from three local watersheds: Capilano, Seymour and Coquitlam. The watersheds contain large collection lakes called reservoirs, which collect and store rainfall and snowmelt from the mountains. Water from the reservoirs is treated at two water treatment facilities: the Seymour Capilano Filtration Plant, which treats water from the Seymour and Capilano reservoirs, and supplies two thirds of the region's drinking water; and the Coquitlam Water Treatment Plant, which treats water from the Coquitlam reservoir and supplies the remaining third of the region's drinking water. The City of Richmond gets the majority of its water from the Seymour and Capilano reservoirs.

The Seymour plant is the largest filtration plant in Canada and has the capacity to filter and disinfect up to 1.8 billion litres of water per day. It is located in the Seymour watershed so water has to be transmitted from the Capilano reservoir to the Seymour plant and back by two underground watermains called "Twin Tunnels," which are over seven kilometres long and 3.8 metres in diameter. Water at this facility undergoes filtration and ultraviolet (UV) disinfection.

The Coquitlam plant is located north of the City of Coquitlam and treats 380 million litres of water per day. Water at this facility undergoes ozone and UV disinfection. The treatment methods at each plant are designed to address the specific characteristics of the source water.

The City of Richmond gets the majority of its water from the Seymour and Capilano reservoirs.

Metro Vancouver manages three local watersheds: Capilano, Seymour and Coquitlam.

The Seymour plant is the largest filtration plant in Canada and has the capacity to filter and disinfect up to 1.8 billion litres of water per day.

Metro Vancouver Watershed and Water Transmission Map

Did you know?

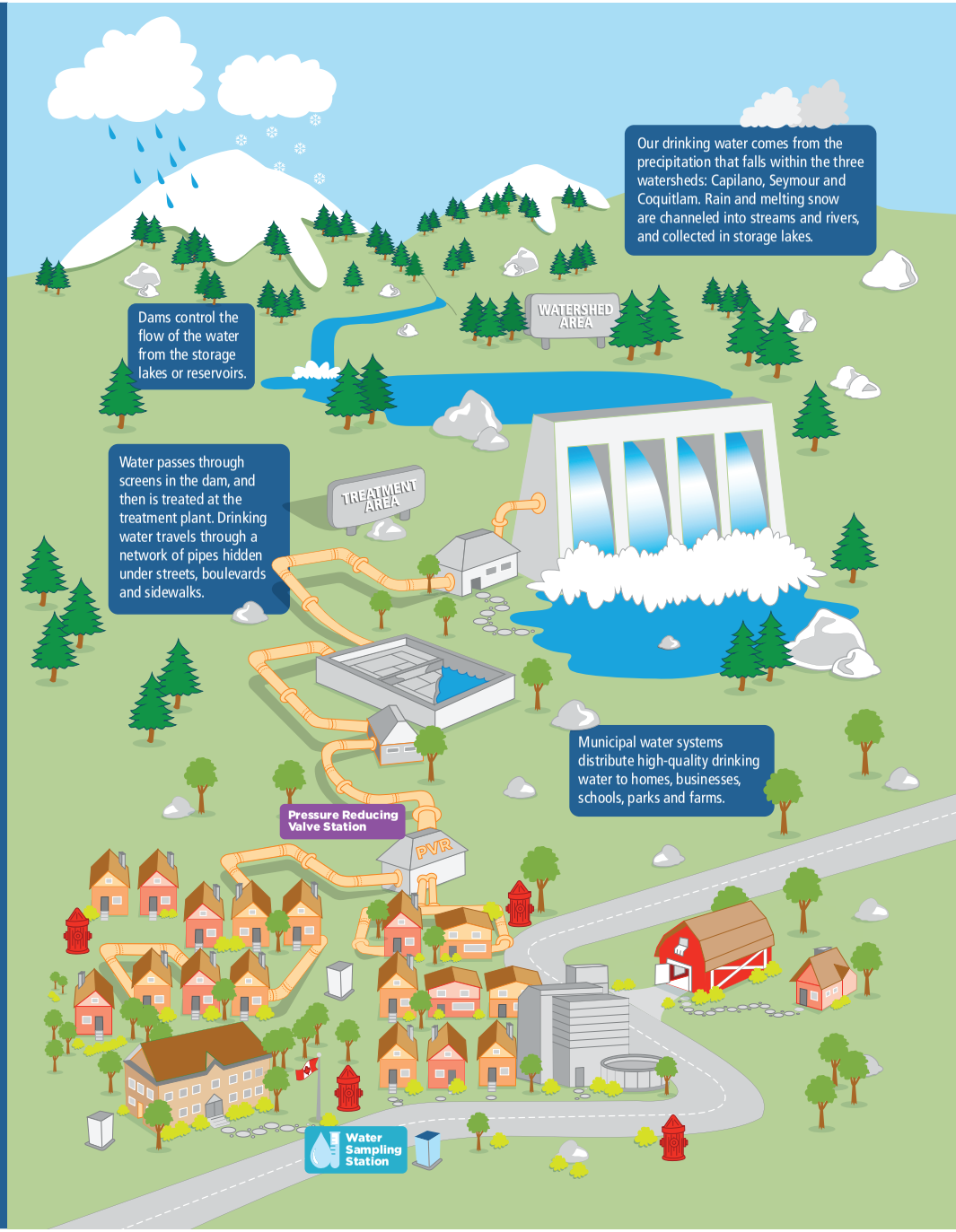
THERE ARE THREE WATERSHEDS that have the capacity to provide over two billion litres of drinking water in one day!

PRESSURE REDUCING VALVE STATIONS are located throughout Richmond to decrease the pressure of water as it enters Richmond's distribution system from Metro Vancouver's.

WATER SAMPLING STATIONS are located throughout Richmond, where the water is regularly tested and monitored. The City takes pride in providing residents with safe, high-quality tap water.

GRAVITY AND PUMP STATIONS in Metro Vancouver's water transmission deliver water to Richmond and keep pressure up in the system.

PWT – 34



2.2 Our Water System

The City of Richmond owns, operates and maintains a complex water distribution system, which delivers water to its residents, businesses and other customers.

Once Metro Vancouver treats the water, it is carried into Richmond via four large transmission mains: Angus Drive main, Lulu Island-Delta main, Tilbury main and Annacis main No. 4. Richmond then draws water through 13 connection points along Metro Vancouver's mains. Each connection has a pressure reducing valve station that reduces the pressure from the transmission mains to match the pressure set in the City's system. The pressure reducing valve stations are monitored from the Works Yard through a supervisory control and data acquisition (SCADA) system.

Downstream of the pressure reducing valve stations is the rest of the City's water distribution system, consisting of more than 630 kilometres of distribution mains.

The watermains are all interconnected in different ways to supply high-quality water to our residents and businesses. Individual service connections feed water from the main network to homes and businesses. All businesses and single-family homes, as well as many multi-family complexes, have been provided with water meters, which record consumption. A network of fire hydrants, valves, service connections and other infrastructure further supports delivery of water where and when it is needed. An overview of our water system is shown on *Figure 1* on page 28.

34.2 million CUBIC METRES OF **water**
IS DELIVERED TO
239,389 residents in Richmond.

Richmond's water supply originates from one of three regional reservoirs.

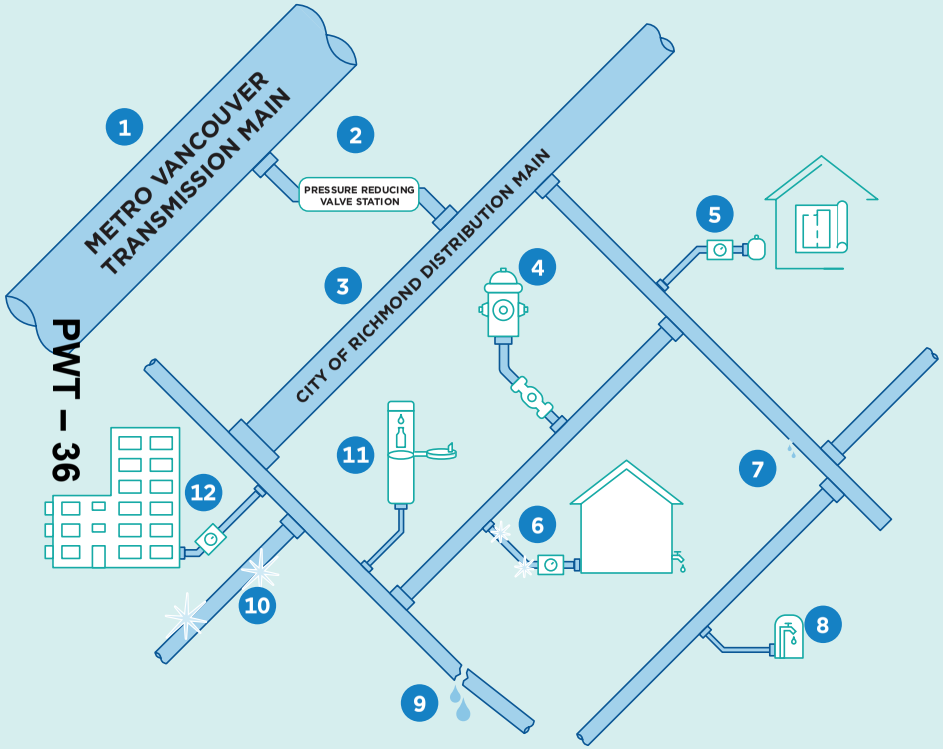


Figure 1

Richmond's Water System

1. Metro Vancouver supplies drinking water to the City of Richmond via four transmission mains.
2. Pressure reducing valve (PRV) stations are the interface between Metro Vancouver's mains and the City of Richmond's water system. Water Services crews operate and maintain PRV stations throughout the City.
3. The City of Richmond's water system is made up of more than 630 km of watermains. The watermains are all interconnected in different ways to supply high-quality water to Richmond residents.
4. Fire hydrants play an important role in the City's water system. They deliver large quantities of water for fighting fires and help keep the City's drinking water safe by providing a way for water to be safely flushed out of the water system.
5. Water service connections link City of Richmond watermains to houses and businesses.
6. Sometimes service connections can get damaged or break for different reasons. Water Services crews are always ready to repair water connections to prevent service disruptions to residents.
7. The City of Richmond's Leak Detection Program uses specialized equipment to find underground leaks in the water system.
8. Water Sampling Stations help Water Services staff monitor the quality of the City's drinking water. Stations are located in strategic locations throughout the City.
9. All pressurized systems can develop breaks due to the strain on the pipes. Water Services staff minimize breaks by replacing ageing infrastructure and implementing a Pressure Management Program.
10. The City of Richmond has a watermain replacement and installation program to upgrade aging underground water infrastructure and improve the watermain network throughout the City.
11. Drinking water fountains help bring fresh drinking water to City of Richmond residents and are a sustainable way of keeping hydrated while on the go. Water Services staff maintain and service fountains along Richmond's dikes and in parks.
12. Water metering is important since it measures how much water each property has used. This makes sure that residents only pay for what they use and it also keeps residents informed of their water usage and promotes water conservation.

2.3 Mobile Emergency Response Unit

The City has a mobile emergency response unit to provide a supply of safe, drinkable water in the event of a disruption to regular service.

Water Services staff are trained to operate the City's mobile emergency water treatment trailer for use during a major emergency where the City's water is contaminated or unavailable. The emergency mobile unit is flexible and can be used to respond to both large-scale emergencies and smaller, neighbourhood-contained incidents.

All components of the emergency mobile unit that come in contact with the treated water are compliant with the Guidelines for Canadian Drinking Water Quality. The water is pumped into the system and through cartridges to reduce turbidity and through activated carbon to improve taste and odour. Next, it goes through UV units to disinfect the water. Lastly, sodium hypochlorite is added to provide a second source of disinfection and to act as free chlorine, which provides residual disinfection in the water.

The trailer was designed with the consideration of factors such as extreme weather events, sudden loss of clean water from Metro Vancouver and seismic events. It is regularly maintained and tested by Water Services staff to ensure that the City is ready to deliver clean, safe water for Richmond residents during an emergency.

*The treatment trailer is capable of filtering approximately **60 litres of water per minute** and can draw water straight from the Fraser River.*

This mobile trailer ensures safe drinking water can be supplied wherever needed.

PWT-137

3.0 Ensuring Our Water Quality and Safety

PWT – 38

3.1 Water Quality Standards

In 2002, the City of Richmond implemented a Drinking Water Quality Monitoring Program to comply with provincial and federal legislation: the British Columbia Drinking Water Protection Act, the British Columbia Drinking Water Protection Regulations, the Water Quality Monitoring and Reporting Plan for Metro Vancouver, and the Guidelines for Canadian Drinking Water Quality.

Under these regulations, the City of Richmond is required to:

Develop a process to notify the Vancouver Coastal Health (VCH) Drinking Water Officer and the VCH Medical Health Officer of any condition that could render unsafe drinking water.

Implement a sampling program that adequately represents all areas within the City.

Ensure test results are immediately available to the VCH Medical Health Officer.

Receive an annual construction permit for the construction, installation and extension of the water distribution system.

Produce an annual report detailing the results of the City's water quality monitoring program for review by VCH.

The conditions set out in the Drinking Water Protection Act require all water systems in B.C. to be classified as a Level I through IV facility through the Environmental Operators Certification Program (EOCP). Richmond's system is classified as a Level III facility so all staff that work on the system are responsible for possessing a valid Level I to Level III EOCP certificate.

To obtain and maintain their level of certification, staff have to successfully complete the required training and hands-on experience. This ensures staff are able to respond appropriately and immediately to problems prior to them becoming a risk to health or property.

PWT – 39

3.2 Ensuring Water Quality

FLUSHING PROGRAM

Water Services conducts a unidirectional flushing program every year. Unidirectional flushing involves forcing water in a single direction through a specific route through the pipes by closing or opening valves in a strategic way. Forcing the water in a single direction increases the velocity of the water flow and ensures that the inside of the pipes is being scoured and cleaned while the water is safely flushed out of the watermain network. The water is then drained through hydrants at the end of the flushing sequence to remove the debris from the system. Cleaning the inside of the pipes is important because it prevents bacterial growth and removes sediment. Staff take measures to control the flow of water during flushing. When practical, the water that is flushed is captured to be reused for irrigation. The City also conducts regular weekly, monthly and annual flushing at lower velocities to eliminate stagnant water in dead-end watermains and other low-demand areas.

REDUCE WATERMAIN LEAKS AND BREAKS

The City has various programs that reduce leaks and breaks in the system, which help keep our drinking water safe and clean. Whenever there is a watermain break, the system can experience a loss of pressure, which can result in negative pressure. This means that the pressure on the inside of the main is lower than the pressure from the soil on the outside of the main. When a watermain along the system has cracks or gaps between joints, there is a possibility that groundwater can be siphoned back into the system during times of negative pressure. Two programs that promote water conservation also help keep our drinking water safe by preventing this ingress of groundwater. The Leak Detection and Pressure Management programs help reduce watermain breaks and minimize weak spots in the distribution system where groundwater can get into the pipes. You can learn more about these programs in ***Section 6*** of this report.

QUICK RESPONSE TO WATERMAIN LEAKS AND BREAKS

Not only is reducing watermain breaks in the system important, but responding quickly when leaks and breaks happen is just as crucial. Quick response by staff reduces water loss and eliminates the chance or the amount of time that groundwater can enter the system, which in turn prevents contaminants from getting into the watermains. Water Services staff are always on call and trained to respond to all levels of watermain breaks.

BACKFLOW PREVENTER PROGRAM

A Backflow Preventer Program supports safe, temporary use of hydrants by farm, construction and film industries, and others who sometimes require access to bulk volumes of water or where other connections to the water distribution system are not feasible or viable.

Water Services staff install a backflow preventer at every hydrant that has an active hydrant-use permit. The backflow preventer acts as a one-way valve and helps keep outside water from getting into the City's water system, which keeps possible contaminants out.

3.3 Monitoring Water Quality

The City of Richmond collects water samples on a weekly basis at 40 dedicated sampling sites. These sites are strategically located throughout the City to provide a suitable representation of the City's water quality across the whole network.

Water samples collected by City staff are taken to Metro Vancouver laboratories for analysis. Sample results are reviewed by City staff and Vancouver Coastal Health, the Health Authority in Richmond, to ensure the drinking water meets the standards and parameters outlined in the British Columbia Drinking Water Protection Regulations. Richmond is recognized as providing high-quality drinking water. In addition to testing for contaminants, water is also monitored for taste, odour, temperature and appearance. This additional commitment to quality assurance supports the objective of making Richmond's tap water the "water of choice" throughout our community. The 2024 water quality testing results are included in *Appendix A* of this report. Test results for specific parameters can be found in *Appendices B, C, D* and *E*. Test samples are analyzed to ensure the water quality is within defined standards, including bacterial, physical and chemical parameters.

A complete description of the testing parameters can be found in *Appendix F*.

The sampling stations are split up into three groups, and each group is sampled on a different day of the week. Additional information on sampling sites can be found in *Appendix G*.

PART 40

Regular water sample testing helps to ensure Richmond's safe water supply.

As part of regular water flushing to clean pipes and ensure quality, water is tested for contaminates and monitored for taste, odour, temperature and appearance.

Results that are outside of these parameters are considered 'Failed Samples'. It is important for City staff to deal with failed sample results immediately. The City's standard response to a failed water sample is:

Re-sample from the same station.

Flush the watermain extensively.

Re-sample again from the same station.

Isolate the watermain to one feed until test results confirm compliance with the British Columbia Drinking Water Protection Regulations.

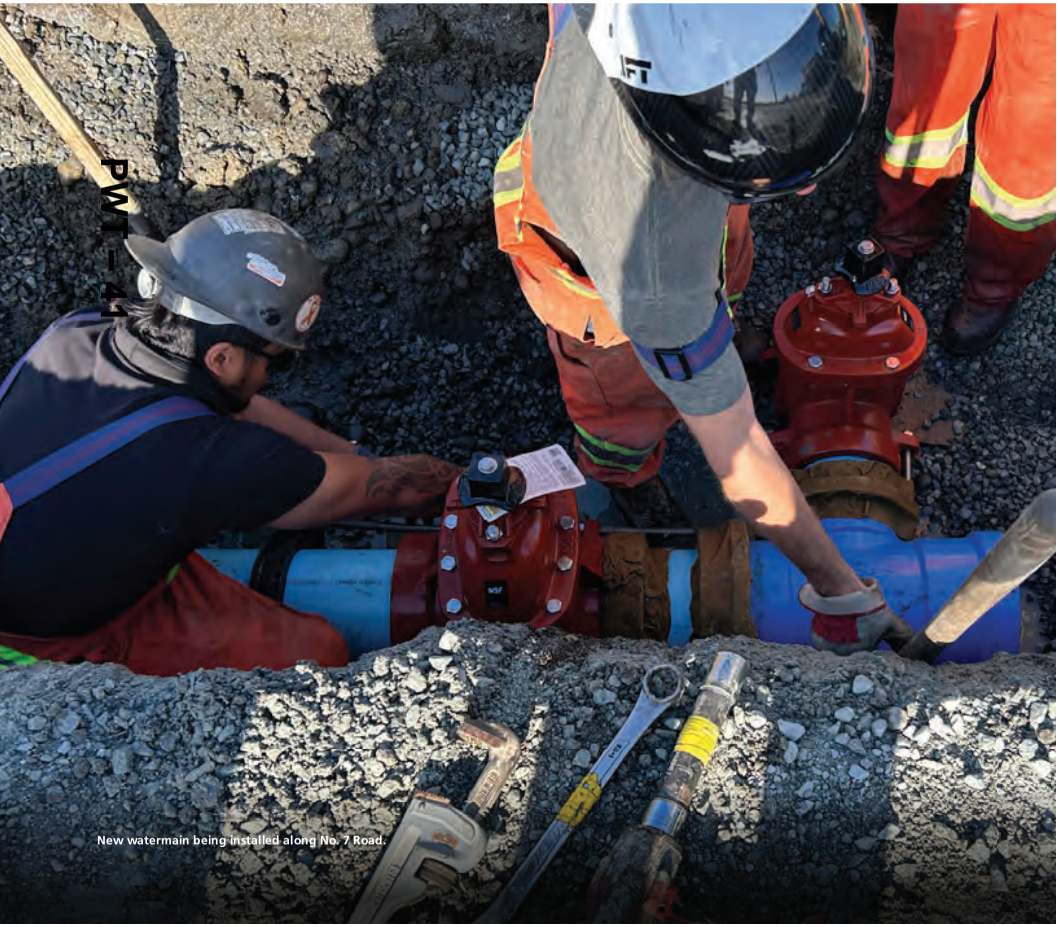
Under the Drinking Water Protection Act, the Metro Vancouver laboratory must immediately inform the City of Richmond, the Drinking Water Officer and the Medical Health Officer if a water supply system result fails to meet established guidelines. Water Services staff then take immediate action and precautions, and issue required notifications.

Water safety situations such as chemical or biological contamination, excessive turbidity, disinfection failure, loss of pressure due to high demand, or a watermain break where there is suspected contamination, would be considered an emergency.

See *Appendix H* for more details about the actions taken by Water Services staff in these situations.

WATER QUALITY ADVISORIES ARE ISSUED TO THE GENERAL PUBLIC WHEN NECESSARY.

4.0 Constructing and Maintaining a Reliable Water System



New watermain being installed along No. 7 Road.

4.1 Comprehensive Water Network

The extensive network of watermains and other infrastructure has been carefully planned to provide redundancy. This ensures system and service stability, and minimizes service disruptions.

The system's network of pressure reducing valves and gate valves provides a broad variety of options to control water flow on an area-specific basis. In addition, most watermains are looped so that water can be fed to properties from both ends of their fronting mains. Therefore, system valves can be used to isolate portions of the system that require repairs, maintenance or replacement, limiting the number of customers that are impacted by service disruptions while necessary work is completed.

The City's municipal water distribution service includes more than:

600 KM OF watermains

ANNUALLY DELIVERING

MORE THAN

30 million CUBIC METRES OF water

TO OUR

CUSTOMERS

CITY CREWS ADD VALUE

Water Services crews work year-round to replace aging watermains and infrastructure across the City as well as to install new watermains, service connections and water meters. In 2024, we completed the installation of just over 5 kilometres of new PVC watermain in a number of areas across the city, including the Burkeville and Sealord neighbourhoods, and segments of No. 2 and No. 7 Roads.

4.2 Capital Construction Programs

The dedicated watermain crew is responsible for completing the annual planned capital construction program. Annual construction programs include installation of new watermains, upgrades to existing water distribution infrastructure, provision of service connections to new construction and multi-family water meter installation.

Crews are tasked with meeting project scope, schedule and budget, while minimizing service and other disruptions to residents, businesses and others. The crews make extra effort to maintain positive relationships and communication with the immediate community within project areas.

Water Services crews have become the service provider of choice for many capital projects that might otherwise be contracted externally.

Crews are able to deliver projects at a competitive price, providing value to taxpayers.

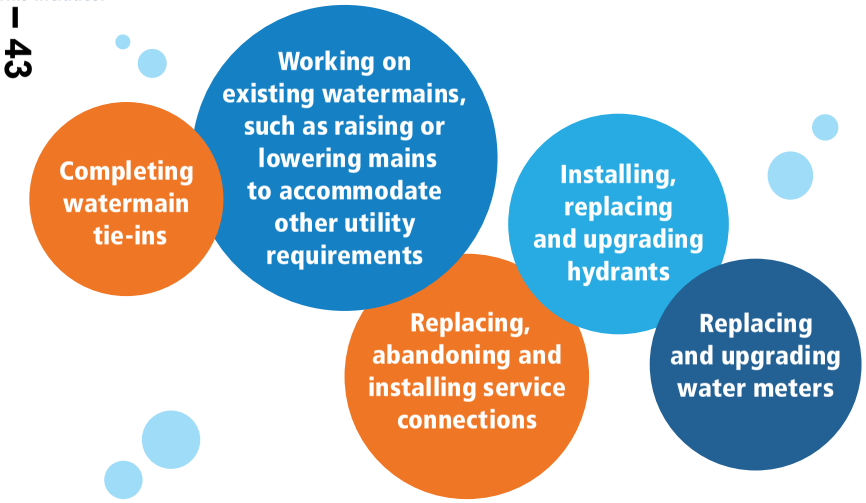
Crews install new watermain along No. 2 Road.

4.3 Maintenance and Repairs

Water Services also undertakes system repairs as required, including fixing watermain breaks and repairing damaged or broken water service connections. In addition, Water Services uses specialized equipment to identify, locate and repair underground leaks in our water system.

Water Services crews are also tasked with responding to maintenance and service requests from a wide variety of customers, including residents, businesses, developers, contractors and other utilities such as Fortis BC, BC Hydro and Metro Vancouver.

This includes:

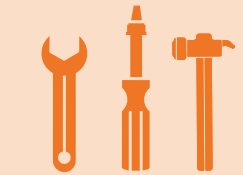


Ongoing maintenance ensures a safe, reliable water supply.

Additional ongoing preventative maintenance and repair programs help extend the life of the infrastructure and reduce service disruptions due to equipment or infrastructure breakdowns. This helps reduce ongoing operating and capital costs. Dedicated preventative maintenance programs are in place for all valves, hydrants and the system's pressure reducing valves.

Preventative maintenance can identify the need for demand maintenance, a more in-depth maintenance process that is only done if required. This includes valve box raising, hydrant parts replacement, valve replacements and other work. Demand repairs can arise at any time and crews are available to respond to emergencies at all hours of the day.

The department's rapid response standards include a team of staff who work after-hours and overnight to quickly respond to issues arising with the water system and other City utilities and assets. This ensures major disruptions to water services, such as pipe breaks and leaks and other issues, are dealt with quickly and efficiently, minimizing impact on the system, its users and the community at large.



4.4 Fire Protection

Fire hydrants play an important role in our water system as they serve multiple needs. Hydrants deliver large quantities of water for fighting fires and help keep our drinking water safe by providing a way for water to be flushed out of our system.

Water Services conducts extensive annual maintenance on the City's 5,000-plus fire hydrants to ensure they are ready to provide large volumes of water during fire fighting efforts.

In addition to replacing hydrants as part of the City's Capital Construction Watermain Replacement Program, or demand replacements due to damage or malfunction, Water Services actively performs hydrant retrofits to replace slide gate hydrants with compression hydrants. Compression hydrants close when they are compromised, preventing major water loss and infrastructure damage. Since starting the retrofits, Water Services has replaced 40 hydrants throughout the City. Slide gate hydrants are being phased out and all new hydrants being installed in the City are compression-style.

Fire hydrants play an important role in our water system.

Fire hydrants are being upgraded to ensure a stable supply of water when needed.

5.0 Accessible Water in the Community

The City's mobile water fountains provide free drinking water at many community events.

5.1 Water Where You Are

Universal access to safe drinking water is critical to public health and quality of life, whether you are at home, at work or out in the community.

The City ensures this access by providing free water at its network of permanent public water fountains and at mobile water fountains deployed at special events. This helps the public maintain healthy hydration levels at all times while also protecting the environment and promoting sustainability by reducing the need to use plastic water bottles.

Water misting stations, deployed during extreme heat events, also support public health.

Water fountain with a pet bowl located in Steveston Village.

PWT – 46

5.2 Water Fountains

The water fountains found in Richmond parks and other public areas are maintained by Water Services. This ensures the public has ready access to free, safe drinking water throughout the community.

The water fountains are tested and inspected regularly to ensure they provide high-quality drinking water. The fountains are turned off in winter months to prevent freezing and costly damage, and are turned back on in the spring for the public to enjoy.

A permanent water fountain upgrade program was launched in 2023. The program involves upgrading older fountains with new and longer-lasting fountains. The new fountains have improved designs that also incorporate a bottle water-fill station. Some of the fountains also include ground-level spouts to keep pets hydrated. Part of the upgrades might also include relocating the fountains to another location within the same area to better serve the community.

The first fountain to be upgraded as part of this program is located at Barnard Park. A new fountain with a water bottle filler and pet drinking bowl at ground level was installed in a more convenient location for the public. Four additional fountain upgrades were completed in 2024.

A permanent water fountain upgrade program was launched in 2023.

5.3 Portable Water Fountains

City staff proudly maintain four portable drinking water units that are used at numerous community events. Two of the units have the ability to chill water when connected to a power source. The units provide the public with access to free, potable tap water at events and promote tap water usage as an alternative to bottled water consumption.

The portable water fountains are deployed at a variety of popular community events such as the Steveston Salmon Festival, Richmond Maritime Festival and dozens of other local events annually.

In addition to the larger, wheeled water fountains, the City also maintains a number of drinking water fountains that can be attached to the tops of fire hydrants. These units provide an alternative potable water source at events or camps where other service options are not available or practical. The units can also be used at large events like the Salmon Festival to provide additional drinking water sources.

The water from the portable fountains is tested upon installation to ensure we provide good quality water for the public to enjoy.

5.4 Misting Stations

In response to recurring extreme hot weather, Water Services staff designed and built misting stations that can be placed at a water source, like a hydrant, and provide a way for people to cool down.

In coordination with Emergency Programs, misting stations are regularly deployed in parks and popular outdoor locations, such as Minoru Plaza and Garry Point Park, during extreme high temperature events to provide heat relief.

Misting stations are also deployed outside of extreme heat events throughout the City to provide the public with a fun way to keep cool while enjoying being out and about in the community.

Misting station in use in Steveston Village on Canada Day.

6.0 Conserving Our Water Supply

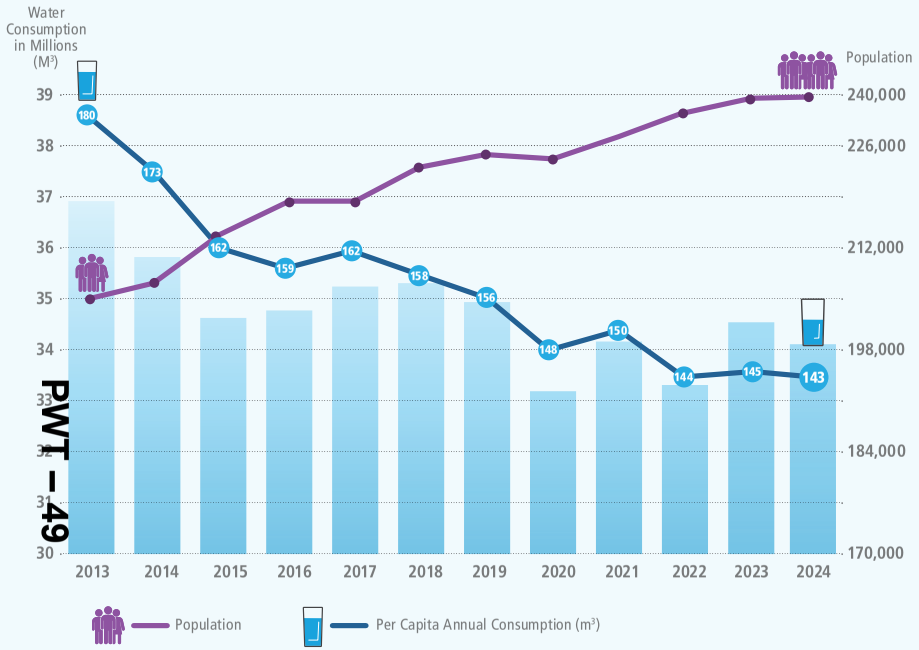
PWT – 48

6.1 Reducing Water Consumption

Water conservation efforts are important to ensure that our regional system can keep up with the growing population to safeguard our water supply and to help maintain our beautiful environment.

The City of Richmond continues to succeed in reducing annual water consumption despite a growing population by implementing corporate and community-wide initiatives. These include water metering, lawn watering regulation, pressure management, leak-reduction and leak-detection programs, a toilet rebate program and a rain barrel sale program.

Water Consumption vs. Population | 2013 to 2024



The graph above shows how the City of Richmond has been conserving water despite an increase in population over the years. Water consumption has been steadily decreasing since its peak in 2006, except for small year-to-year increases in 2021 and 2023. The steady decrease in consumption parallels the City's steady and ongoing transition toward universal water metering for all users.

Despite this progress, the whole Metro Vancouver region, including Richmond, saw a spike in consumption due to extreme heat in the summers of 2021 and 2023, placing a strain on our regional water supply. This has reinforced the City's determination to continue to expand and place increased emphasis on our water conservation programs in order to further decrease our consumption and do our part in the region's push to conserve water.

6.2 Water Metering Programs

Water metering plays a significant role in the City's water management program as it promotes water conservation by encouraging users to reduce their water consumption.

The City implemented its single-family water metering program in 2003. Initially voluntary, water meters eventually became mandatory. All single-family homes in Richmond have been metered since the end of 2017. All industrial, commercial and institutional properties are also metered. Most users have experienced significant savings in costs over the previous flat-rate billing system. The program has contributed to significant overall reductions in water consumption in Richmond.

The City is now working to achieve water meter universality in multi-family residences. Currently, more than half of Richmond's multi-family residential complexes have water meters. All remaining unmetered properties are scheduled to be metered over the next 15 years.

Nearly all multi-family residences that have installed meters have experienced reductions in their water costs, with average savings of nearly 50%. Multi-family water meter installations are undertaken by experienced City crews and are completed with minimal service disruptions.

Multi-family complexes are being transitioned to water meters.

AVERAGE **SAVINGS** OF NEARLY **50%**

Residents and businesses are ***billed based on actual amount of water they use***, rather than a flat-rate system, providing a ***financial incentive to conserve water***.

6.3 Pressure Management Program

Using the pressure reducing valve stations, the City of Richmond reduces water pressure in the system by 10 pounds per square inch (PSI) from October to May, lowering the system pressure from 90 PSI to 80 PSI.

The purpose of this practice is to reduce the volume of leakage during a lower demand period, decrease the risk of watermain breaks and extend the life of our water infrastructure.

During summer months, the daytime pressure is set to 90 PSI to meet the increased water demand on the system.

A timer-based system is used to lower the pressure to 80 PSI daily from midnight to 4 a.m. as water demand decreases during that time over the summer.

This program has successfully decreased watermain leaks and breaks in the water system.

PMT - 150

A look inside a pressure reducing valve station.

6.4 Leak Reduction and Detection Programs

The City has made significant progress identifying and eliminating leaks through programs that target residential users and the City's own network.

The Leak Reduction Program identifies single-family properties with continuous flow using our metering system. City staff then inform the homeowner about the potential leak. The program can significantly reduce overall private property leakage since leaks can be detected by the metering system before they become visible or obvious.

The Leak Detection Program discovers non-visible underground leaks within the City's distribution system without the need to excavate. City crews use special equipment called noise loggers to measure sound frequencies along the targeted pipe. The frequencies are then recorded for staff review. A leak in the pipe creates different sound patterns than typical water flow in the watermain, allowing the crew to pinpoint leaks and provide swift action to excavate and repair the affected asset.

It is estimated that most municipalities in North America lose 12% to 15% of their potable water to undiscovered underground leakage.

6.5 Toilet Rebate Program

This program encourages homeowners to replace older, high-volume toilets with low-flush toilets to conserve water and reduce costs.

Toilets account for almost one quarter of the water used in the average home. Switching to a low-flush toilet could save more than 70 litres of water per day per person and, when combined with a water meter, will result in cost savings.

In addition to reducing water use and costs, installing low-flush toilets ensures homes reflect current best practices and market preferences.

Single and multi-family homeowners are eligible to apply for a lifetime maximum of two rebates per property. Industrial, commercial and other non-residential properties are not eligible at this time.

The City of Richmond's Toilet Rebate Program provides a utility account rebate of $100 to homeowners when they install a low-flush toilet.

6.6 Rain Barrel Sale Program

Rain barrels are excellent outdoor water-saving devices that collect and store rainwater from rooftops for lawn and garden use.

Rain barrels are available for purchase at the City's Recycling Depot by Richmond residents only. The barrels can hold up to 208 litres and are made from safe and durable recycled materials. The barrels include a mosquito mesh to keep out bugs and leaves. Installation instructions are included with each rain barrel.

Rainwater is a great water source for lawns, plants and gardens, and for washing outside surfaces. Using rainwater will reduce the amount of tap water you use, therefore saving money on your utility bill.

Collecting water using a rain barrel to water flowers and plants.

6.7 Lawn Watering Regulations

As the temperature increases, water consumption increases with it. During summer months, average water use can increase by as much as 50%, largely due to lawn watering. Overall, lawn watering typically represents nearly 40% of all water used in an average single-family home.

The higher water demand combined with the decrease in precipitation during the summer causes water levels in the Metro Vancouver reservoirs to drop more quickly. Water conservation, particularly in summer, is vital in order to maintain a minimum amount of water in the reservoirs in case of emergency. Conservation is particularly important in years when snowpack levels are low and seasonal rainfall is below normal.

To help manage the high demand for drinking water during the hot and dry summer months in 2024, Metro Vancouver initiated annual Stage 1 lawn watering regulations from May 1 to Oct. 15, 2024. Regional lawn watering and other water usage restrictions are applied on an annual basis to limit consumption and ensure adequate supply levels are maintained.

The staged water restrictions are applied and adjusted throughout the summer based on demand and available supply.

Lawn watering and other water usage is regulated through the Water Use Restriction Bylaw No. 7784. Failure to comply with lawn watering restrictions is an offence subject to fines.

6.8 Waterwise Demonstration Garden

Lawn and garden watering are major consumers of water during the summer. Overwatering can place a strain on the regional water supply and can be detrimental to the health of many plants. In addition, with the advent of water metering for most Richmond homes, excessive lawn and garden watering can significantly increase utility bills.

The City of Richmond's Waterwise Demonstration Garden acts as a resource for local residents, providing tips on how they can reduce their water usage and still have beautiful, healthy gardens, lawns and landscapes. The garden shows a variety of plants that residents and businesses can use in their landscaping that are drought-tolerant and do not require a lot of water to grow and thrive in our unique climate. The garden also offers lawn maintenance tips, and provides information on micro-irrigation, with different ways and systems of watering plants like driplines, bubblers, micro-sprays and others.

The demonstration garden is located within Terra Nova Rural Park and can be visited year-round for those looking for useful information on reducing their water consumption.

In 2024, Water Services and Parks launched planning for a revitalization of the demonstration garden, with a new layout and signage to be implemented in 2025.

7.0 Community Outreach


Water Services staff share information and host activities at Richmond's Public Works Open House.

Students go into the community to learn about Richmond's water and drainage systems as part of the Public Works on Wheels program.

7.1 Project WET

Project WET is an interactive elementary school program aimed at educating students on the importance of water.

In partnership with Richmond elementary school teachers, City of Richmond Public Works staff invite students in Grades 4 to 7 to the Works Yard to learn about water conservation, supply and quality. Students also learn about other Public Works areas like Sewerage and Drainage, Environmental Programs and Inspections.

There are several interactive displays, with staff guiding students through key learning objectives for each. Project WET field trips take place as a celebration of National Public Works Week. The available class spaces are in high demand and are always fully booked.

Due to scheduling issues, Project WET was not held in 2024. However, as an alternative, a group of Grade 3, 4 and 5 students from Manoah Steves Elementary participated in a wide-ranging Public Works on Wheels program. They visited a number of sites in Burkeville and Terra Nova, where they learned about the City's water distribution and drainage systems. Project WET will return in 2025.


Kids learning about water distribution and the importance of fire hydrants at Project WET.

7.2 Community Engagement

Water Services strives to remain engaged with the community throughout the year, both through its day-to-day activities and specific initiatives.

When the City undertakes a new project in the community, it makes every effort to ensure residents and businesses in the area are kept aware of what will be happening, the projected timeline, potential service impacts and more.

PWT – 54

Before every project, the City sends letters to all area residents who will be affected by the construction work. In addition, the City regularly conducts direct outreach with individuals and groups in the project area. Staff often meet directly with local residents, schools and others to answer their questions and address concerns about the project. This has included inviting school classes to the project site to learn first-hand about the work being done.

A major highlight of the City's engagement activity is the Public Works Open House, and National Public Works Week.

Water Services staff annually work to develop new displays for the Open House with information and activities to help keep the public informed about the work being done to deliver high-quality water to their taps, promote water conservation and provide excellent value to taxpayers.

During the past year, Water Services set up an above-ground water system display that included water meters, valves and blow-offs to teach Open House attendees about the water system and water conservation. The Emergency Water Treatment trailer was also set up to educate people on the importance of water quality and emergency preparedness. Staff volunteered their time and effort on a non-working day to educate and interact with the public.

The Public Works Open House also features the City's portable water fountains and misters to help keep attendees hydrated and cool during the warm weather.

Community engagement is also undertaken through various communication initiatives with the public through a variety of mediums. The watermain construction crew was featured in a National Public Works Week media campaign for hosting a class of elementary school children at one of its sites. The visit allowed a great teaching opportunity for kids to learn about the water system and ask questions of our staff. City staff take pride in their work and embrace opportunities to raise awareness about their contributions and the benefits to the community.

8.0 Appendices

Crews don't mind the mud when working on pipes in dirt trenches to keep Richmond's water clean and safe to drink.

Appendices

Appendix A | 2024 Water Quality Results

Water Sampling | Type: **GRAB** | Station Number: **RMD-202** | Address: **1500 Valemont Way**

Sampled Date	Total Coliform (CFU/1000 ml)	E.coli (CFU/1000 ml)	HPC (CFU/ml)	Chlorine Free (mg/l)	Turbidity (NTU)	Temperature (C°)
2024-01-05 09:30	<1	<1	<2	0.86	0.5	9
2024-01-11 09:45	<1	<1	<2	0.66	0.23	7
2024-01-25 09:25	<1	<1	<2	0.78	0.14	7
2024-02-02 09:30	<1	<1	<2	0.67	0.15	7
2024-02-08 09:45	<1	<1	<2	0.7	0.21	8
2024-02-16 09:30	<1	<1	<2	0.72	0.22	5
2024-02-22 09:30	<1	<1	<2	0.74	0.23	6
2024-03-01 09:25	<1	<1	<2	0.65	0.15	6
2024-03-07 09:45	<1	<1	<2	0.66	0.18	6
2024-03-15 09:25	<1	<1	<2	0.82	0.17	7
2024-03-21 09:30	<1	<1	4	0.73	0.21	9
2024-03-28 09:30	<1	<1	<2	0.79	0.35	6
2024-04-04 09:50	<1	<1	2	0.76	0.13	8
2024-04-12 09:45	<1	<1	2	0.71	0.14	7
2024-04-18 09:50	<1	<1	<2	0.62	0.11	7
2024-04-26 09:25	<1	<1	<2	0.73	0.11	9
2024-05-02 10:00	<1	<1	<2	0.83	0.16	9
2024-05-10 09:30	<1	<1	<2	0.75	0.16	9
2024-05-16 09:30	<1	<1	2	0.79	0.16	10
2024-05-24 09:30	<1	<1	<2	0.7	0.14	10
2024-05-30 09:25	<1	<1	<2	0.74	0.2	10
2024-06-07 09:30	<1	<1	<2	0.92	0.21	10
2024-06-13 09:25	<1	<1	<2	0.62	0.15	11
2024-06-21 09:30	<1	<1	2	0.61	0.14	10
2024-06-27 09:45	<1	<1	10	0.57	0.17	11
2024-07-05 09:30	<1	<1	2	0.71	0.19	12
2024-07-11 09:30	<1	<1	<2	0.61	0.13	12
2024-07-25 09:45	<1	<1	<2	0.83	0.12	12
2024-08-02 09:30	<1	<1	<2	0.78	0.13	13
2024-08-07 14:30	<1	<1	<2	0.7	0.13	14
2024-08-16 10:05	<1	<1	<2	0.67	0.1	17
2024-08-22 09:25	<1	<1	2	0.64	0.09	16
2024-08-30 09:45	<1	<1	<2	0.65	0.1	15
2024-09-05 10:00	<1	<1	<2	0.86	0.13	17
2024-09-13 09:30	<1	<1	<2	0.68	0.1	17
2024-09-19 09:25	<1	<1	<2	0.75	0.09	16
2024-09-27 09:30	<1	<1	<2	0.71	0.16	16
2024-10-03 09:55	<1	<1	<2	0.67	0.15	15
2024-10-11 10:00	<1	<1	<2	0.72	0.72	14
2024-10-17 09:25	<1	<1	<2	0.74	0.23	14
2024-10-25 09:25	<1	<1	<2	0.59	0.16	11
2024-10-31 09:30	<1	<1	<2	0.68	0.17	11
2024-11-08 09:25	<1	<1	2	0.54	0.33	9
2024-11-14 09:25	<1	<1	<2	0.54	0.33	10
2024-11-22 09:25	<1	<1	<2	0.67	0.17	8
2024-11-28 09:25	<1	<1	4	0.75	0.2	7
2024-12-06 09:30	<1	<1	<2	0.71	0.2	7
2024-12-12 09:55	<1	<1	<2	0.66	0.17	7
2024-12-20 09:30	<1	<1	NA	0.63	0.34	8
2024-12-23 09:25	<1	<1	NA	0.67	0.2	7

PWT_56

Water Sampling | Type: **GRAB** | Station Number: **RMD-203** | Address: **23260 Westminster Highway**

Sampled Date	Total Coliform (CFU/1000 ml)	E.coli (CFU/1000 ml)	HPC (CFU/ml)	Chlorine Free (mg/l)	Turbidity (NTU)	Temperature (C°)
2024-01-05 11:10	<1	<1	<2	0.59	0.33	9
2024-01-11 11:30	<1	<1	<2	0.68	0.22	6
2024-01-25 11:00	<1	<1	<2	0.77	0.55	7
2024-02-02 11:10	<1	<1	<2	0.68	0.33	7
2024-02-08 11:30	<1	<1	<2	0.69	0.26	7
2024-02-16 11:10	<1	<1	<2	0.66	0.41	6
2024-02-22 11:10	<1	<1	<2	0.68	0.23	7
2024-03-01 11:00	<1	<1	<2	0.63	0.13	6
2024-03-07 11:30	<1	<1	4	0.68	0.23	5
2024-03-15 11:00	<1	<1	2	0.88	0.17	6
2024-03-21 11:10	<1	<1	<2	0.57	0.23	10
2024-03-28 11:00	<1	<1	2	0.76	1.2	6
2024-04-04 11:30	<1	<1	<2	0.78	0.14	8
2024-04-12 11:30	<1	<1	<2	0.73	0.13	7
2024-04-18 11:30	<1	<1	<2	0.72	0.13	7
2024-04-26 11:00	<1	<1	<2	0.71	0.09	8
2024-05-02 11:30	<1	<1	<2	0.81	0.28	9
2024-05-10 11:10	<1	<1	<2	0.76	0.14	10
2024-05-16 11:10	<1	<1	<2	0.74	0.88	11
2024-05-24 11:10	<1	<1	4	0.67	0.13	11
2024-05-30 11:00	<1	<1	<2	0.71	0.22	11
2024-06-07 11:10	<1	<1	<2	0.61	0.12	11
2024-06-13 11:00	<1	<1	<2	0.7	0.24	11
2024-06-21 11:10	<1	<1	<2	0.42	0.15	11
2024-06-27 11:45	<1	<1	2	0.63	0.2	11
2024-07-05 11:10	<1	<1	8	0.69	0.15	12
2024-07-11 11:10	<1	<1	<2	0.59	0.11	12
2024-07-25 11:30	<1	<1	<2	0.7	0.11	13
2024-08-02 11:10	<1	<1	<2	0.89	0.13	14
2024-08-07 15:50	<1	<1	6	0.63	0.12	15
2024-08-16 11:45	<1	<1	2	0.71	0.36	13
2024-08-22 11:00	<1	<1	26	0.62	0.24	15
2024-08-30 11:30	<1	<1	<2	0.82	0.27	12
2024-09-05 11:30	<1	<1	4	0.78	0.23	15
2024-09-13 11:10	<1	<1	<2	0.77	0.34	14
2024-09-19 11:00	<1	<1	8	0.58	0.31	15
2024-09-27 11:10	<1	<1	2	0.54	0.26	15
2024-10-03 11:40	<1	<1	4	0.39	0.22	14
2024-10-11 11:30	<1	<1	<2	0.5	0.31	14
2024-10-17 11:00	<1	<1	<2	0.71	0.32	12
2024-10-25 11:00	<1	<1	2	0.58	0.2	11
2024-10-31 11:10	<1	<1	<2	0.68	0.16	11
2024-11-08 11:00	<1	<1	10	0.85	1.4	9
2024-11-14 11:00	<1	<1	8	0.52	0.89	10
2024-11-22 11:00	<1	<1	6	0.51	0.57	8
2024-11-28 11:00	<1	<1	12	0.24	0.58	9
2024-12-06 11:10	<1	<1	<2	0.48	0.42	9
2024-12-12 11:45	<1	<1	<2	0.48	0.41	8
2024-12-20 11:10	<1	<1	NA	0.46	1.1	8
2024-12-23 11:00	<1	<1	NA	0.63	0.54	7

Water Sampling | Type: GRAB | Station Number: RMD-204 | Address: 3180 Granville Avenue

Sampled Date	Total Coliform (CFU/1000 ml)	E.coli (CFU/1000 ml)	HPC (CFU/ml)	Chlorine Free (mg/l)	Turbidity (NTU)	Temperature (C°)
2024-01-05 07:30	<1	<1	<2	0.36	0.18	10
2024-01-11 08:00	<1	<1	<2	0.74	0.25	7
2024-01-25 07:30	<1	<1	2	0.65	0.23	8
2024-02-02 07:30	<1	<1	<2	0.73	0.23	8
2024-02-08 08:00	<1	<1	<2	0.66	0.2	9
2024-02-16 07:30	<1	<1	<2	0.65	0.19	7
2024-02-22 07:30	<1	<1	<2	0.63	0.12	7
2024-03-01 07:30	<1	<1	<2	0.63	0.12	7
2024-03-07 08:00	<1	<1	2	0.8	0.19	9
2024-03-15 07:30	<1	<1	<2	0.89	0.16	7
2024-03-21 07:30	<1	<1	2	0.77	0.29	9
2024-03-28 07:30	<1	<1	<2	0.67	0.14	8
2024-04-04 07:50	<1	<1	<2	0.71	0.17	8
2024-04-12 08:00	<1	<1	<2	0.69	0.14	9
2024-04-18 08:00	<1	<1	<2	0.71	0.11	9
2024-04-26 07:30	<1	<1	<2	0.68	0.12	10
2024-05-02 08:00	<1	<1	<2	0.72	0.13	10
2024-05-10 07:30	<1	<1	2	0.71	0.13	10
2024-05-16 07:30	<1	<1	<2	0.59	0.15	10
2024-05-24 07:30	<1	<1	<2	0.65	0.11	11
2024-05-30 07:30	<1	<1	2	0.63	0.1	11
2024-06-07 07:30	<1	<1	<2	0.61	0.12	11
2024-06-13 07:30	<1	<1	<2	0.61	0.16	12
2024-06-21 07:30	<1	<1	<2	0.63	0.14	12
2024-06-27 08:00	<1	<1	<2	0.61	0.1	13
2024-07-05 07:30	<1	<1	2	0.71	0.11	13
2024-07-11 07:30	<1	<1	<2	0.63	0.1	14
2024-07-25 08:00	<1	<1	6	0.6	0.09	14
2024-08-02 07:30	<1	<1	2	0.68	0.12	15
2024-08-07 12:30	<1	<1	34	0.66	0.1	15
2024-08-16 08:00	<1	<1	<2	0.62	0.09	17
2024-08-22 07:30	<1	<1	32	0.64	0.18	17
2024-08-30 08:00	<1	<1	<2	0.65	0.11	17
2024-09-05 08:00	<1	<1	2	0.69	0.09	17
2024-09-13 07:30	<1	<1	<2	0.74	0.08	18
2024-09-19 07:30	<1	<1	<2	0.59	0.09	18
2024-09-27 07:30	<1	<1	<2	0.52	0.1	17
2024-10-03 07:45	<1	<1	4	0.74	0.1	16
2024-10-11 08:00	<1	<1	<2	0.71	0.12	15
2024-10-17 07:30	<1	<1	<2	1.03	0.2	16
2024-10-25 07:30	<1	<1	12	0.72	0.17	13
2024-10-31 07:30	<1	<1	4	0.48	0.14	12
2024-11-08 07:30	<1	<1	<2	0.46	0.13	11
2024-11-14 07:30	<1	<1	<2	0.56	0.13	11
2024-11-22 07:30	<1	<1	<2	0.76	0.14	10
2024-11-28 07:30	<1	<1	<2	0.85	0.12	9
2024-12-06 07:30	<1	<1	10	0.88	0.19	8
2024-12-12 08:00	<1	<1	<2	0.91	0.13	8
2024-12-20 07:30	<1	<1	NA	0.75	0.12	7
2024-12-23 07:30	<1	<1	NA	0.68	0.1	8

PMT - 57

Water Sampling | Type: GRAB | Station Number: RMD-205 | Address: 13851 Steveston Highway

Sampled Date	Total Coliform (CFU/1000 ml)	E.coli (CFU/1000 ml)	HPC (CFU/ml)	Chlorine Free (mg/l)	Turbidity (NTU)	Temperature (C°)
2024-01-05 09:15	<1	<1	<2	0.5	0.17	10
2024-01-11 09:30	<1	<1	<2	0.64	0.17	6
2024-01-25 09:10	<1	<1	<2	0.69	0.21	7
2024-02-02 09:15	<1	<1	<2	0.69	0.18	7
2024-02-08 09:30	<1	<1	<2	0.69	0.26	8
2024-02-16 09:15	<1	<1	4	0.65	0.35	6
2024-02-22 09:15	<1	<1	<2	0.69	0.25	6
2024-03-01 09:00	<1	<1	<2	0.67	0.15	6
2024-03-07 09:30	<1	<1	<2	0.81	0.21	5
2024-03-15 09:00	<1	<1	<2	0.73	0.21	6
2024-03-21 09:10	<1	<1	<2	0.75	0.25	10
2024-03-28 09:15	<1	<1	<2	0.75	0.21	6
2024-04-04 09:30	<1	<1	<2	0.69	0.2	8
2024-04-12 09:30	<1	<1	<2	0.83	0.1	7
2024-04-18 09:30	<1	<1	<2	0.62	0.13	7
2024-04-26 09:00	<1	<1	<2	0.7	0.08	9
2024-05-02 09:30	<1	<1	<2	0.73	0.13	8
2024-05-10 09:15	<1	<1	<2	0.85	0.16	9
2024-05-16 09:15	<1	<1	<2	0.84	0.24	10
2024-05-24 09:15	<1	<1	<2	0.71	0.16	11
2024-05-30 09:00	<1	<1	<2	0.71	0.14	10
2024-06-07 09:15	<1	<1	<2	0.62	0.14	10
2024-06-13 09:00	<1	<1	<2	0.65	0.23	11
2024-06-21 09:15	<1	<1	<2	0.64	0.21	10
2024-06-27 09:30	<1	<1	<2	0.6	0.35	11
2024-07-05 09:15	<1	<1	2	0.71	0.18	12
2024-07-11 09:15	<1	<1	<2	0.63	0.13	12
2024-07-25 09:30	<1	<1	<2	0.75	0.13	13
2024-08-02 09:15	<1	<1	<2	0.77	0.1	13
2024-08-07 14:00	<1	<1	<2	0.67	0.16	15
2024-08-16 09:45	<1	<1	2	0.66	0.11	16
2024-08-22 09:00	<1	<1	2	0.68	0.11	16
2024-08-30 09:30	<1	<1	<2	0.64	0.11	16
2024-09-05 09:30	<1	<1	<2	0.65	0.12	17
2024-09-13 09:15	<1	<1	<2	0.73	0.11	17
2024-09-19 09:00	<1	<1	<2	0.68	0.1	16
2024-09-27 09:15	<1	<1	<2	0.7	0.18	16
2024-10-03 09:35	<1	<1	<2	0.7	0.11	15
2024-10-11 09:30	<1	<1	<2	0.8	0.2	15
2024-10-17 09:00	<1	<1	6	0.8	0.3	15
2024-10-25 09:00	<1	<1	2	0.68	0.16	13
2024-10-31 09:15	<1	<1	<2	0.69	0.14	11
2024-11-08 09:00	<1	<1	NA	0.67	0.14	9
2024-11-14 09:00	<1	<1	<2	0.64	0.13	11
2024-11-22 09:00	<1	<1	6	0.58	0.17	9
2024-11-28 09:00	<1	<1	10	0.81	0.26	8
2024-12-06 09:15	<1	<1	<2	0.69	0.17	8
2024-12-12 09:35	<1	<1	<2	0.65	0.14	7
2024-12-20 09:15	<1	<1	NA	0.73	0.16	8
2024-12-23 09:00	<1	<1	NA	0.66	0.13	6

Water Sampling | Type: GRAB | Station Number: RMD-206 | Address: 4251 Moncton Street

Sampled Date	Total Coliform (CFU/1000 ml)	E.coli (CFU/1000 ml)	HPC (CFU/ml)	Chlorine Free (mg/l)	Turbidity (NTU)	Temperature (C°)
2024-01-05 07:50	<1	<1	2	0.55	0.38	10
2024-01-11 08:15	<1	<1	4	0.57	0.2	6
2024-01-25 07:45	<1	<1	<2	0.71	0.13	8
2024-02-02 07:50	<1	<1	<2	0.7	0.11	7
2024-02-08 08:15	<1	<1	<2	0.55	0.15	8
2024-02-16 07:50	<1	<1	<2	0.61	0.21	6
2024-02-22 07:50	<1	<1	2	0.58	0.17	6
2024-03-01 07:45	<1	<1	<2	0.59	0.13	7
2024-03-07 08:15	<1	<1	<2	0.7	0.11	9
2024-03-15 07:45	<1	<1	<2	0.77	0.2	6
2024-03-21 07:45	<1	<1	2	0.79	0.33	10
2024-03-28 07:50	<1	<1	<2	0.57	0.19	6
2024-04-04 08:05	<1	<1	<2	0.64	0.4	8
2024-04-12 08:15	<1	<1	2	0.68	0.12	8
2024-04-18 08:15	<1	<1	6	0.57	0.13	8
2024-04-26 07:45	<1	<1	<2	0.71	0.11	9
2024-05-02 08:15	<1	<1	<2	0.66	0.15	9
2024-05-10 07:50	<1	<1	<2	0.71	0.16	9
2024-05-16 07:50	<1	<1	2	0.61	0.23	10
2024-05-24 07:50	<1	<1	<2	0.69	0.11	11
2024-05-30 07:45	<1	<1	<2	0.62	0.1	10
2024-06-07 07:50	<1	<1	<2	0.63	0.15	11
2024-06-13 07:45	<1	<1	<2	0.64	0.18	11
2024-06-21 07:50	<1	<1	<2	0.6	0.33	12
2024-06-27 08:15	<1	<1	<2	0.56	0.22	11
2024-07-05 07:50	<1	<1	4	0.69	0.23	12
2024-07-11 07:50	<1	<1	<2	0.68	0.21	12
2024-07-25 08:15	<1	<1	6	0.65	0.39	13
2024-08-02 07:50	<1	<1	<2	0.77	0.42	14
2024-08-07 12:45	<1	<1	<2	0.65	0.14	15
2024-08-16 08:15	<1	<1	6	0.58	0.3	16
2024-08-22 07:45	<1	<1	30	0.69	0.13	16
2024-08-30 08:15	<1	<1	64	0.6	0.15	16
2024-09-05 08:15	<1	<1	24	0.64	0.12	16
2024-09-13 07:50	<1	<1	8	0.63	0.12	17
2024-09-19 07:45	<1	<1	<2	0.81	0.09	16
2024-09-27 07:50	<1	<1	2	0.81	0.09	16
2024-10-03 08:00	<1	<1	<2	0.63	0.11	16
2024-10-11 08:15	<1	<1	80	0.66	0.13	15
2024-10-17 07:45	<1	<1	6	0.87	0.26	15
2024-10-25 07:45	<1	<1	14	0.66	0.13	13
2024-10-31 07:50	<1	<1	10	0.38	0.79	13
2024-11-08 07:45	<1	<1	6	0.57	0.37	11
2024-11-14 07:45	<1	<1	2	0.59	0.21	10
2024-11-22 07:45	<1	<1	4	0.66	0.13	9
2024-11-28 07:45	<1	<1	<2	0.64	0.42	8
2024-12-06 07:50	<1	<1	<2	0.46	0.49	8
2024-12-12 08:20	<1	<1	<2	0.79	0.18	7
2024-12-20 07:50	<1	<1	NA	0.49	0.36	7
2024-12-23 07:45	<1	<1	NA	0.8	0.14	7

PWT – 58

Water Sampling | Type: GRAB | Station Number: RMD-208 | Address: 13200 No. 4 Road

Sampled Date	Total Coliform (CFU/1000 ml)	E.coli (CFU/1000 ml)	HPC (CFU/ml)	Chlorine Free (mg/l)	Turbidity (NTU)	Temperature (C°)
2024-01-05 08:55	<1	<1	<2	<1	0.26	10
2024-01-11 09:15	<1	<1	2	<1	0.28	7
2024-01-25 08:50	<1	<1	<2	<1	0.11	7
2024-02-02 08:55	<1	<1	<2	<1	0.11	7
2024-02-08 09:15	<1	<1	<2	<1	0.18	8
2024-02-16 08:55	<1	<1	<2	<1	0.32	6
2024-02-22 08:55	<1	<1	<2	<1	0.17	6
2024-03-01 08:45	<1	<1	<2	<1	0.11	6
2024-03-07 09:15	<1	<1	<2	<1	0.12	6
2024-03-15 08:45	<1	<1	<2	<1	0.18	6
2024-03-21 08:50	<1	<1	<2	<1	0.24	9
2024-03-28 09:00	<1	<1	2	<1	0.13	6
2024-04-04 09:20	<1	<1	<2	<1	0.12	9
2024-04-12 09:15	<1	<1	4	<1	0.14	7
2024-04-18 09:15	<1	<1	6	<1	0.13	9
2024-04-26 08:45	<1	<1	<2	<1	0.1	8
2024-05-02 09:15	<1	<1	<2	<1	0.13	9
2024-05-10 08:55	<1	<1	<2	<1	0.14	9
2024-05-16 08:55	<1	<1	<2	<1	0.19	10
2024-05-24 08:55	<1	<1	<2	<1	0.12	10
2024-05-30 08:45	<1	<1	<2	<1	0.13	10
2024-06-07 08:55	<1	<1	<2	<1	0.14	11
2024-06-13 08:45	<1	<1	<2	<1	0.14	12
2024-06-21 08:55	<1	<1	<2	<1	0.13	12
2024-06-27 09:15	<1	<1	<2	<1	0.13	12
2024-07-05 08:55	<1	<1	<2	<1	0.15	12
2024-07-11 08:55	<1	<1	<2	<1	0.11	13
2024-07-25 09:15	<1	<1	<2	<1	0.11	15
2024-08-02 08:55	<1	<1	<2	<1	0.12	14
2024-08-07 13:45	<1	<1	4	<1	0.12	15
2024-08-16 09:20	<1	<1	<2	<1	0.11	16
2024-08-22 08:45	<1	<1	<2	<1	0.09	17
2024-08-30 09:15	<1	<1	4	<1	0.09	16
2024-09-05 09:15	<1	<1	2	<1	0.09	16
2024-09-13 08:55	<1	<1	<2	<1	0.09	17
2024-09-19 08:45	<1	<1	2	<1	0.09	16
2024-09-27 08:55	<1	<1	<2	<1	0.11	16
2024-10-03 09:15	<1	<1	<2	<1	0.09	16
2024-10-11 09:15	<1	<1	2	<1	0.13	15
2024-10-17 08:45	<1	<1	<2	<1	0.14	14
2024-10-25 08:45	<1	<1	8	<1	0.14	13
2024-10-31 08:55	<1	<1	<2	<1	0.16	11
2024-11-08 08:45	<1	<1	<2	<1	0.22	10
2024-11-14 08:45	<1	<1	<2	<1	0.14	10
2024-11-22 08:45	<1	<1	<2	<1	0.14	10
2024-11-28 08:45	<1	<1	<2	<1	0.12	10
2024-12-06 08:55	<1	<1	<2	<1	0.27	8
2024-12-12 09:20	<1	<1	8	<1	0.14	7
2024-12-20 08:55	<1	<1	NA	<1	0.18	8
2024-12-23 08:45	<1	<1	NA	<1	0.29	7

Water Sampling | Type: GRAB | Station Number: RMD-212 | Address: Across from 8600 Ryan Road

Sampled Date	Total Coliform (CFU/1000 ml)	E.coli (CFU/1000 ml)	HPC (CFU/ml)	Chlorine Free (mg/l)	Turbidity (NTU)	Temperature (C°)
2024-01-05 08:40	<1	<1	<2	0.47	0.18	10
2024-01-11 09:00	<1	<1	<2	0.62	0.18	6
2024-01-25 08:30	<1	<1	<2	0.68	0.19	8
2024-02-02 08:40	<1	<1	2	0.72	0.21	8
2024-02-08 09:00	<1	<1	<2	0.68	0.21	8
2024-02-16 08:40	<1	<1	<2	0.68	0.35	6
2024-02-22 08:40	<1	<1	<2	0.68	0.15	6
2024-03-01 08:30	<1	<1	2	0.65	0.12	7
2024-03-07 09:00	<1	<1	10	0.65	0.11	6
2024-03-15 08:30	<1	<1	10	0.79	0.15	6
2024-03-21 08:35	<1	<1	<2	0.83	0.4	9
2024-03-28 08:45	<1	<1	<2	0.77	0.17	7
2024-04-04 09:00	<1	<1	<2	0.69	0.14	8
2024-04-12 09:00	<1	<1	2	0.72	0.12	8
2024-04-18 09:00	<1	<1	<2	0.69	0.13	9
2024-04-26 08:30	<1	<1	<2	0.62	0.45	9
2024-05-02 09:00	<1	<1	2	0.73	0.14	9
2024-05-10 08:40	<1	<1	<2	0.75	0.16	10
2024-05-16 08:40	<1	<1	<2	0.78	0.17	11
2024-05-24 08:40	<1	<1	<2	0.72	0.12	10
2024-05-30 08:30	<1	<1	<2	0.59	0.1	11
2024-06-07 08:40	<1	<1	2	0.71	0.12	11
2024-06-13 08:30	<1	<1	<2	0.63	0.14	11
2024-06-21 08:40	<1	<1	<2	0.7	0.15	12
2024-06-27 09:00	<1	<1	<2	0.56	0.15	13
2024-07-05 08:40	<1	<1	2	0.74	0.11	13
2024-07-11 08:40	<1	<1	<2	0.6	0.12	14
2024-07-25 09:00	<1	<1	4	0.64	0.09	15
2024-08-02 08:40	<1	<1	2	0.73	0.11	15
2024-08-07 13:30	<1	<1	6	0.74	0.1	16
2024-08-16 09:05	<1	<1	2	0.64	0.1	17
2024-08-22 08:30	<1	<1	2	0.74	0.08	17
2024-08-30 09:00	<1	<1	6	0.86	0.09	16
2024-09-05 09:00	<1	<1	<2	0.64	0.09	17
2024-09-13 08:40	<1	<1	<2	0.68	0.09	17
2024-09-19 08:30	<1	<1	6	0.76	0.23	16
2024-09-27 08:40	<1	<1	6	0.89	0.09	17
2024-10-03 09:00	<1	<1	<2	0.58	0.1	15
2024-10-11 09:00	<1	<1	<2	0.75	0.12	15
2024-10-17 08:30	<1	<1	<2	0.84	0.14	15
2024-10-25 08:30	<1	<1	10	0.58	0.15	13
2024-10-31 08:40	<1	<1	4	0.53	0.16	12
2024-11-08 08:30	<1	<1	<2	0.6	0.15	12
2024-11-14 08:30	<1	<1	2	0.35	0.12	10
2024-11-22 08:30	<1	<1	4	0.71	0.14	10
2024-11-28 08:30	<1	<1	<2	0.56	0.16	9
2024-12-06 08:40	<1	<1	<2	0.75	0.28	8
2024-12-12 09:05	<1	<1	<2	0.9	0.16	7
2024-12-20 08:40	<1	<1	NA	0.76	0.2	8
2024-12-23 08:30	<1	<1	NA	0.83	0.1	7

PWT – 59

Water Sampling | Type: GRAB | Station Number: RMD-214 | Address: 11720 Westminster Highway

Sampled Date	Total Coliform (CFU/1000 ml)	E.coli (CFU/1000 ml)	HPC (CFU/ml)	Chlorine Free (mg/l)	Turbidity (NTU)	Temperature (C°)
2024-01-05 9:50	<1	<1	2	0.38	0.22	11
2024-01-11 10:00	<1	<1	<2	0.66	0.14	6
2024-01-25 09:40	<1	<1	<2	0.75	0.14	7
2024-02-02 09:50	<1	<1	<2	0.72	0.16	7
2024-02-08 10:00	<1	<1	<2	0.69	0.2	7
2024-02-16 09:50	<1	<1	<2	0.63	0.16	6
2024-02-22 09:50	<1	<1	2	0.65	0.17	6
2024-03-01 09:45	<1	<1	<2	0.7	0.13	6
2024-03-07 10:00	<1	<1	8	0.64	0.15	6
2024-03-15 09:45	<1	<1	<2	0.61	0.13	6
2024-03-21 09:45	<1	<1	<2	0.79	0.2	10
2024-03-28 09:45	<1	<1	<2	0.74	0.16	7
2024-04-04 10:05	<1	<1	<2	0.74	0.11	8
2024-04-12 10:00	<1	<1	<2	0.77	0.11	8
2024-04-18 10:15	<1	<1	<2	0.68	0.11	8
2024-04-26 09:45	<1	<1	<2	0.65	0.08	9
2024-05-02 10:15	<1	<1	<2	0.72	0.14	9
2024-05-10 09:50	<1	<1	<2	0.69	0.15	8
2024-05-16 09:50	<1	<1	<2	0.74	0.19	10
2024-05-24 09:50	<1	<1	<2	0.71	0.12	10
2024-05-30 09:45	<1	<1	<2	0.63	0.12	10
2024-06-07 09:50	<1	<1	2	0.71	0.16	10
2024-06-13 09:45	<1	<1	<2	0.59	0.14	11
2024-06-21 09:50	<1	<1	<2	0.61	0.17	10
2024-06-27 10:00	<1	<1	<2	0.62	0.13	11
2024-07-05 09:50	<1	<1	<2	0.68	0.17	12
2024-07-11 09:50	<1	<1	2	0.61	0.13	11
2024-07-25 10:00	<1	<1	<2	0.72	0.13	13
2024-08-02 09:50	<1	<1	<2	0.77	0.14	13
2024-08-07 14:35	<1	<1	8	0.76	0.14	15
2024-08-16 10:30	<1	<1	2	0.67	0.13	16
2024-08-22 09:45	<1	<1	2	0.77	0.14	16
2024-08-30 10:00	<1	<1	<2	0.71	0.13	15
2024-09-05 10:15	<1	<1	<2	0.83	0.14	16
2024-09-13 09:50	<1	<1	<2	0.69	0.12	16
2024-09-19 09:45	<1	<1	<2	0.73	0.13	16
2024-09-27 09:50	<1	<1	2	0.72	0.13	16
2024-10-11 10:15	<1	<1	<2	0.77	0.13	14
2024-10-17 09:45	<1	<1	<2	0.85	0.21	15
2024-10-25 09:45	<1	<1	LA	0.65	0.2	12
2024-10-31 09:50	<1	<1	<2	0.57	0.17	11
2024-11-08 09:45	<1	<1	<2	0.64	0.16	10
2024-11-14 09:45	<1	<1	2	0.61	0.16	11
2024-11-22 09:45	<1	<1	<2	0.68	0.18	9
2024-11-28 09:45	<1	<1	<2	0.63	0.12	8
2024-12-06 09:50	<1	<1	<2	0.64	0.16	7
2024-12-12 10:15	<1	<1	<2	0.94	0.18	8
2024-12-20 09:50	<1	<1	NA	0.66	0.12	6
2024-12-23 09:45	<1	<1	NA	0.72	0.13	7

Water Sampling | Type: GRAB | Station Number: RMD-216 | Address: 11080 No. 2 Road

Sampled Date	Total Coliform (CFU/1000 ml)	E.coli (CFU/1000 ml)	HPC (CFU/ml)	Chlorine Free (mg/l)	Turbidity (NTU)	Temperature (C°)
2024-01-05 08:05	<1	<1	<2	0.68	0.17	10
2024-01-11 08:30	<1	<1	<2	0.67	0.26	6
2024-01-25 08:00	<1	<1	<2	0.74	0.13	8
2024-02-02 08:05	<1	<1	<2	0.7	0.13	7
2024-02-08 08:30	<1	<1	<2	0.65	0.15	8
2024-02-16 08:05	<1	<1	4	0.69	0.22	6
2024-02-22 08:05	<1	<1	<2	0.66	0.17	6
2024-03-01 08:00	<1	<1	8	0.69	0.16	7
2024-03-07 08:30	<1	<1	<2	0.81	0.18	9
2024-03-15 08:00	<1	<1	<2	0.81	0.15	6
2024-03-21 08:00	<1	<1	<2	0.82	0.53	10
2024-03-28 08:10	<1	<1	<2	0.71	0.17	8
2024-04-04 08:20	<1	<1	2	0.68	0.24	8
2024-04-12 08:30	<1	<1	<2	0.73	0.13	8
2024-04-18 08:30	<1	<1	<2	0.69	0.14	8
2024-04-26 08:00	<1	<1	<2	0.7	0.13	9
2024-05-02 08:30	<1	<1	<2	0.7	0.12	9
2024-05-10 08:05	<1	<1	<2	0.72	0.19	9
2024-05-16 08:05	<1	<1	<2	0.73	0.15	10
2024-05-24 08:05	<1	<1	<2	0.73	0.11	11
2024-05-30 08:00	<1	<1	<2	0.59	0.12	10
2024-06-07 08:05	<1	<1	<2	0.7	0.15	11
2024-06-13 08:00	<1	<1	<2	0.67	0.16	11
2024-06-21 08:05	<1	<1	6	0.71	0.13	11
2024-06-27 08:30	<1	<1	<2	0.57	0.13	12
2024-07-05 08:05	<1	<1	4	0.76	0.14	12
2024-07-11 08:05	<1	<1	<2	0.61	0.11	12
2024-07-25 08:30	<1	<1	6	0.69	0.09	13
2024-08-02 08:05	<1	<1	40	0.78	0.12	14
2024-08-07 13:00	<1	<1	24	0.7	0.13	15
2024-08-16 08:30	<1	<1	<2	0.68	0.11	17
2024-08-22 08:00	<1	<1	10	0.67	0.08	15
2024-08-30 08:30	<1	<1	6	0.74	0.09	16
2024-09-05 08:30	<1	<1	<2	0.9	0.09	16
2024-09-13 08:05	<1	<1	10	0.58	0.08	17
2024-09-19 08:00	<1	<1	<2	0.85	0.1	17
2024-09-27 08:05	<1	<1	<2	0.8	0.1	16
2024-10-03 08:20	<1	<1	<2	0.59	0.12	16
2024-10-11 08:30	<1	<1	<2	0.63	0.13	15
2024-10-17 08:00	<1	<1	6	0.93	0.25	15
2024-10-25 08:00	<1	<1	20	0.69	0.2	12
2024-10-31 08:05	<1	<1	<2	0.74	0.14	12
2024-11-08 08:00	<1	<1	6	0.45	0.16	10
2024-11-14 08:00	<1	<1	2	0.55	0.14	10
2024-11-22 08:00	<1	<1	2	0.58	0.13	10
2024-11-28 08:00	<1	<1	6	0.6	0.11	10
2024-12-06 08:05	<1	<1	<2	0.5	0.21	9
2024-12-12 08:35	<1	<1	<2	0.84	0.19	8
2024-12-20 08:05	<1	<1	NA	0.69	0.11	8
2024-12-23 08:00	<1	<1	NA	0.74	0.11	7

PWT - 60

Water Sampling | Type: GRAB | Station Number: RMD-249 | Address: 23000 block Dyke Road

Sampled Date	Total Coliform (CFU/1000 ml)	E.coli (CFU/1000 ml)	HPC (CFU/ml)	Chlorine Free (mg/l)	Turbidity (NTU)	Temperature (C°)
2024-01-05 10:25	<1	<1	2	0.43	0.19	10
2024-01-11 10:30	<1	<1	<2	0.69	0.23	6
2024-01-25 10:15	<1	<1	<2	0.7	0.19	8
2024-02-02 10:25	<1	<1	2	0.58	0.31	7
2024-02-08 10:30	<1	<1	<2	0.56	0.22	8
2024-02-16 10:25	<1	<1	<2	0.62	0.21	6
2024-02-22 10:25	<1	<1	2	0.69	0.19	7
2024-03-01 10:15	<1	<1	<2	0.63	0.14	7
2024-03-07 10:30	<1	<1	<2	0.62	0.2	6
2024-03-15 10:15	<1	<1	<2	0.71	0.19	7
2024-03-21 10:15	<1	<1	<2	0.72	0.25	11
2024-03-28 10:15	<1	<1	<2	0.44	0.2	7
2024-04-04 10:45	<1	<1	<2	0.7	0.17	8
2024-04-12 10:30	<1	<1	<2	0.63	0.17	9
2024-04-18 10:45	<1	<1	<2	0.65	0.11	9
2024-04-26 10:15	<1	<1	8	0.61	0.1	9
2024-05-02 10:45	<1	<1	4	0.67	0.12	10
2024-05-10 10:25	<1	<1	8	0.7	0.63	9
2024-05-16 10:25	<1	<1	12	0.71	0.15	13
2024-05-24 10:25	<1	<1	12	0.64	0.11	13
2024-05-30 10:15	<1	<1	24	0.68	0.11	10
2024-06-07 10:25	<1	<1	2	0.73	0.13	11
2024-06-13 10:15	<1	<1	<2	0.58	0.15	14
2024-06-21 10:25	<1	<1	<2	0.56	0.09	14
2024-06-27 10:30	<1	<1	4	0.5	0.11	15
2024-07-05 10:25	<1	<1	12	0.64	0.13	15
2024-07-11 10:25	<1	<1	12	0.56	0.1	16
2024-07-25 10:30	<1	<1	18	0.64	0.09	17
2024-08-02 10:25	<1	<1	<2	0.65	0.16	17
2024-08-07 15:05	<1	<1	12	0.63	0.1	17
2024-08-16 11:10	<1	<1	10	0.54	0.21	17
2024-08-22 10:15	<1	<1	12	0.48	0.16	17
2024-08-30 10:30	<1	<1	<2	0.4	0.15	16
2024-09-05 10:45	<1	<1	10	0.52	0.17	16
2024-09-13 10:25	<1	<1	<2	0.51	0.16	17
2024-09-19 10:15	<1	<1	22	0.43	0.17	17
2024-09-27 10:25	<1	<1	6	0.25	0.23	16
2024-10-03 10:50	<1	<1	<2	0.37	0.2	14
2024-10-11 10:45	<1	<1	4	0.35	0.22	15
2024-10-17 10:15	<1	<1	<2	0.35	0.29	12
2024-10-25 10:15	<1	<1	<2	0.51	0.17	13
2024-10-31 10:25	<1	<1	4	0.59	0.15	13
2024-11-08 10:15	<1	<1	4	0.35	0.77	11
2024-11-14 10:15	<1	<1	4	0.43	0.96	11
2024-11-22 10:15	<1	<1	LA	0.28	0.41	10
2024-11-28 10:15	<1	<1	8	0.55	0.27	9
2024-12-06 10:25	<1	<1	2	0.22	0.34	9
2024-12-12 11:00	<1	<1	<2	0.22	0.38	7
2024-12-20 10:25	<1	<1	NA	0.29	0.54	7
2024-12-23 10:15	<1	<1	NA	0.27	0.36	8

Water Sampling | Type: GRAB | Station Number: RMD-250 | Address: 6071 Azure Road

Sampled Date	Total Coliform (CFU/1000 ml)	E.coli (CFU/1000 ml)	HPC (CFU/ml)	Chlorine Free (mg/l)	Turbidity (NTU)	Temperature (C°)
2024-01-02 15:45	<1	<1	<2	0.62	0.24	8
2024-01-08 16:00	<1	<1	<2	0.58	0.12	7
2024-01-15 15:45	<1	<1	2	0.68	0.13	6
2024-01-22 15:45	<1	<1	<2	0.74	0.38	6
2024-01-29 15:45	<1	<1	4	0.72	0.2	7
2024-02-05 15:45	<1	<1	<2	0.65	0.17	8
2024-02-12 15:45	<1	<1	2	0.63	0.17	7
2024-02-20 15:45	<1	<1	<2	0.63	0.14	6
2024-02-26 15:45	<1	<1	<2	0.62	0.12	7
2024-03-04 15:45	<1	<1	<2	0.66	0.21	9
2024-03-11 15:45	<1	<1	<2	0.71	0.2	7
2024-03-18 15:45	<1	<1	2	0.72	0.27	7
2024-03-25 15:45	<1	<1	<2	0.51	0.27	7
2024-04-02 15:45	<1	<1	<2	0.76	0.13	8
2024-04-08 15:45	<1	<1	2	0.71	0.42	8
2024-04-15 15:45	<1	<1	<2	0.66	0.1	8
2024-04-22 15:45	<1	<1	2	0.57	0.2	9
2024-04-29 15:45	<1	<1	<2	0.65	0.11	9
2024-05-06 15:45	<1	<1	16	0.69	0.11	10
2024-05-13 15:45	<1	<1	<2	0.69	0.16	11
2024-05-21 15:45	<1	<1	<2	0.5	0.11	11
2024-05-27 15:45	<1	<1	2	0.82	0.09	11
2024-06-03 15:45	<1	<1	<2	0.63	0.09	12
2024-06-10 15:45	<1	<1	<2	0.62	0.11	11
2024-06-17 15:45	<1	<1	8	0.64	0.11	12
2024-06-24 15:45	<1	<1	4	0.68	0.11	13
2024-07-02 15:45	<1	<1	24	0.71	0.09	13
2024-07-08 15:45	<1	<1	2	0.76	0.11	14
2024-07-15 15:45	<1	<1	20	0.76	0.15	14
2024-07-22 15:45	<1	<1	16	0.71	0.14	14
2024-07-29 15:45	<1	<1	6	0.69	0.09	15
2024-08-07 15:45	<1	<1	16	0.75	0.1	16
2024-08-12 15:30	<1	<1	4	0.64	0.09	16
2024-08-19 15:45	<1	<1	<2	0.63	0.12	17
2024-08-26 15:45	<1	<1	<2	0.76	0.1	17
2024-09-03 15:45	<1	<1	4	0.5	0.15	16
2024-09-09 15:45	<1	<1	2	0.64	0.13	17
2024-09-16 15:45	<1	<1	<2	0.66	0.09	17
2024-09-23 15:45	<1	<1	2	0.77	0.18	17
2024-10-01 15:45	<1	<1	4	0.64	0.11	16
2024-10-07 15:45	<1	<1	2	0.69	0.13	16
2024-10-15 15:45	<1	<1	4	0.66	0.1	15
2024-10-21 15:45	<1	<1	2	0.69	0.11	14
2024-10-28 15:45	<1	<1	2	0.62	0.15	12
2024-11-04 15:45	<1	<1	<2	0.44	0.17	12
2024-11-12 15:45	<1	<1	2	0.59	0.14	11
2024-11-18 15:45	<1	<1	<2	0.63	0.1	10
2024-11-25 15:30	<1	<1	<2	0.69	0.29	8
2024-12-02 15:45	<1	<1	2	0.7	0.11	8
2024-12-09 15:45	<1	<1	<2	0.8	0.12	8
2024-12-16 15:45	<1	<1	2	0.67	0.12	7
2024-12-23 13:45	<1	<1	NA	0.79	0.1	7
2024-12-30 15:45	<1	<1	NA	0.8	0.08	7

PMT_61

Water Sampling | Type: GRAB | Station Number: RMD-251 | Address: 5951 McCallan Road

Sampled Date	Total Coliform (CFU/1000 ml)	E.coli (CFU/1000 ml)	HPC (CFU/ml)	Chlorine Free (mg/l)	Turbidity (NTU)	Temperature (C°)
2024-01-02 12:30	<1	<1	2	0.62	0.17	8
2024-01-08 12:30	<1	<1	2	0.64	0.13	7
2024-01-15 12:30	<1	<1	<2	0.69	0.18	6
2024-01-22 12:30	<1	<1	<2	0.71	0.21	5
2024-01-29 12:30	<1	<1	6	0.73	0.14	7
2024-02-05 12:30	<1	<1	2	0.63	0.26	7
2024-02-12 12:30	<1	<1	<2	0.64	0.17	7
2024-02-20 12:30	<1	<1	<2	0.62	0.16	6
2024-02-26 12:30	<1	<1	<2	0.61	0.24	6
2024-03-04 12:30	<1	<1	<2	0.64	0.45	7
2024-03-11 12:30	<1	<1	<2	0.98	0.16	6
2024-03-18 12:30	<1	<1	<2	0.62	0.2	7
2024-03-25 12:30	<1	<1	<2	0.66	0.22	6
2024-04-02 12:30	<1	<1	<2	0.62	0.21	7
2024-04-08 12:30	<1	<1	2	0.72	0.18	7
2024-04-15 12:30	<1	<1	<2	0.72	0.11	7
2024-04-22 12:30	<1	<1	2	0.68	0.25	9
2024-04-29 12:30	<1	<1	2	0.68	0.12	8
2024-05-06 12:30	<1	<1	2	0.7	0.11	9
2024-05-13 12:30	<1	<1	<2	0.73	0.15	10
2024-05-21 12:30	<1	<1	4	0.56	0.1	10
2024-05-27 12:30	<1	<1	<2	0.81	0.09	11
2024-06-03 12:30	<1	<1	<2	0.64	0.13	10
2024-06-10 12:30	<1	<1	2	0.68	0.11	10
2024-06-17 12:30	<1	<1	6	0.62	0.1	11
2024-06-24 12:30	<1	<1	2	0.66	0.11	12
2024-07-02 12:30	<1	<1	<2	0.71	0.12	11
2024-07-08 12:30	<1	<1	<2	0.7	0.12	12
2024-07-15 12:30	<1	<1	<2	0.74	0.13	12
2024-07-22 12:30	<1	<1	<2	0.73	0.11	13
2024-07-29 12:30	<1	<1	2	0.72	0.09	13
2024-08-07 12:30	<1	<1	<2	0.69	0.1	14
2024-08-12 12:00	<1	<1	<2	0.65	0.09	15
2024-08-19 12:30	<1	<1	<2	0.67	0.1	16
2024-08-26 12:30	<1	<1	2	0.74	0.08	16
2024-09-03 12:30	<1	<1	<2	0.64	0.09	16
2024-09-09 12:30	<1	<1	6	0.68	0.12	16
2024-09-16 12:30	<1	<1	2	0.72	0.11	17
2024-09-23 12:30	<1	<1	2	0.77	0.11	16
2024-10-01 12:30	<1	<1	4	0.65	0.11	16
2024-10-07 12:30	<1	<1	<2	0.68	0.12	15
2024-10-15 12:30	<1	<1	<2	0.76	0.11	15
2024-10-21 12:30	<1	<1	2	0.64	0.11	13
2024-10-28 12:30	<1	<1	<2	0.61	0.19	11
2024-11-04 12:30	<1	<1	<2	0.59	0.15	11
2024-11-12 12:30	<1	<1	4	0.55	0.17	10
2024-11-18 12:30	<1	<1	<2	0.53	0.12	9
2024-11-25 12:00	<1	<1	<2	0.64	0.53	8
2024-12-02 12:30	<1	<1	<2	0.75	0.29	7
2024-12-09 12:30	<1	<1	<2	0.83	0.15	9
2024-12-16 12:30	<1	<1	2	0.6	0.28	6
2024-12-23 12:30	<1	<1	NA	0.73	0.11	7
2024-12-30 12:30	<1	<1	NA	0.79	0.09	7

Water Sampling | Type: GRAB | Station Number: RMD-252 | Address: 9751 Pendleton Road

Sampled Date	Total Coliform (CFU/1000 ml)	E.coli (CFU/1000 ml)	HPC (CFU/ml)	Chlorine Free (mg/l)	Turbidity (NTU)	Temperature (C°)
2024-01-02 13:00	<1	<1	<2	0.56	0.23	8
2024-01-08 13:10	<1	<1	<2	0.58	0.13	8
2024-01-15 13:00	<1	<1	<2	0.64	0.14	7
2024-01-22 13:00	<1	<1	<2	0.71	0.33	5
2024-01-29 13:00	<1	<1	<2	0.72	0.2	7
2024-02-05 13:00	<1	<1	<2	0.66	0.18	8
2024-02-12 13:00	<1	<1	<2	0.62	0.28	7
2024-02-20 13:00	<1	<1	<2	0.62	0.13	7
2024-02-26 13:00	<1	<1	<2	0.62	0.11	7
2024-03-04 13:00	<1	<1	<2	0.62	0.28	8
2024-03-11 13:00	<1	<1	<2	0.71	0.49	7
2024-03-18 13:00	<1	<1	<2	0.71	0.17	7
2024-03-25 13:00	<1	<1	<2	0.52	0.15	7
2024-04-02 13:00	<1	<1	<2	0.67	0.2	8
2024-04-08 13:00	<1	<1	<2	0.66	0.27	8
2024-04-15 13:00	<1	<1	<2	0.69	0.1	8
2024-04-22 13:00	<1	<1	2	0.62	0.15	10
2024-04-29 13:00	<1	<1	<2	0.64	0.13	9
2024-05-06 13:00	<1	<1	<2	0.57	0.11	10
2024-05-13 13:00	<1	<1	2	0.61	0.13	11
2024-05-21 13:00	<1	<1	<2	0.58	0.11	11
2024-05-27 13:00	<1	<1	<2	0.74	0.08	12
2024-06-03 13:00	<1	<1	2	0.52	0.09	12
2024-06-10 13:00	<1	<1	<2	0.65	0.14	12
2024-06-17 13:00	<1	<1	6	0.61	0.16	12
2024-06-24 13:00	<1	<1	6	0.62	0.1	14
2024-07-02 13:00	<1	<1	4	0.63	0.1	13
2024-07-08 13:00	<1	<1	2	0.67	0.1	13
2024-07-15 13:00	<1	<1	<2	0.68	0.16	14
2024-07-22 13:00	<1	<1	4	0.63	0.23	14
2024-07-29 13:00	<1	<1	<2	0.84	3	15
2024-08-07 13:00	<1	<1	6	0.62	0.1	15
2024-08-12 12:30	<1	<1	2	0.58	0.11	15
2024-08-19 13:00	<1	<1	<2	0.56	0.07	17
2024-08-26 13:00	<1	<1	<2	0.68	0.08	16
2024-09-03 13:00	<1	<1	4	0.52	0.09	16
2024-09-09 13:00	<1	<1	60	0.57	0.09	17
2024-09-16 13:00	<1	<1	<2	0.6	0.11	17
2024-09-23 13:00	<1	<1	8	0.74	0.14	17
2024-10-01 13:00	<1	<1	6	0.55	0.11	16
2024-10-07 13:00	<1	<1	<2	0.64	0.12	16
2024-10-15 13:00	<1	<1	4	0.63	0.1	15
2024-10-21 13:00	<1	<1	6	0.65	0.11	14
2024-10-28 13:00	<1	<1	<2	0.56	0.14	12
2024-11-04 13:00	<1	<1	<2	0.49	0.17	12
2024-11-12 13:00	<1	<1	<2	0.5	0.16	12
2024-11-18 13:00	<1	<1	<2	0.56	0.11	11
2024-11-25 12:30	<1	<1	<2	0.85	0.13	10
2024-12-02 13:00	<1	<1	<2	0.63	0.14	10
2024-12-09 13:00	<1	<1	2	0.8	0.12	8
2024-12-16 13:00	<1	<1	<2	0.76	0.1	8
2024-12-23 13:00	<1	<1	NA	0.64	0.1	9
2024-12-30 13:00	<1	<1	NA	0.66	0.08	8

PWT – 92

Water Sampling | Type: GRAB | Station Number: RMD-253 | Address: 11051 No. 3 Road

Sampled Date	Total Coliform (CFU/1000 ml)	E.coli (CFU/1000 ml)	HPC (CFU/ml)	Chlorine Free (mg/l)	Turbidity (NTU)	Temperature (C°)
2024-01-02 13:30	<1	<1	<2	0.65	0.12	8
2024-01-08 13:45	<1	<1	<2	0.63	0.12	7
2024-01-15 13:30	<1	<1	<2	0.72	0.12	6
2024-01-22 13:30	<1	<1	<2	0.71	0.13	5
2024-01-29 13:30	<1	<1	<2	0.71	0.23	6
2024-02-05 13:30	<1	<1	<2	0.75	0.29	8
2024-02-12 13:30	<1	<1	<2	0.8	0.19	7
2024-02-20 13:30	<1	<1	<2	0.71	0.16	6
2024-02-26 13:30	<1	<1	<2	0.62	0.14	6
2024-03-04 13:30	<1	<1	<2	0.66	0.18	6
2024-03-11 13:30	<1	<1	<2	0.81	0.25	7
2024-03-18 13:30	<1	<1	<2	0.63	0.16	6
2024-03-25 13:30	<1	<1	<2	0.56	0.2	6
2024-04-02 13:40	<1	<1	<2	0.48	0.58	7
2024-04-08 13:30	<1	<1	<2	0.78	0.2	7
2024-04-15 13:30	<1	<1	<2	0.71	0.16	7
2024-04-22 13:30	<1	<1	<2	0.91	0.17	9
2024-04-29 13:30	<1	<1	2	0.67	0.16	8
2024-05-06 13:30	<1	<1	<2	0.74	0.59	10
2024-05-13 13:30	<1	<1	<2	0.66	0.15	9
2024-05-21 13:30	<1	<1	<2	0.51	0.12	10
2024-05-27 13:30	<1	<1	<2	0.75	0.11	11
2024-06-03 13:30	<1	<1	<2	0.63	0.11	10
2024-06-10 13:30	<1	<1	<2	0.79	0.12	12
2024-06-17 13:30	<1	<1	<2	0.54	0.12	12
2024-06-24 13:30	<1	<1	<2	0.69	0.14	11
2024-07-02 13:30	<1	<1	<2	0.61	0.14	12
2024-07-08 13:30	<1	<1	<2	0.83	0.17	11
2024-07-15 13:30	<1	<1	<2	0.77	0.13	12
2024-07-22 13:30	<1	<1	<2	0.7	0.16	13
2024-07-29 13:30	<1	<1	<2	0.79	0.12	13
2024-08-07 13:30	<1	<1	<2	0.65	0.1	14
2024-08-12 13:00	<1	<1	38	0.62	0.11	15
2024-08-19 13:30	<1	<1	2	0.53	0.11	16
2024-08-26 13:30	<1	<1	<2	0.76	0.11	16
2024-09-03 13:30	<1	<1	<2	0.6	0.17	16
2024-09-09 13:30	<1	<1	6	0.62	0.13	16
2024-09-16 13:30	<1	<1	<2	0.71	0.11	16
2024-09-23 13:30	<1	<1	<2	0.83	0.25	16
2024-10-01 13:30	<1	<1	2	0.69	0.12	16
2024-10-07 13:30	<1	<1	2	0.71	0.16	16
2024-10-15 13:30	<1	<1	4	0.78	0.11	15
2024-10-21 13:30	<1	<1	<2	0.74	0.17	15
2024-10-28 13:30	<1	<1	2	0.62	0.18	12
2024-11-04 13:30	<1	<1	<2	0.61	0.17	12
2024-11-12 13:30	<1	<1	<2	0.69	0.13	10
2024-11-18 13:30	<1	<1	<2	0.57	0.11	10
2024-11-25 13:20	<1	<1	2	0.61	0.22	10
2024-12-02 13:30	<1	<1	<2	0.63	0.17	7
2024-12-09 13:30	<1	<1	<2	0.91	0.13	7
2024-12-16 13:30	<1	<1	<2	0.62	0.13	7
2024-12-23 13:30	<1	<1	NA	0.78	0.12	7
2024-12-30 13:30	<1	<1	NA	0.78	0.1	7

Water Sampling | Type: GRAB | Station Number: RMD-254 | Address: 5300 No. 3 Road

Sampled Date	Total Coliform (CFU/1000 ml)	E.coli (CFU/1000 ml)	HPC (CFU/ml)	Chlorine Free (mg/l)	Turbidity (NTU)	Temperature (C°)
2024-01-02 14:30	<1	<1	<2	0.6	0.22	8
2024-01-08 14:45	<1	<1	2	0.59	0.2	7
2024-01-15 14:30	<1	<1	<2	0.69	0.15	7
2024-01-22 14:30	<1	<1	<2	0.7	0.2	5
2024-01-29 14:30	<1	<1	2	0.76	0.23	6
2024-02-05 14:30	<1	<1	<2	0.69	0.17	8
2024-02-12 14:30	<1	<1	<2	0.61	0.26	7
2024-02-20 14:30	<1	<1	2	0.66	0.14	7
2024-02-26 14:25	<1	<1	<2	0.69	0.14	7
2024-03-04 14:25	<1	<1	2	0.65	0.2	7
2024-03-11 14:30	<1	<1	<2	0.74	0.26	7
2024-03-18 14:30	<1	<1	<2	0.76	0.44	6
2024-03-25 14:25	<1	<1	<2	0.5	0.14	7
2024-04-02 14:30	<1	<1	2	0.65	2.2	7
2024-04-08 14:25	<1	<1	<2	0.69	0.14	8
2024-04-15 14:30	<1	<1	2	0.62	0.11	8
2024-04-22 14:25	<1	<1	<2	0.62	0.12	9
2024-04-29 14:25	<1	<1	<2	0.66	0.11	10
2024-05-06 14:30	<1	<1	<2	0.78	0.52	10
2024-05-13 14:30	<1	<1	<2	0.6	0.14	10
2024-05-21 14:25	<1	<1	<2	0.54	0.11	10
2024-05-27 14:30	<1	<1	<2	0.81	0.09	10
2024-06-03 14:25	<1	<1	<2	0.56	0.1	12
2024-06-10 14:30	<1	<1	<2	0.65	0.1	11
2024-06-17 14:30	<1	<1	<2	0.58	0.12	12
2024-06-24 14:25	<1	<1	<2	0.7	0.12	13
2024-07-02 14:30	<1	<1	<2	0.73	0.09	13
2024-07-08 14:30	<1	<1	2	0.78	0.12	12
2024-07-15 14:30	<1	<1	<2	0.78	0.15	14
2024-07-22 14:30	<1	<1	6	0.72	0.14	14
2024-07-29 14:30	<1	<1	2	0.63	0.11	15
2024-08-07 14:30	<1	<1	14	0.7	0.09	13
2024-08-12 14:00	<1	<1	2	0.61	0.09	14
2024-08-19 14:25	<1	<1	10	0.63	0.19	18
2024-08-26 14:30	<1	<1	6	0.78	0.08	16
2024-09-03 14:25	<1	<1	6	0.56	0.08	17
2024-09-09 14:20	<1	<1	2	0.66	0.11	17
2024-09-16 14:30	<1	<1	4	0.68	0.11	15
2024-09-23 14:30	<1	<1	6	0.78	0.17	17
2024-10-01 14:30	<1	<1	<2	0.67	0.1	16
2024-10-07 14:30	<1	<1	<2	0.68	0.11	16
2024-10-15 14:30	<1	<1	<2	0.65	0.12	15
2024-10-21 14:25	<1	<1	<2	0.73	0.11	14
2024-10-28 14:30	<1	<1	<2	0.55	0.13	12
2024-11-04 14:30	<1	<1	<2	0.58	0.14	12
2024-11-12 14:30	<1	<1	<2	0.59	0.14	11
2024-11-18 14:30	<1	<1	<2	0.63	0.12	10
2024-11-25 14:10	<1	<1	<2	0.62	0.14	9
2024-12-02 14:30	<1	<1	4	0.68	0.12	9
2024-12-09 14:30	<1	<1	<2	1.04	0.14	9
2024-12-16 14:25	<1	<1	<2	0.79	0.2	8
2024-12-23 14:30	<1	<1	NA	0.82	0.1	7
2024-12-30 14:30	<1	<1	NA	0.78	0.09	7

PWT - 63

Water Sampling | Type: GRAB | Station Number: RMD-255 | Address: 6000 block Miller Road

Sampled Date	Total Coliform (CFU/1000 ml)	E.coli (CFU/1000 ml)	HPC (CFU/ml)	Chlorine Free (mg/l)	Turbidity (NTU)	Temperature (C°)
2024-01-02 15:00	<1	<1	<2	0.76	0.21	8
2024-01-08 15:15	<1	<1	<2	0.67	0.18	7
2024-01-15 15:00	<1	<1	<2	0.76	0.15	6
2024-01-22 15:00	<1	<1	<2	0.73	0.24	5
2024-01-29 15:00	<1	<1	<2	0.83	0.22	6
2024-02-05 15:00	<1	<1	<2	0.73	0.28	8
2024-02-12 15:00	<1	<1	<2	0.87	0.29	7
2024-02-20 15:00	<1	<1	<2	0.73	0.28	5
2024-02-26 14:55	<1	<1	<2	0.74	0.15	6
2024-03-04 14:55	<1	<1	4	0.71	0.25	6
2024-03-11 15:00	<1	<1	2	0.85	0.2	6
2024-03-18 15:00	<1	<1	<2	0.78	0.22	6
2024-03-25 14:55	<1	<1	<2	0.71	0.46	6
2024-04-02 15:00	<1	<1	<2	0.69	0.54	6
2024-04-08 14:55	<1	<1	2	0.68	1	7
2024-04-15 15:00	<1	<1	2	0.6	0.21	7
2024-04-22 14:55	<1	<1	<2	0.6	0.19	8
2024-04-29 14:55	<1	<1	<2	0.73	0.18	8
2024-05-06 15:00	<1	<1	<2	0.77	0.42	9
2024-05-13 15:00	<1	<1	<2	0.87	0.28	9
2024-05-21 14:55	<1	<1	<2	0.61	0.33	11
2024-05-27 15:00	<1	<1	<2	0.8	0.16	10
2024-06-03 14:55	<1	<1	<2	0.59	0.13	13
2024-06-10 15:00	<1	<1	<2	0.72	0.3	10
2024-06-17 15:00	<1	<1	<2	0.84	0.24	10
2024-06-24 14:55	<1	<1	<2	0.79	0.23	11
2024-07-02 15:00	<1	<1	4	0.94	0.19	12
2024-07-08 15:00	<1	<1	<2	0.93	0.23	11
2024-07-15 15:00	<1	<1	2	0.82	0.23	11
2024-07-22 15:00	<1	<1	2	0.78	0.26	12
2024-07-29 15:00	<1	<1	8	0.89	0.17	12
2024-08-07 15:00	<1	<1	<2	0.79	0.16	13
2024-08-12 15:10	<1	<1	<2	0.68	0.17	14
2024-08-19 14:55	2	<1	6	0.61	0.26	15
2024-08-26 15:00	<1	<1	4	0.87	0.14	15
2024-09-03 14:55	<1	<1	<2	0.64	0.25	16
2024-09-09 14:55	<1	<1	6	0.79	0.14	16
2024-09-16 15:00	<1	<1	<2	0.96	0.13	15
2024-09-23 15:00	<1	<1	<2	0.9	0.24	16
2024-10-01 15:00	<1	<1	<2	0.84	0.21	16
2024-10-07 15:00	<1	<1	4	0.93	0.18	15
2024-10-15 15:00	<1	<1	<2	0.88	0.22	15
2024-10-21 14:55	<1	<1	<2	0.84	0.3	14
2024-10-28 15:00	<1	<1	4	0.62	0.28	11
2024-11-04 15:00	<1	<1	2	0.59	0.24	10
2024-11-12 15:00	<1	<1	2	0.69	0.22	10
2024-11-18 15:00	<1	<1	<2	0.73	0.29	9
2024-11-25 14:40	<1	<1	<2	0.84	0.23	8
2024-12-02 15:00	<1	<1	<2	0.77	0.28	9
2024-12-09 15:00	<1	<1	2	1.35	0.27	8
2024-12-16 14:55	<1	<1	<2	0.91	0.49	6
2024-12-23 15:00	<1	<1	NA	0.84	0.46	6
2024-12-30 15:00	<1	<1	NA	0.79	0.35	6

Water Sampling | Type: GRAB | Station Number: RMD-256 | Address: 1000 block McDonald Road

Sampled Date	Total Coliform (CFU/1000 ml)	E.coli (CFU/1000 ml)	HPC (CFU/ml)	Chlorine Free (mg/l)	Turbidity (NTU)	Temperature (C°)
2024-01-02 14:45	<1	<1	<2	0.65	0.16	9
2024-01-08 15:00	<1	<1	<2	0.65	0.15	7
2024-01-15 14:45	<1	<1	2	0.63	0.12	6
2024-01-22 14:45	<1	<1	<2	0.71	0.15	5
2024-01-29 14:45	<1	<1	<2	0.68	0.49	7
2024-02-05 14:45	<1	<1	2	0.64	0.19	9
2024-02-12 14:45	<1	<1	<2	0.58	0.19	7
2024-02-20 14:45	<1	<1	<2	0.52	0.14	6
2024-02-26 14:40	<1	<1	<2	0.56	0.17	7
2024-03-04 14:40	<1	<1	<2	0.61	0.17	7
2024-03-11 14:45	<1	<1	<2	0.69	0.12	7
2024-03-18 14:45	<1	<1	<2	0.67	0.3	7
2024-03-25 14:40	<1	<1	<2	0.62	0.14	8
2024-04-02 14:45	<1	<1	<2	0.55	0.13	9
2024-04-08 14:40	<1	<1	2	0.66	0.36	8
2024-04-15 14:45	<1	<1	<2	0.5	0.09	9
2024-04-22 14:40	<1	<1	<2	0.71	0.16	9
2024-04-29 14:40	<1	<1	<2	0.54	0.14	10
2024-05-06 14:45	<1	<1	<2	0.58	0.12	11
2024-05-13 14:45	<1	<1	2	0.53	0.12	12
2024-05-21 14:40	<1	<1	2	0.48	0.11	14
2024-05-27 14:45	<1	<1	<2	0.65	0.08	13
2024-06-03 14:40	<1	<1	4	0.75	0.09	13
2024-06-10 14:45	<1	<1	<2	0.69	0.13	11
2024-06-17 14:45	<1	<1	<2	0.6	0.12	14
2024-06-24 14:40	<1	<1	<2	0.6	0.1	15
2024-07-02 14:45	<1	<1	2	0.49	0.09	17
2024-07-08 14:45	<1	<1	<2	0.63	0.13	16
2024-07-15 14:45	<1	<1	4	0.66	0.14	16
2024-07-22 14:45	<1	<1	<2	0.58	0.12	17
2024-07-29 14:45	<1	<1	2	0.66	0.1	17
2024-08-07 14:45	<1	<1	32	0.56	0.11	19
2024-08-12 14:50	<1	<1	2	0.61	0.11	19
2024-08-19 14:40	<1	<1	<2	0.64	0.1	20
2024-08-26 14:45	<1	<1	<2	0.6	0.08	18
2024-09-03 14:40	<1	<1	130	0.5	0.12	18
2024-09-09 14:40	<1	<1	6	0.59	0.12	19
2024-09-16 14:45	<1	<1	10	0.53	0.11	17
2024-09-23 14:45	<1	<1	30	0.55	0.16	18
2024-10-01 14:45	<1	<1	230	0.53	0.09	17
2024-10-07 14:45	<1	<1	10	0.57	0.11	16
2024-10-15 14:45	<1	<1	480	0.62	0.11	16
2024-10-21 14:40	<1	<1	220	0.52	0.16	15
2024-10-28 14:45	<1	<1	30	0.38	0.12	13
2024-11-04 14:45	<1	<1	4	0.44	0.15	13
2024-11-12 14:45	<1	<1	120	0.56	0.13	12
2024-11-18 14:45	<1	<1	92	0.45	0.1	11
2024-11-25 14:25	<1	<1	38	0.53	0.13	10
2024-12-02 14:45	<1	<1	8	0.65	0.16	9
2024-12-09 14:45	<1	<1	<2	0.65	0.1	8
2024-12-16 14:40	<1	<1	<2	0.63	0.13	8
2024-12-23 14:45	<1	<1	NA	0.62	0.12	8
2024-12-30 14:45	<1	<1	NA	0.59	0.21	8

PWT – 64

Water Sampling | Type: GRAB | Station Number: RMD-257 | Address: 6640 Blundell Road

Sampled Date	Total Coliform (CFU/1000 ml)	E.coli (CFU/1000 ml)	HPC (CFU/ml)	Chlorine Free (mg/l)	Turbidity (NTU)	Temperature (C°)
2024-01-03 15:40	<1	<1	2	0.72	0.23	7
2024-01-10 15:45	<1	<1	<2	0.63	0.17	8
2024-01-24 15:45	<1	<1	6	0.74	0.17	5
2024-01-31 15:45	<1	<1	<2	0.72	0.11	8
2024-02-07 15:45	<1	<1	<2	0.69	0.14	6
2024-02-14 15:45	<1	<1	<2	0.65	0.14	7
2024-02-21 15:45	<1	<1	4	0.64	0.13	6
2024-02-28 15:45	<1	<1	<2	0.63	0.13	6
2024-03-06 15:45	<1	<1	<2	0.64	0.18	8
2024-03-20 15:45	<1	<1	<2	0.74	0.22	7
2024-03-27 15:45	<1	<1	<2	0.85	0.15	7
2024-04-10 15:50	210	<1	4	0.71	0.15	7
2024-04-17 15:55	<1	<1	<2	0.65	0.14	8
2024-04-24 15:45	<1	<1	<2	0.63	0.11	8
2024-05-01 16:00	<1	<1	<2	0.7	0.13	8
2024-05-08 15:45	<1	<1	2	0.77	0.15	9
2024-05-15 15:45	<1	<1	<2	0.79	0.18	10
2024-05-22 15:45	<1	<1	<2	0.67	0.11	10
2024-05-29 15:45	<1	<1	<2	0.66	0.12	10
2024-06-05 15:45	<1	<1	<2	0.73	0.12	10
2024-06-12 15:45	<1	<1	<2	0.71	0.12	10
2024-06-19 15:45	<1	<1	<2	0.71	0.1	11
2024-06-26 15:45	<1	<1	2	0.64	0.11	11
2024-07-03 15:45	<1	<1	<2	0.71	0.11	11
2024-07-10 15:45	<1	<1	<2	0.72	0.15	12
2024-07-17 15:45	<1	<1	4	0.74	0.15	12
2024-07-24 09:30	<1	<1	<2	0.75	0.26	12
2024-07-31 16:00	<1	<1	2	0.73	0.2	13
2024-08-07 16:00	<1	<1	<2	0.73	0.1	15
2024-08-14 15:45	<1	<1	<2	0.72	0.09	16
2024-08-21 15:45	<1	<1	<2	0.74	0.1	15
2024-08-28 15:45	<1	<1	4	0.75	0.11	16
2024-09-04 15:45	<1	<1	<2	0.79	0.11	16
2024-09-11 15:45	<1	<1	2	0.65	0.09	17
2024-09-18 15:45	<1	<1	2	0.65	0.1	16
2024-09-25 15:45	<1	<1	<2	0.81	0.11	16
2024-10-02 15:45	<1	<1	<2	0.69	0.1	16
2024-10-09 15:45	<1	<1	<2	0.69	0.1	15
2024-10-16 15:45	<1	<1	14	0.83	0.1	15
2024-10-23 15:45	<1	<1	2	0.79	0.15	12
2024-10-30 15:45	<1	<1	<2	0.55	0.13	12
2024-11-07 15:45	<1	<1	<2	0.59	0.13	11
2024-11-13 15:45	<1	<1	<2	0.68	0.12	10
2024-11-20 15:45	<1	<1	<2	0.65	0.11	10
2024-11-27 15:45	<1	<1	<2	0.67	0.15	10
2024-12-04 15:45	<1	<1	<2	0.77	0.26	7
2024-12-11 15:40	<1	<1	<2	0.76	0.32	8
2024-12-18 15:45	<1	<1	<2	0.81	0.11	7
2024-12-23 15:45	<1	<1	NA	0.83	0.11	8
2024-12-31 11:30	<1	<1	NA	0.72	0.11	7

Water Sampling | Type: GRAB | Station Number: RMD-258 | Address: 7000 block Dyke Road

Sampled Date	Total Coliform (CFU/1000 ml)	E.coli (CFU/1000 ml)	HPC (CFU/ml)	Chlorine Free (mg/l)	Turbidity (NTU)	Temperature (C°)
2024-01-03 15:15	<1	<1	<2	0.71	0.21	8
2024-01-10 15:30	<1	<1	2	0.51	0.35	8
2024-01-24 15:25	<1	<1	<2	0.69	0.19	5
2024-01-31 15:30	<1	<1	<2	0.77	0.15	8
2024-02-07 15:25	<1	<1	<2	0.75	0.12	6
2024-02-14 15:30	<1	<1	<2	0.69	0.26	8
2024-02-21 15:25	<1	<1	<2	0.66	0.18	6
2024-02-28 15:25	<1	<1	<2	0.67	0.1	7
2024-03-06 15:25	<1	<1	<2	0.7	0.16	8
2024-03-20 15:25	<1	<1	<2	0.8	0.2	7
2024-03-27 15:30	<1	<1	<2	0.58	0.13	8
2024-04-10 15:30	<1	<1	<2	0.73	0.14	8
2024-04-17 15:40	<1	<1	<2	0.53	0.11	9
2024-04-24 15:25	<1	<1	<2	0.66	0.1	9
2024-05-01 15:40	<1	<1	2	0.67	0.12	9
2024-05-08 15:25	<1	<1	<2	0.68	0.1	10
2024-05-15 15:25	<1	<1	2	0.85	0.12	11
2024-05-22 15:25	<1	<1	<2	0.66	0.12	11
2024-05-29 15:25	<1	<1	4	0.57	0.13	11
2024-06-05 15:25	<1	<1	<2	0.68	0.11	11
2024-06-12 15:25	<1	<1	<2	0.76	0.14	12
2024-06-19 15:25	<1	<1	<2	0.66	0.13	11
2024-06-26 15:25	<1	<1	<2	0.64	0.17	13
2024-07-03 15:25	<1	<1	<2	0.65	0.1	14
2024-07-10 15:30	<1	<1	<2	0.56	0.13	16
2024-07-17 15:25	<1	<1	8	0.72	0.12	15
2024-07-24 10:20	<1	<1	8	0.73	0.14	15
2024-07-31 15:45	<1	<1	<2	0.66	0.07	15
2024-08-07 15:40	<1	<1	<2	0.74	0.1	15
2024-08-14 15:30	<1	<1	2	0.66	0.08	17
2024-08-21 15:30	<1	<1	2	0.59	0.08	17
2024-08-28 15:25	<1	<1	2	0.7	0.09	16
2024-09-04 15:25	<1	<1	8	0.68	0.08	17
2024-09-11 15:25	<1	<1	<2	0.64	0.08	17
2024-09-18 15:30	<1	<1	2	0.71	0.1	16
2024-09-25 15:25	<1	<1	2	0.76	0.13	17
2024-10-02 15:25	<1	<1	<2	0.63	0.11	16
2024-10-09 15:25	<1	<1	2	0.5	0.12	16
2024-10-16 15:30	<1	<1	<2	0.6	0.11	16
2024-10-23 15:25	<1	<1	<2	0.69	0.12	14
2024-10-30 15:25	<1	<1	2	0.5	0.14	11
2024-11-07 15:30	<1	<1	2	0.61	0.13	10
2024-11-13 15:30	<1	<1	<2	0.6	0.1	11
2024-11-20 15:30	<1	<1	<2	0.75	0.15	10
2024-11-27 15:30	<1	<1	2	0.57	0.14	10
2024-12-04 15:30	<1	<1	<2	0.79	0.17	8
2024-12-11 15:20	<1	<1	<2	0.91	0.15	8
2024-12-18 15:25	<1	<1	<2	0.73	0.09	8
2024-12-23 15:30	<1	<1	NA	0.76	0.2	7
2024-12-31 11:15	<1	<1	NA	0.74	0.09	7

PMT - 65

Water Sampling | Type: GRAB | Station Number: RMD-259 | Address: 10020 Amethyst Avenue

Sampled Date	Total Coliform (CFU/1000 ml)	E.coli (CFU/1000 ml)	HPC (CFU/ml)	Chlorine Free (mg/l)	Turbidity (NTU)	Temperature (C°)
2024-01-03 14:25	<1	<1	<2	0.66	0.19	8
2024-01-10 14:40	<1	<1	<2	0.6	0.17	8
2024-01-24 14:40	<1	<1	<2	0.7	0.21	6
2024-01-31 14:40	<1	<1	<2	0.7	0.16	8
2024-02-07 14:40	<1	<1	<2	0.61	0.14	7
2024-02-14 14:45	<1	<1	2	0.69	0.22	8
2024-02-21 14:40	<1	<1	4	0.64	0.12	6
2024-02-28 14:40	<1	<1	<2	0.64	0.27	7
2024-03-06 14:40	<1	<1	<2	0.61	0.16	7
2024-03-20 14:40	<1	<1	<2	0.71	0.27	7
2024-03-27 14:45	<1	<1	<2	0.57	0.13	9
2024-04-10 14:45	<1	<1	<2	0.72	0.13	8
2024-04-17 14:55	<1	<1	<2	0.7	0.12	9
2024-04-24 14:40	<1	<1	<2	0.67	0.09	10
2024-05-01 14:55	<1	<1	4	0.66	0.14	9
2024-05-08 14:40	<1	<1	<2	0.64	0.11	10
2024-05-15 14:40	<1	<1	<2	0.74	0.12	11
2024-05-22 14:40	<1	<1	<2	0.56	0.12	12
2024-05-29 14:40	<1	<1	2	0.53	0.1	12
2024-06-05 14:40	<1	<1	<2	0.71	0.12	11
2024-06-12 14:40	<1	<1	<2	0.69	0.12	13
2024-06-19 14:40	<1	<1	<2	0.65	0.11	13
2024-06-26 14:40	<1	<1	4	0.65	0.1	14
2024-07-03 14:40	<1	<1	16	0.58	0.1	15
2024-07-10 14:40	<1	<1	18	0.59	0.12	13
2024-07-17 14:40	<1	<1	46	0.73	0.1	14
2024-07-24 10:45	<1	<1	60	0.69	0.12	14
2024-07-31 15:00	<1	<1	68	0.63	0.1	16
2024-08-07 14:50	<1	<1	50	0.65	0.11	14
2024-08-14 14:40	<1	<1	64	0.66	0.08	18
2024-08-21 14:40	<1	<1	84	0.63	0.08	17
2024-08-28 14:40	<1	<1	34	0.65	0.1	17
2024-09-04 14:40	<1	<1	24	0.64	0.08	17
2024-09-11 14:40	<1	<1	44	0.77	0.11	18
2024-09-18 14:40	<1	<1	16	0.58	0.09	15
2024-09-25 14:40	<1	<1	<2	0.75	0.09	17
2024-10-02 14:40	<1	<1	16	0.52	0.1	16
2024-10-09 14:40	<1	<1	10	0.69	0.28	15
2024-10-16 14:40	<1	<1	10	0.71	0.17	16
2024-10-23 14:40	<1	<1	<2	0.72	0.14	14
2024-10-30 14:40	<1	<1	6	0.5	0.13	11
2024-11-07 14:40	<1	<1	2	0.52	0.13	12
2024-11-13 14:40	<1	<1	6	0.72	0.13	11
2024-11-20 14:40	<1	<1	<2	0.6	0.11	10
2024-11-27 14:40	<1	<1	12	0.69	0.16	10
2024-12-04 14:40	<1	<1	<2	0.67	0.17	9
2024-12-11 14:40	<1	<1	<2	0.84	0.18	8
2024-12-18 14:40	<1	<1	<2	0.8	0.1	8
2024-12-23 14:40	<1	<1	NA	0.74	0.1	8
2024-12-31 10:30	<1	<1	NA	0.62	0.1	8

Water Sampling | Type: GRAB | Station Number: RMD-260 | Address: 11111 Horseshoe Way

Sampled Date	Total Coliform (CFU/1000 ml)	E.coli (CFU/1000 ml)	HPC (CFU/ml)	Chlorine Free (mg/l)	Turbidity (NTU)	Temperature (C°)
2024-01-03 14:10	<1	<1	2	0.74	0.29	7
2024-01-10 14:25	<1	<1	4	0.67	0.17	8
2024-01-24 14:25	<1	<1	<2	0.71	0.16	5
2024-01-31 14:25	<1	<1	<2	0.81	0.21	7
2024-02-07 14:25	<1	<1	<2	0.69	0.18	6
2024-02-14 14:30	<1	<1	<2	0.64	0.15	8
2024-02-21 14:25	<1	<1	2	0.75	0.21	6
2024-02-28 14:25	<1	<1	<2	0.64	0.15	6
2024-03-06 14:25	<1	<1	<2	0.7	0.17	6
2024-03-20 14:25	<1	<1	<2	0.74	0.24	6
2024-03-27 14:30	<1	<1	<2	0.63	0.14	7
2024-04-10 14:25	<1	<1	2	0.69	0.18	7
2024-04-17 14:40	<1	<1	<2	0.74	0.16	7
2024-04-24 14:25	<1	<1	<2	0.75	0.12	8
2024-05-01 14:40	<1	<1	<2	0.69	0.15	8
2024-05-08 14:25	<1	<1	<2	0.7	0.16	9
2024-05-15 14:25	<1	<1	<2	0.82	0.22	9
2024-05-22 14:25	<1	<1	6	0.66	0.12	10
2024-05-29 14:25	<1	<1	6	0.68	0.1	10
2024-06-05 14:25	<1	<1	<2	0.76	0.14	10
2024-06-12 14:25	<1	<1	<2	0.7	0.14	10
2024-06-19 14:25	<1	<1	<2	0.65	0.11	11
2024-06-26 14:25	<1	<1	4	0.74	0.14	11
2024-07-03 14:25	<1	<1	4	0.68	0.12	11
2024-07-10 14:25	<1	<1	<2	0.77	0.12	12
2024-07-17 14:25	<1	<1	2	0.79	0.12	12
2024-07-24 11:15	<1	<1	2	0.77	0.13	12
2024-07-31 14:45	<1	<1	4	0.71	0.1	14
2024-08-07 14:35	<1	<1	<2	0.86	0.11	14
2024-08-14 14:25	<1	<1	2	0.73	0.11	16
2024-08-21 14:25	<1	<1	8	0.71	0.1	16
2024-08-28 14:25	<1	<1	4	0.71	0.12	16
2024-09-04 14:25	<1	<1	<2	0.75	0.11	17
2024-09-11 14:25	<1	<1	<2	0.71	0.09	17
2024-09-18 14:25	<1	<1	<2	0.64	0.11	15
2024-09-25 14:25	<1	<1	<2	0.75	0.14	16
2024-10-02 14:25	<1	<1	<2	0.64	0.12	16
2024-10-09 14:25	<1	<1	<2	0.72	0.12	15
2024-10-16 14:25	<1	<1	2	0.57	0.1	15
2024-10-23 14:25	<1	<1	<2	0.74	0.12	13
2024-10-30 14:25	<1	<1	8	0.67	0.14	11
2024-11-07 14:25	<1	<1	8	0.61	0.13	11
2024-11-13 14:25	<1	<1	28	0.59	0.1	10
2024-11-20 14:25	<1	<1	<2	0.65	0.13	9
2024-11-27 14:25	<1	<1	6	0.56	0.11	8
2024-12-04 14:25	<1	<1	<2	0.76	0.34	7
2024-12-11 14:25	<1	<1	<2	0.86	0.17	7
2024-12-18 14:25	<1	<1	2	0.91	0.12	7
2024-12-23 14:25	<1	<1	NA	0.89	0.11	7
2024-12-31 10:15	<1	<1	NA	0.77	0.09	7

PMT_96

Water Sampling | Type: GRAB | Station Number: RMD-261 | Address: 9911 Sidaway Road

Sampled Date	Total Coliform (CFU/1000 ml)	E.coli (CFU/1000 ml)	HPC (CFU/ml)	Chlorine Free (mg/l)	Turbidity (NTU)	Temperature (C°)
2024-01-03 13:55	<1	<1	<2	0.65	0.24	8
2024-01-10 14:10	<1	<1	<2	0.66	0.15	7
2024-01-24 14:10	<1	<1	<2	0.55	0.16	5
2024-01-31 14:10	<1	<1	2	0.67	0.19	8
2024-02-07 14:10	<1	<1	<2	0.73	0.13	6
2024-02-14 14:15	<1	<1	2	0.61	0.14	7
2024-02-21 14:10	<1	<1	<2	0.61	0.14	6
2024-02-28 14:10	<1	<1	<2	0.66	0.23	7
2024-03-06 14:10	<1	<1	<2	0.65	0.17	6
2024-03-20 14:10	<1	<1	<2	0.83	0.24	6
2024-03-27 14:15	<1	<1	<2	0.71	0.14	8
2024-04-10 14:10	<1	<1	2	0.61	0.1	7
2024-04-17 14:25	<1	<1	<2	0.67	0.38	7
2024-04-24 14:10	<1	<1	<2	0.71	0.09	9
2024-05-01 14:25	<1	<1	2	0.61	0.11	9
2024-05-08 14:10	<1	<1	4	0.61	0.12	9
2024-05-15 14:10	<1	<1	<2	0.6	0.15	10
2024-05-22 14:10	<1	<1	<2	0.66	0.24	11
2024-05-29 14:10	<1	<1	<2	0.75	0.11	10
2024-06-05 14:10	<1	<1	<2	0.51	0.11	11
2024-06-12 14:10	<1	<1	<2	0.69	0.14	10
2024-06-19 14:10	<1	<1	<2	0.59	0.08	12
2024-06-26 14:10	<1	<1	6	0.53	0.19	12
2024-07-03 14:10	<1	<1	<2	0.57	0.18	13
2024-07-10 14:10	<1	<1	2	0.52	0.09	13
2024-07-17 14:10	<1	<1	<2	0.59	0.11	13
2024-07-24 13:30	<1	<1	8	0.63	0.15	14
2024-07-31 14:30	<1	<1	<2	0.66	0.08	15
2024-08-07 14:20	<1	<1	2	0.63	0.1	15
2024-08-14 14:10	<1	<1	<2	0.65	0.09	17
2024-08-21 14:10	<1	<1	2	0.67	0.08	16
2024-08-28 14:10	<1	<1	<2	0.66	0.1	16
2024-09-04 14:10	<1	<1	2	0.63	0.09	17
2024-09-11 14:10	<1	<1	2	0.69	0.1	17
2024-09-18 14:10	<1	<1	<2	0.57	0.09	16
2024-09-25 14:10	<1	<1	2	0.72	0.11	16
2024-10-02 14:10	<1	<1	4	0.64	0.08	16
2024-10-09 14:10	<1	<1	2	0.67	0.11	15
2024-10-16 14:10	<1	<1	2	0.6	0.14	15
2024-10-23 14:10	<1	<1	<2	0.7	0.18	13
2024-10-30 14:10	<1	<1	8	0.6	0.16	11
2024-11-07 14:00	<1	<1	2	0.57	0.11	12
2024-11-13 14:10	<1	<1	<2	0.55	0.12	11
2024-11-20 14:10	<1	<1	2	0.63	0.21	9
2024-11-27 14:10	<1	<1	8	0.76	0.19	9
2024-12-04 14:10	<1	<1	<2	0.69	0.32	7
2024-12-11 14:10	<1	<1	<2	0.66	0.13	7
2024-12-18 14:10	<1	<1	<2	0.76	0.1	7
2024-12-23 14:10	<1	<1	NA	0.7	0.13	7
2024-12-31 10:00	<1	<1	NA	0.56	0.09	7

Water Sampling | Type: GRAB | Station Number: RMD-262 | Address: 13799 Commerce Parkway

Sampled Date	Total Coliform (CFU/1000 ml)	E.coli (CFU/1000 ml)	HPC (CFU/ml)	Chlorine Free (mg/l)	Turbidity (NTU)	Temperature (C°)
2024-01-03 13:15	<1	<1	<2	0.72	0.15	7
2024-01-10 13:15	<1	<1	<2	0.66	0.14	7
2024-01-24 13:20	<1	<1	<2	0.66	0.13	5
2024-01-31 13:15	<1	<1	<2	0.7	0.13	8
2024-02-07 13:20	<1	<1	<2	0.7	0.12	6
2024-02-14 13:15	<1	<1	<2	0.63	0.12	7
2024-02-21 13:20	<1	<1	<2	0.63	0.14	6
2024-02-28 13:15	<1	<1	<2	0.7	0.15	6
2024-03-06 13:20	<1	<1	<2	0.71	0.24	6
2024-03-20 13:15	<1	<1	<2	0.74	0.19	7
2024-03-27 13:20	<1	<1	<2	0.68	0.12	8
2024-04-10 13:15	<1	<1	4	0.62	0.19	7
2024-04-17 13:30	<1	<1	<2	0.62	0.13	8
2024-04-24 13:20	<1	<1	<2	0.67	0.1	9
2024-05-01 13:30	<1	<1	<2	0.65	0.1	9
2024-05-08 13:15	<1	<1	<2	0.68	0.13	9
2024-05-15 13:15	<1	<1	<2	0.82	0.26	10
2024-05-22 13:00	<1	<1	<2	0.68	0.22	11
2024-05-29 13:20	<1	<1	<2	0.74	0.1	10
2024-06-05 13:15	<1	<1	2	0.75	0.13	11
2024-06-12 13:15	<1	<1	<2	0.54	0.27	11
2024-06-19 13:20	<1	<1	<2	0.58	0.13	11
2024-06-26 13:20	<1	<1	<2	0.61	0.2	12
2024-07-03 13:20	<1	<1	<2	0.71	0.18	12
2024-07-10 13:15	<1	<1	4	0.73	0.1	13
2024-07-17 13:20	<1	<1	2	0.72	0.14	13
2024-07-24 13:15	<1	<1	<2	0.67	0.18	14
2024-07-31 13:45	<1	<1	2	0.7	0.08	15
2024-08-07 13:20	<1	<1	2	0.74	0.11	15
2024-08-14 13:15	<1	<1	<2	0.67	0.17	17
2024-08-21 13:15	<1	<1	4	0.71	0.09	16
2024-08-28 13:20	<1	<1	4	0.75	0.1	16
2024-09-04 13:15	<1	<1	2	0.61	0.12	17
2024-09-11 13:15	<1	<1	2	0.64	0.1	17
2024-09-18 13:15	<1	<1	<2	0.62	0.09	17
2024-09-25 13:20	<1	<1	<2	0.73	0.1	16
2024-10-02 13:20	<1	<1	<2	0.61	0.1	16
2024-10-09 13:15	<1	<1	2	0.67	0.12	15
2024-10-16 13:15	<1	<1	10	0.7	0.2	15
2024-10-23 13:20	<1	<1	<2	0.6	0.13	13
2024-10-30 13:20	<1	<1	4	0.69	0.13	12
2024-11-07 13:15	<1	<1	<2	0.71	0.15	10
2024-11-13 13:15	<1	<1	<2	0.62	0.11	11
2024-11-20 13:15	<1	<1	<2	0.67	0.11	9
2024-11-27 13:15	<1	<1	2	0.98	0.2	8
2024-12-04 13:15	<1	<1	<2	0.74	0.31	7
2024-12-11 13:15	<1	<1	<2	0.65	0.13	7
2024-12-18 13:20	<1	<1	<2	0.77	0.13	7
2024-12-23 13:15	<1	<1	NA	0.62	0.13	7
2024-12-31 08:50	<1	<1	NA	0.57	0.1	8

PMT - 67

Water Sampling | Type: GRAB | Station Number: RMD-263 | Address: 12560 Cambie Road

Sampled Date	Total Coliform (CFU/1000 ml)	E.coli (CFU/1000 ml)	HPC (CFU/ml)	Chlorine Free (mg/l)	Turbidity (NTU)	Temperature (C°)
2024-01-03 12:30	<1	<1	<2	0.7	0.22	8
2024-01-10 12:30	<1	<1	<2	0.65	0.12	7
2024-01-24 12:30	<1	<1	<2	0.73	0.13	5
2024-01-31 12:30	<1	<1	<2	0.8	0.16	7
2024-02-07 12:30	<1	<1	<2	0.69	0.13	7
2024-02-14 12:30	<1	<1	<2	0.67	0.15	7
2024-02-21 12:30	<1	<1	<2	0.69	0.16	6
2024-02-28 12:30	<1	<1	<2	0.64	0.12	6
2024-03-06 12:30	<1	<1	<2	0.69	0.19	6
2024-03-20 12:30	<1	<1	<2	0.73	0.22	6
2024-03-27 12:30	<1	<1	<2	0.74	0.14	8
2024-04-10 12:30	<1	<1	<2	0.65	0.14	7
2024-04-17 12:30	<1	<1	<2	0.78	0.14	7
2024-04-24 12:30	<1	<1	<2	0.89	0.11	8
2024-05-01 12:45	<1	<1	2	0.73	0.12	9
2024-05-08 12:30	<1	<1	<2	0.73	0.14	9
2024-05-15 12:30	<1	<1	<2	0.71	0.18	10
2024-05-22 13:50	<1	<1	<2	0.65	0.12	11
2024-05-29 12:30	<1	<1	<2	0.62	0.1	11
2024-06-05 12:30	<1	<1	<2	0.7	0.11	11
2024-06-12 12:30	<1	<1	16	0.71	0.14	11
2024-06-19 12:30	<1	<1	18	0.63	0.11	11
2024-06-26 12:30	<1	<1	14	0.71	0.13	12
2024-07-03 12:30	<1	<1	26	0.65	0.14	12
2024-07-10 12:30	<1	<1	<2	0.76	0.12	12
2024-07-17 12:30	<1	<1	<2	0.81	0.15	13
2024-07-24 12:30	<1	<1	<2	0.72	0.28	14
2024-07-31 13:00	<1	<1	2	0.69	0.1	14
2024-08-07 12:30	<1	<1	46	0.69	0.12	15
2024-08-14 12:30	<1	<1	<2	0.75	0.12	16
2024-08-21 12:30	<1	<1	44	0.65	0.08	16
2024-08-28 12:30	<1	<1	26	0.66	0.12	16
2024-09-04 12:30	<1	<1	20	0.6	0.1	17
2024-09-11 12:30	<1	<1	20	0.73	0.1	17
2024-09-18 12:30	<1	<1	46	0.76	0.11	17
2024-09-25 12:30	<1	<1	12	0.73	0.11	17
2024-10-02 12:30	<1	<1	16	0.64	0.1	16
2024-10-09 12:30	<1	<1	12	0.77	0.12	15
2024-10-16 12:30	<1	<1	14	0.76	0.25	15
2024-10-23 12:30	<1	<1	2	0.62	0.14	13
2024-10-30 12:30	<1	<1	4	0.51	0.14	12
2024-11-07 12:30	<1	<1	4	0.63	0.18	11
2024-11-13 12:30	<1	<1	<2	0.56	0.12	10
2024-11-20 12:30	<1	<1	<2	0.65	0.13	9
2024-11-27 12:30	<1	<1	<2	0.76	0.18	8
2024-12-04 12:30	<1	<1	<2	0.76	0.2	8
2024-12-11 12:30	<1	<1	<2	0.75	0.15	7
2024-12-18 12:30	<1	<1	<2	0.73	0.11	7
2024-12-23 12:30	<1	<1	NA	0.76	0.11	7
2024-12-31 08:00	<1	<1	NA	0.72	0.12	7

Water Sampling | Type: GRAB | Station Number: RMD-264 | Address: 13100 Mitchell Road

Sampled Date	Total Coliform (CFU/1000 ml)	E.coli (CFU/1000 ml)	HPC (CFU/ml)	Chlorine Free (mg/l)	Turbidity (NTU)	Temperature (C°)
2024-01-03 12:45	<1	<1	<2	0.74	0.27	8
2024-01-10 12:45	<1	<1	<2	0.69	0.14	7
2024-01-24 13:00	<1	<1	<2	0.77	0.16	5
2024-01-31 12:45	<1	<1	<2	0.74	0.15	8
2024-02-07 13:00	<1	<1	<2	0.67	0.19	6
2024-02-14 13:00	<1	<1	<2	0.64	0.14	8
2024-02-21 13:00	<1	<1	<2	0.68	0.33	6
2024-02-28 13:00	<1	<1	<2	0.68	0.16	7
2024-03-06 13:00	<1	<1	2	0.66	0.17	6
2024-03-20 12:45	<1	<1	2	0.81	0.22	7
2024-03-27 13:05	<1	<1	2	0.61	0.13	8
2024-04-10 13:00	<1	<1	2	0.71	0.14	7
2024-04-17 13:15	<1	<1	<2	0.75	0.14	8
2024-04-24 13:00	<1	<1	<2	0.69	0.12	9
2024-05-01 13:15	<1	<1	<2	0.76	0.12	10
2024-05-08 13:00	<1	<1	<2	0.64	0.13	9
2024-05-15 12:45	<1	<1	4	0.87	0.19	10
2024-05-22 13:30	<1	<1	<2	0.65	0.13	11
2024-05-29 13:00	<1	<1	<2	0.57	0.19	11
2024-06-05 12:45	<1	<1	<2	0.72	0.12	11
2024-06-12 12:45	<1	<1	<2	0.66	0.15	11
2024-06-19 13:00	<1	<1	<2	0.6	0.12	11
2024-06-26 13:00	<1	<1	2	0.78	0.15	12
2024-07-03 13:00	<1	<1	<2	0.6	0.13	13
2024-07-10 12:45	<1	<1	<2	0.64	0.11	12
2024-07-17 13:00	<1	<1	2	0.77	0.19	13
2024-07-24 13:00	<1	<1	<2	0.65	0.21	14
2024-07-31 13:30	<1	<1	<2	0.71	0.11	15
2024-08-07 13:00	<1	<1	<2	0.77	0.11	15
2024-08-14 13:00	<1	<1	4	0.73	0.15	16
2024-08-21 12:45	<1	<1	52	0.64	0.11	16
2024-08-28 13:00	<1	<1	18	0.7	0.09	16
2024-09-04 12:45	<1	<1	4	0.66	0.11	17
2024-09-11 12:45	<1	<1	<2	0.68	0.1	17
2024-09-18 12:45	<1	<1	2	0.57	0.11	16
2024-09-25 13:00	<1	<1	<2	0.83	0.16	17
2024-10-02 13:00	<1	<1	<2	0.69	0.12	16
2024-10-09 12:45	<1	<1	2	0.73	0.11	15
2024-10-16 12:45	<1	<1	2	0.88	0.14	15
2024-10-23 13:00	<1	<1	16	0.73	0.15	13
2024-10-30 13:00	<1	<1	28	0.47	0.14	12
2024-11-07 12:45	<1	<1	<2	0.61	0.17	11
2024-11-13 12:45	<1	<1	2	0.59	0.13	10
2024-11-20 12:45	<1	<1	<2	0.54	0.12	10
2024-11-27 12:45	<1	<1	2	0.65	0.17	9
2024-12-04 12:45	<1	<1	<2	0.69	0.21	8
2024-12-11 13:00	<1	<1	<2	0.79	0.15	8
2024-12-18 13:00	<1	<1	<2	0.63	0.12	8
2024-12-23 12:45	<1	<1	NA	0.5	0.13	8
2024-12-31 08:15	<1	<1	NA	0.51	0.11	8

PWT_68

Water Sampling | Type: GRAB | Station Number: RMD-266 | Address: 9380 General Currie Road

Sampled Date	Total Coliform (CFU/1000 ml)	E.coli (CFU/1000 ml)	HPC (CFU/ml)	Chlorine Free (mg/l)	Turbidity (NTU)	Temperature (C°)
2024-01-03 14:40	<1	<1	<2	0.7	0.22	7
2024-01-10 14:55	<1	<1	<2	0.67	0.16	8
2024-01-24 14:55	<1	<1	<2	0.65	0.25	5
2024-01-31 14:55	<1	<1	<2	0.67	0.2	8
2024-02-07 14:55	<1	<1	<2	0.62	0.15	6
2024-02-14 15:00	<1	<1	<2	0.68	0.2	7
2024-02-21 14:55	<1	<1	<2	0.66	0.13	6
2024-02-28 14:55	<1	<1	<2	0.75	0.14	6
2024-03-06 14:55	<1	<1	<2	0.66	0.15	6
2024-03-20 14:55	<1	<1	2	0.75	0.21	6
2024-03-27 15:00	<1	<1	<2	0.66	0.16	7
2024-04-10 15:00	<1	<1	<2	0.77	0.17	7
2024-04-17 15:10	<1	<1	<2	0.67	0.19	8
2024-04-24 14:55	<1	<1	<2	0.75	0.11	9
2024-05-01 15:10	<1	<1	<2	0.73	0.13	9
2024-05-08 14:55	<1	<1	<2	0.74	0.16	9
2024-05-15 14:55	<1	<1	<2	0.82	0.21	9
2024-05-22 14:55	<1	<1	2	0.63	0.12	11
2024-05-29 14:55	<1	<1	2	0.62	0.12	11
2024-06-05 14:55	<1	<1	<2	0.77	0.12	11
2024-06-12 14:55	<1	<1	<2	0.71	0.14	10
2024-06-19 14:55	<1	<1	<2	0.66	0.12	11
2024-06-26 14:55	<1	<1	<2	0.69	0.19	12
2024-07-03 14:55	<1	<1	<2	0.7	0.13	12
2024-07-10 14:55	<1	<1	<2	0.64	0.12	12
2024-07-17 14:55	<1	<1	2	0.82	0.14	13
2024-07-24 11:00	<1	<1	2	0.79	0.16	13
2024-07-31 15:15	<1	<1	<2	0.73	0.1	14
2024-08-07 15:05	<1	<1	<2	0.85	0.12	15
2024-08-14 14:55	<1	<1	2	0.7	0.12	17
2024-08-21 14:55	<1	<1	2	0.65	0.08	16
2024-08-28 14:55	<1	<1	<2	0.77	0.12	16
2024-09-04 14:55	<1	<1	<2	0.62	0.1	17
2024-09-11 14:55	<1	<1	8	0.68	0.08	17
2024-09-18 14:55	<1	<1	<2	0.75	0.11	17
2024-09-25 14:55	<1	<1	<2	0.8	0.1	17
2024-10-02 14:55	<1	<1	<2	0.62	0.11	16
2024-10-09 14:55	<1	<1	<2	0.73	0.12	15
2024-10-16 14:55	<1	<1	<2	0.87	0.32	15
2024-10-23 14:55	<1	<1	<2	0.77	0.18	13
2024-10-30 14:55	<1	<1	<2	0.53	0.16	12
2024-11-07 14:55	<1	<1	<2	0.58	0.13	11
2024-11-13 14:55	<1	<1	<2	0.7	0.14	12
2024-11-20 14:55	<1	<1	<2	0.63	0.12	9
2024-11-27 14:55	<1	<1	<2	0.71	0.13	9
2024-12-04 14:55	<1	<1	<2	0.82	0.25	7
2024-12-11 14:55	<1	<1	<2	0.96	0.14	7
2024-12-18 14:55	<1	<1	<2	0.88	0.11	7
2024-12-23 14:55	<1	<1	NA	0.84	0.14	7
2024-12-31 10:45	<1	<1	NA	0.77	0.1	7

Water Sampling | Type: GRAB | Station Number: RMD-267 | Address: 17240 Fedoruk Road

Sampled Date	Total Coliform (CFU/1000 ml)	E.coli (CFU/1000 ml)	HPC (CFU/ml)	Chlorine Free (mg/l)	Turbidity (NTU)	Temperature (C°)
2024-01-05 10:10	<1	<1	4	0.5	0.24	10
2024-01-11 10:15	<1	<1	<2	0.63	0.15	6
2024-01-25 10:00	<1	<1	<2	0.7	0.13	7
2024-02-02 10:10	<1	<1	2	0.62	0.18	8
2024-02-08 10:15	<1	<1	<2	0.67	0.2	8
2024-02-16 10:10	<1	<1	<2	0.64	0.19	6
2024-02-22 10:10	<1	<1	<2	0.66	0.33	7
2024-03-01 10:00	<1	<1	<2	0.63	0.15	7
2024-03-07 10:15	<1	<1	<2	0.6	0.2	6
2024-03-15 10:00	<1	<1	4	0.78	0.11	7
2024-03-21 10:00	<1	<1	<2	0.75	0.3	11
2024-03-28 10:00	<1	<1	<2	0.73	0.17	7
2024-04-04 10:20	<1	<1	<2	0.76	0.12	9
2024-04-12 10:15	<1	<1	<2	0.75	0.1	8
2024-04-18 10:30	<1	<1	<2	0.62	0.1	9
2024-04-26 10:00	<1	<1	<2	0.64	0.1	10
2024-05-02 10:30	<1	<1	<2	0.57	0.11	10
2024-05-10 10:10	<1	<1	<2	0.77	0.13	10
2024-05-16 10:10	<1	<1	<2	0.7	0.14	11
2024-05-24 10:10	<1	<1	2	0.7	0.13	11
2024-05-30 10:00	<1	<1	2	0.74	0.14	11
2024-06-07 10:10	<1	<1	<2	0.66	0.17	11
2024-06-13 10:00	<1	<1	<2	0.74	0.14	12
2024-06-21 10:10	<1	<1	<2	0.61	0.16	13
2024-06-27 10:15	<1	<1	2	0.57	0.35	13
2024-07-05 10:10	<1	<1	2	0.65	0.14	13
2024-07-11 10:10	<1	<1	10	0.54	0.11	14
2024-07-25 10:15	<1	<1	6	0.7	0.13	15
2024-08-02 10:10	<1	<1	<2	0.68	0.1	15
2024-08-07 14:50	<1	<1	2	0.64	0.11	17
2024-08-16 10:50	<1	<1	<2	0.61	0.09	18
2024-08-22 10:00	<1	<1	6	0.66	0.1	17
2024-08-30 10:15	<1	<1	2	0.63	0.11	16
2024-09-05 10:30	<1	<1	<2	0.64	0.11	17
2024-09-13 10:10	<1	<1	<2	0.75	0.1	17
2024-09-19 10:00	<1	<1	6	0.68	0.11	17
2024-09-27 10:10	<1	<1	6	0.71	0.12	17
2024-10-11 10:30	<1	<1	2	0.75	0.17	15
2024-10-17 10:00	<1	<1	40	0.63	0.21	16
2024-10-25 10:00	<1	<1	2	0.61	0.27	12
2024-10-31 10:10	<1	<1	2	0.72	0.12	11
2024-11-08 10:00	<1	<1	32	0.6	0.14	10
2024-11-14 10:00	<1	<1	14	0.64	0.14	11
2024-11-22 10:00	<1	<1	14	0.53	0.14	10
2024-11-28 10:00	<1	<1	4	0.77	0.19	9
2024-12-06 10:10	<1	<1	8	0.66	0.16	7
2024-12-12 10:30	<1	<1	<2	0.64	0.15	7
2024-12-20 10:10	<1	<1	NA	0.71	0.12	8
2024-12-23 10:00	<1	<1	NA	0.62	0.1	7

PMT - 69

Water Sampling | Type: GRAB | Station Number: RMD-268 | Address: 13800 No. 3 Road

Sampled Date	Total Coliform (CFU/1000 ml)	E.coli (CFU/1000 ml)	HPC (CFU/ml)	Chlorine Free (mg/l)	Turbidity (NTU)	Temperature (C°)
2024-01-03 15:00	<1	<1	<2	0.66	0.18	8
2024-01-10 15:15	<1	<1	<2	0.64	0.14	8
2024-01-24 15:10	<1	<1	<2	0.71	0.15	5
2024-01-31 15:15	<1	<1	<2	0.7	0.17	8
2024-02-07 15:10	<1	<1	<2	0.66	0.1	6
2024-02-14 15:15	<1	<1	<2	0.7	0.16	8
2024-02-21 15:10	<1	<1	<2	0.65	0.14	6
2024-02-28 15:10	<1	<1	<2	0.68	0.12	7
2024-03-06 15:10	<1	<1	<2	0.68	0.16	7
2024-03-20 15:10	<1	<1	<2	0.79	0.18	7
2024-03-27 15:15	<1	<1	<2	0.54	0.16	8
2024-04-10 15:15	<1	<1	<2	0.65	0.14	8
2024-04-17 15:25	<1	<1	<2	0.71	0.15	8
2024-04-24 15:10	<1	<1	<2	0.71	0.11	9
2024-05-01 15:25	<1	<1	<2	0.74	0.11	9
2024-05-08 15:10	<1	<1	<2	0.69	0.1	10
2024-05-15 15:10	<1	<1	<2	0.78	0.16	10
2024-05-22 15:10	<1	<1	<2	0.61	0.13	11
2024-05-29 15:10	<1	<1	2	0.56	0.1	11
2024-06-05 15:10	<1	<1	<2	0.69	0.11	11
2024-06-12 15:10	<1	<1	<2	0.71	0.16	11
2024-06-19 15:10	<1	<1	<2	0.65	0.12	11
2024-06-26 15:10	<1	<1	<2	0.72	1.7	12
2024-07-03 15:10	<1	<1	2	0.69	0.09	12
2024-07-10 15:15	<1	<1	<2	0.6	0.1	13
2024-07-17 15:10	<1	<1	4	0.68	0.12	13
2024-07-24 10:30	<1	<1	2	0.7	0.12	14
2024-07-31 15:30	<1	<1	<2	0.67	0.08	15
2024-08-07 15:20	<1	<1	<2	0.79	0.09	15
2024-08-14 15:15	<1	<1	<2	0.73	0.08	16
2024-08-21 15:15	<1	<1	<2	0.61	0.09	17
2024-08-28 15:10	<1	<1	6	0.61	0.09	16
2024-09-04 15:10	<1	<1	<2	0.65	0.09	17
2024-09-11 15:10	<1	<1	<2	0.62	0.08	17
2024-09-18 15:15	<1	<1	<2	0.7	0.43	17
2024-09-25 15:10	<1	<1	<2	0.8	0.11	17
2024-10-02 15:10	<1	<1	<2	0.6	0.09	16
2024-10-09 15:00	<1	<1	2	0.73	0.57	15
2024-10-16 15:15	<1	<1	4	0.64	0.1	15
2024-10-23 15:10	<1	<1	2	0.69	0.11	14
2024-10-30 15:10	<1	<1	<2	0.49	0.17	12
2024-11-07 15:15	<1	<1	<2	0.61	0.13	11
2024-11-13 15:15	<1	<1	<2	0.6	0.12	11
2024-11-20 15:15	<1	<1	<2	0.71	0.1	10
2024-11-27 15:15	<1	<1	<2	0.72	0.11	10
2024-12-04 15:15	<1	<1	<2	0.74	0.17	8
2024-12-11 15:10	<1	<1	<2	0.92	0.15	8
2024-12-18 15:10	<1	<1	<2	0.75	0.1	8
2024-12-23 15:15	<1	<1	NA	0.68	0.12	8
2024-12-31 11:00	<1	<1	NA	0.73	0.1	7

Water Sampling | Type: GRAB | Station Number: RMD-269 | Address: 14951 Triangle Road

Sampled Date	Total Coliform (CFU/1000 ml)	E.coli (CFU/1000 ml)	HPC (CFU/ml)	Chlorine Free (mg/l)	Turbidity (NTU)	Temperature (C°)
2024-01-02 13:50	<1	<1	<2	0.67	0.18	9
2024-01-08 14:10	<1	<1	<2	0.61	0.14	6
2024-01-15 13:50	<1	<1	<2	0.67	0.13	6
2024-01-22 13:50	<1	<1	<2	0.74	0.23	5
2024-01-29 13:50	<1	<1	<2	0.7	0.19	6
2024-02-05 13:50	<1	<1	<2	0.76	2.1	8
2024-02-12 13:50	<1	<1	<2	0.64	0.22	7
2024-02-20 13:50	<1	<1	<2	0.69	0.16	5
2024-02-26 13:50	<1	<1	<2	0.66	0.32	6
2024-03-04 13:50	<1	<1	<2	0.72	0.27	6
2024-03-11 13:50	<1	<1	<2	0.76	0.14	7
2024-03-18 13:50	<1	<1	2	0.75	0.35	7
2024-03-25 13:50	<1	<1	<2	0.62	0.17	6
2024-04-02 14:00	<1	<1	<2	0.67	0.14	7
2024-04-08 13:50	<1	<1	<2	0.73	0.28	7
2024-04-15 13:50	<1	<1	2	0.68	0.13	7
2024-04-22 13:50	<1	<1	<2	0.66	0.14	8
2024-04-29 13:50	<1	<1	<2	0.71	0.11	8
2024-05-06 13:50	<1	<1	<2	0.63	0.37	10
2024-05-13 13:50	<1	<1	<2	0.84	0.16	9
2024-05-21 13:50	<1	<1	<2	0.51	0.16	10
2024-05-27 13:50	<1	<1	<2	0.74	0.09	11
2024-06-03 13:50	<1	<1	<2	0.79	0.11	10
2024-06-10 13:55	<1	<1	<2	0.58	0.19	11
2024-06-17 13:50	<1	<1	<2	0.68	0.12	11
2024-06-24 13:50	<1	<1	2	0.61	0.16	12
2024-07-02 13:50	<1	<1	2	0.69	0.16	11
2024-07-08 13:50	<1	<1	2	0.65	0.14	12
2024-07-15 13:50	<1	<1	<2	0.7	0.12	12
2024-07-22 13:50	<1	<1	8	0.66	0.13	13
2024-07-29 13:50	<1	<1	6	0.7	0.11	13
2024-08-07 13:50	<1	<1	8	0.74	0.12	14
2024-08-12 13:20	<1	<1	10	0.64	0.1	15
2024-08-19 13:50	<1	<1	4	0.65	0.1	17
2024-08-26 13:50	<1	<1	8	0.72	0.09	16
2024-09-03 13:50	<1	<1	<2	0.6	0.12	16
2024-09-09 13:50	<1	<1	<2	0.63	0.1	16
2024-09-16 13:50	<1	<1	<2	0.7	0.2	16
2024-09-23 13:50	<1	<1	2	0.77	0.12	16
2024-10-01 13:50	<1	<1	<2	0.76	0.14	16
2024-10-07 13:50	<1	<1	<2	0.6	0.17	15
2024-10-15 13:50	<1	<1	<2	0.62	0.11	14
2024-10-21 13:50	<1	<1	2	0.6	0.12	13
2024-10-28 13:50	<1	<1	<2	0.72	0.14	11
2024-11-04 13:50	<1	<1	2	0.71	0.15	10
2024-11-12 13:50	<1	<1	<2	0.56	0.22	9
2024-11-18 13:50	<1	<1	<2	0.65	0.11	9
2024-11-25 13:35	<1	<1	8	0.63	0.12	8
2024-12-02 13:50	<1	<1	<2	0.68	0.19	7
2024-12-09 13:50	<1	<1	2	0.7	0.12	9
2024-12-16 13:50	<1	<1	<2	0.59	0.15	6
2024-12-23 13:50	<1	<1	NA	0.67	0.12	6
2024-12-30 13:50	<1	<1	NA	0.7	0.09	6

PMT-70

Water Sampling | Type: GRAB | Station Number: RMD-270 | Address: 8200 Jones Road

Sampled Date	Total Coliform (CFU/1000 ml)	E.coli (CFU/1000 ml)	HPC (CFU/ml)	Chlorine Free (mg/l)	Turbidity (NTU)	Temperature (C°)
2024-01-02 14:15	<1	<1	2	0.6	0.13	9
2024-01-08 14:30	<1	<1	8	0.58	0.13	7
2024-01-15 14:15	<1	<1	<2	0.69	0.54	7
2024-01-22 14:15	<1	<1	<2	0.67	0.2	5
2024-01-29 14:15	<1	<1	<2	0.72	0.22	7
2024-02-05 14:15	<1	<1	2	0.7	0.23	8
2024-02-12 14:15	<1	<1	10	0.66	0.19	7
2024-02-20 14:15	<1	<1	<2	0.62	0.12	7
2024-02-26 14:10	<1	<1	<2	0.64	0.16	7
2024-03-04 14:10	<1	<1	<2	0.65	0.27	7
2024-03-11 14:15	<1	<1	<2	0.73	0.19	7
2024-03-18 14:15	<1	<1	<2	0.74	0.14	7
2024-03-25 14:10	<1	<1	<2	0.53	0.27	8
2024-04-02 14:15	<1	<1	<2	0.72	0.14	9
2024-04-08 14:10	<1	<1	<2	0.7	0.3	8
2024-04-15 14:15	<1	<1	<2	0.69	0.1	8
2024-04-22 14:10	<1	<1	<2	0.66	0.12	10
2024-04-29 14:10	<1	<1	<2	0.69	0.18	9
2024-05-06 14:15	<1	<1	<2	0.73	0.54	10
2024-05-13 14:15	<1	<1	<2	0.57	0.12	11
2024-05-21 14:10	<1	<1	<2	0.52	0.1	11
2024-05-27 14:15	<1	<1	<2	0.81	0.09	11
2024-06-03 14:10	<1	<1	<2	0.6	0.12	12
2024-06-10 14:15	<1	<1	2	0.68	0.14	11
2024-06-17 14:15	<1	<1	6	0.62	0.13	13
2024-06-24 14:10	<1	<1	<2	0.68	0.11	14
2024-07-02 14:15	<1	<1	<2	0.63	0.1	14
2024-07-08 14:15	<1	<1	<2	0.76	0.14	14
2024-07-15 14:15	<1	<1	<2	0.62	0.17	15
2024-07-22 14:15	<1	<1	12	0.58	0.13	15
2024-07-29 14:15	<1	<1	140	0.71	0.1	15
2024-08-07 14:15	<1	<1	10	0.68	0.1	16
2024-08-12 13:40	<1	<1	8	0.64	0.19	17
2024-08-19 14:10	<1	<1	16	0.63	0.11	18
2024-08-26 14:15	<1	<1	18	0.7	0.08	16
2024-09-03 14:10	<1	<1	<2	0.55	0.08	16
2024-09-09 14:05	<1	<1	16	0.65	0.11	17
2024-09-16 14:15	<1	<1	14	0.67	0.09	15
2024-09-23 14:15	<1	<1	2	0.79	0.1	17
2024-10-01 14:15	<1	<1	4	0.72	0.11	16
2024-10-07 14:15	<1	<1	<2	0.65	0.12	16
2024-10-15 14:15	<1	<1	8	0.63	0.1	15
2024-10-21 14:10	<1	<1	<2	0.74	0.12	14
2024-10-28 14:15	<1	<1	26	0.54	0.14	12
2024-11-04 14:15	<1	<1	6	0.51	0.18	12
2024-11-12 14:15	<1	<1	<2	0.52	0.11	11
2024-11-18 14:15	<1	<1	2	0.61	0.1	10
2024-11-25 13:50	<1	<1	<2	0.65	0.46	10
2024-12-02 14:15	<1	<1	<2	0.66	0.13	9
2024-12-09 14:15	<1	<1	<2	0.98	0.14	9
2024-12-16 14:10	<1	<1	<2	0.72	0.13	8
2024-12-23 14:10	<1	<1	NA	0.76	0.1	8
2024-12-30 14:10	<1	<1	NA	0.74	0.1	8

Water Sampling | Type: GRAB | Station Number: RMD-271 | Address: 3800 Cessna Drive

Sampled Date	Total Coliform (CFU/1000 ml)	E.coli (CFU/1000 ml)	HPC (CFU/ml)	Chlorine Free (mg/l)	Turbidity (NTU)	Temperature (C°)
2024-01-02 15:15	<1	<1	<2	0.69	0.18	8
2024-01-08 15:30	<1	<1	<2	0.66	0.14	7
2024-01-15 15:15	<1	<1	<2	0.7	0.14	7
2024-01-22 15:15	<1	<1	<2	0.7	0.25	5
2024-01-29 15:15	<1	<1	<2	0.71	0.26	7
2024-02-05 15:15	<1	<1	4	0.78	0.19	8
2024-02-12 15:30	<1	<1	2	0.74	0.31	7
2024-02-20 15:15	<1	<1	<2	0.71	0.13	6
2024-02-26 15:10	<1	<1	<2	0.72	0.12	6
2024-03-04 15:10	<1	<1	<2	0.67	0.19	7
2024-03-11 15:15	<1	<1	<2	0.76	0.52	7
2024-03-18 15:15	<1	<1	<2	0.76	0.49	7
2024-03-25 15:15	<1	<1	<2	0.66	0.13	7
2024-04-02 15:15	<1	<1	<2	0.59	0.13	8
2024-04-08 15:15	<1	<1	<2	0.6	0.24	8
2024-04-15 15:15	<1	<1	<2	0.73	0.15	8
2024-04-22 15:10	<1	<1	<2	0.67	0.1	9
2024-04-29 15:10	<1	<1	<2	0.68	0.13	9
2024-05-06 15:15	<1	<1	6	0.77	0.1	10
2024-05-13 15:15	<1	<1	<2	0.74	0.15	10
2024-05-21 15:10	<1	<1	<2	0.64	0.11	11
2024-05-27 15:15	<1	<1	<2	0.85	0.09	11
2024-06-03 15:10	<1	<1	2	0.54	0.1	11
2024-06-10 15:15	<1	<1	2	0.71	0.12	12
2024-06-17 15:15	<1	<1	<2	0.64	0.14	11
2024-06-24 15:10	<1	<1	<2	0.61	0.12	12
2024-07-02 15:15	<1	<1	<2	0.74	0.1	13
2024-07-08 15:15	<1	<1	<2	0.83	0.14	14
2024-07-15 15:15	<1	<1	<2	0.78	0.17	13
2024-07-22 15:15	<1	<1	2	0.74	0.19	12
2024-07-29 15:15	<1	<1	4	0.8	0.12	14
2024-08-07 12:00	<1	<1	2	0.77	0.12	15
2024-08-12 14:20	<1	<1	<2	0.73	0.09	16
2024-08-19 15:15	<1	<1	<2	0.66	0.1	17
2024-08-26 15:15	<1	<1	<2	0.79	0.09	16
2024-09-03 15:10	<1	<1	<2	0.53	0.1	18
2024-09-09 15:10	<1	<1	2	0.66	0.12	17
2024-09-16 15:15	<1	<1	2	0.77	0.15	16
2024-09-23 15:15	<1	<1	<2	1.01	0.1	17
2024-10-01 15:15	<1	<1	<2	0.73	0.11	17
2024-10-07 15:15	<1	<1	2	0.79	0.22	16
2024-10-15 15:15	<1	<1	2	0.75	0.1	15
2024-10-21 15:15	<1	<1	<2	0.63	0.12	14
2024-10-28 15:15	<1	<1	<2	0.59	0.1	15
2024-11-04 15:15	<1	<1	<2	0.62	0.16	11
2024-11-12 15:15	<1	<1	<2	0.55	0.12	12
2024-11-18 15:15	<1	<1	<2	0.61	0.11	13
2024-11-25 14:55	<1	<1	<2	0.58	0.12	11
2024-12-02 15:15	<1	<1	2	0.68	0.12	10
2024-12-09 15:15	<1	<1	<2	0.69	0.15	10
2024-12-16 15:10	<1	<1	<2	0.61	0.14	7
2024-12-23 15:15	<1	<1	NA	0.65	0.1	9
2024-12-30 15:15	<1	<1	NA	0.8	0.07	10

PMT-74

Water Sampling | Type: GRAB | Station Number: RMD-272 | Address: 751 Catalina Crescent

Sampled Date	Total Coliform (CFU/1000 ml)	E.coli (CFU/1000 ml)	HPC (CFU/ml)	Chlorine Free (mg/l)	Turbidity (NTU)	Temperature (C°)
2024-01-02 15:30	<1	<1	<2	0.79	0.2	8
2024-01-08 15:45	<1	<1	2	0.63	0.18	6
2024-01-15 15:30	<1	<1	<2	0.73	0.17	6
2024-01-22 15:30	<1	<1	<2	0.76	0.16	5
2024-01-29 15:30	<1	<1	6	0.64	0.24	7
2024-02-05 15:30	<1	<1	<2	0.8	0.34	8
2024-02-12 15:15	<1	<1	<2	0.72	0.28	7
2024-02-20 15:30	<1	<1	4	0.7	0.19	6
2024-02-26 15:25	<1	<1	<2	0.78	0.18	6
2024-03-04 15:25	<1	<1	<2	0.72	0.2	6
2024-03-11 15:30	<1	<1	<2	0.81	0.14	8
2024-03-18 15:30	<1	<1	<2	0.81	0.21	7
2024-03-25 15:30	<1	<1	<2	0.82	0.33	6
2024-04-02 15:30	<1	<1	<2	0.57	0.2	6
2024-04-08 15:30	<1	<1	2	0.79	0.25	7
2024-04-15 15:30	<1	<1	<2	0.79	0.14	7
2024-04-22 15:25	<1	<1	2	0.79	0.15	8
2024-04-29 15:25	<1	<1	<2	0.69	0.14	8
2024-05-06 15:30	<1	<1	<2	0.84	0.17	10
2024-05-13 15:30	<1	<1	<2	0.82	0.17	9
2024-05-21 15:25	<1	<1	2	0.49	0.12	10
2024-05-27 15:30	<1	<1	<2	0.84	0.09	11
2024-06-03 15:25	<1	<1	<2	0.66	0.11	10
2024-06-10 15:30	<1	<1	<2	0.78	0.15	11
2024-06-17 15:30	<1	<1	2	0.74	0.13	11
2024-06-24 15:25	<1	<1	<2	0.68	0.15	12
2024-07-02 15:30	<1	<1	6	0.86	0.14	13
2024-07-08 15:30	<1	<1	<2	0.85	0.16	12
2024-07-15 15:30	<1	<1	<2	0.71	0.14	12
2024-07-22 15:30	<1	<1	2	0.83	0.2	13
2024-07-29 15:30	<1	<1	<2	0.95	0.12	13
2024-08-07 12:15	<1	<1	<2	0.77	0.1	14
2024-08-12 14:35	<1	<1	4	0.75	0.1	15
2024-08-19 15:30	<1	<1	4	0.73	0.12	16
2024-08-26 15:30	<1	<1	4	0.93	0.13	15
2024-09-03 15:25	<1	<1	8	0.55	0.1	16
2024-09-09 15:30	<1	<1	6	0.69	0.11	16
2024-09-16 15:30	<1	<1	2	0.9	0.1	15
2024-09-23 15:30	<1	<1	6	1	0.13	16
2024-10-01 15:30	<1	<1	16	0.68	0.11	16
2024-10-07 15:30	<1	<1	2	0.91	0.26	15
2024-10-15 15:30	<1	<1	2	0.87	0.15	15
2024-10-21 15:30	<1	<1	4	0.79	0.19	13
2024-10-28 15:30	<1	<1	110	0.62	0.24	11
2024-11-04 15:30	<1	<1	8	0.58	0.14	10
2024-11-12 15:30	<1	<1	<2	0.73	0.16	10
2024-11-18 15:30	<1	<1	<2	0.66	0.15	9
2024-11-25 15:15	<1	<1	<2	0.77	0.15	8
2024-12-02 15:30	<1	<1	<2	0.48	0.14	9
2024-12-09 15:30	<1	<1	<2	1.41	0.17	10
2024-12-16 15:25	<1	<1	<2	0.88	0.16	6
2024-12-23 15:30	<1	<1	NA	0.91	0.14	8
2024-12-30 15:30	<1	<1	NA	0.91	0.11	7

Water Sampling | Type: GRAB | Station Number: RMD-273 | Address: Across from 8331 Fairfax Place

Sampled Date	Total Coliform (CFU/1000 ml)	E.coli (CFU/1000 ml)	HPC (CFU/ml)	Chlorine Free (mg/l)	Turbidity (NTU)	Temperature (C°)
2024-01-02 12:45	<1	<1	<2	0.59	0.17	10
2024-01-08 12:50	<1	<1	<2	0.57	0.15	8
2024-01-15 12:45	<1	<1	<2	0.63	0.17	7
2024-01-22 12:45	<1	<1	<2	0.69	0.26	6
2024-01-29 12:45	<1	<1	<2	0.64	0.35	7
2024-02-05 12:45	<1	<1	<2	0.59	0.31	9
2024-02-12 12:45	<1	<1	<2	0.57	0.17	8
2024-02-20 12:45	<1	<1	<2	0.58	0.13	7
2024-02-26 12:45	<1	<1	<2	0.62	0.11	8
2024-03-04 12:45	<1	<1	<2	0.64	0.31	8
2024-03-11 12:45	<1	<1	<2	0.69	0.29	8
2024-03-18 12:45	<1	<1	<2	0.68	0.2	9
2024-03-25 12:45	<1	<1	<2	0.6	0.2	9
2024-04-02 12:45	<1	<1	2	0.59	0.23	9
2024-04-08 12:45	<1	<1	<2	0.52	0.23	9
2024-04-15 12:45	<1	<1	<2	0.68	0.11	10
2024-04-22 12:45	<1	<1	<2	0.52	0.16	11
2024-04-29 12:45	<1	<1	<2	0.59	0.12	10
2024-05-06 12:45	<1	<1	<2	0.58	0.11	12
2024-05-13 12:45	<1	<1	30	0.66	0.14	13
2024-05-21 12:45	<1	<1	<2	0.51	0.11	14
2024-05-27 12:45	<1	<1	<2	0.76	0.08	14
2024-06-03 12:45	<1	<1	2	0.51	0.12	14
2024-06-10 12:45	<1	<1	<2	0.57	0.16	14
2024-06-17 12:45	<1	<1	<2	0.56	0.13	15
2024-06-24 12:45	<1	<1	<2	0.63	0.12	16
2024-07-02 12:45	<1	<1	4	0.62	0.13	16
2024-07-08 12:45	<1	<1	<2	0.65	0.13	17
2024-07-15 12:45	<1	<1	6	0.68	0.13	17
2024-07-22 12:45	<1	<1	<2	0.6	0.17	18
2024-07-29 12:45	<1	<1	16	0.72	0.1	19
2024-08-07 12:45	<1	<1	2	0.54	0.09	19
2024-08-12 12:15	<1	<1	<2	0.73	0.09	19
2024-08-19 12:45	<1	<1	6	0.52	0.21	20
2024-08-26 12:45	<1	<1	10	0.81	1.8	19
2024-09-03 12:45	<1	<1	<2	0.5	0.1	20
2024-09-09 12:45	<1	<1	<2	0.61	0.12	20
2024-09-16 12:45	<1	<1	4	0.67	0.1	18
2024-09-23 12:45	<1	<1	2	0.66	0.1	19
2024-10-01 12:45	<1	<1	<2	0.53	0.09	18
2024-10-07 12:45	<1	<1	4	0.58	0.15	17
2024-10-15 12:45	<1	<1	<2	0.66	0.1	16
2024-10-21 12:45	<1	<1	2	0.65	0.1	15
2024-10-28 12:45	<1	<1	2	0.51	0.15	14
2024-11-04 12:45	<1	<1	<2	0.45	0.13	13
2024-11-12 12:45	<1	<1	<2	0.45	0.16	13
2024-11-18 12:45	<1	<1	<2	0.52	0.11	11
2024-11-25 12:15	<1	<1	2	0.58	0.11	10
2024-12-02 12:45	<1	<1	2	0.59	0.12	10
2024-12-09 12:45	<1	<1	<2	0.82	0.11	10
2024-12-16 12:45	<1	<1	<2	0.66	0.1	9
2024-12-23 12:45	<1	<1	NA	0.66	0.1	9
2024-12-30 12:45	<1	<1	NA	0.61	0.09	9

PWT-72

Water Sampling | Type: GRAB | Station Number: RMD-274 | Address: 10920 Springwood Court

Sampled Date	Total Coliform (CFU/1000 ml)	E.coli (CFU/1000 ml)	HPC (CFU/ml)	Chlorine Free (mg/l)	Turbidity (NTU)	Temperature (C°)
2024-01-02 13:15	<1	<1	4	0.53	0.23	9
2024-01-08 13:30	<1	<1	4	0.7	0.12	8
2024-01-15 13:15	<1	<1	<2	0.68	0.15	7
2024-01-22 13:15	<1	<1	<2	0.68	0.4	6
2024-01-29 13:15	<1	<1	2	0.65	0.45	7
2024-02-05 13:15	<1	<1	<2	0.62	0.34	9
2024-02-12 13:15	<1	<1	<2	0.58	0.16	7
2024-02-20 13:15	<1	<1	<2	0.65	0.12	7
2024-02-26 13:15	<1	<1	2	0.59	0.13	7
2024-03-04 13:15	<1	<1	<2	0.62	0.16	8
2024-03-11 13:15	<1	<1	<2	0.68	0.26	8
2024-03-18 13:15	<1	<1	8	0.55	0.27	8
2024-03-25 13:15	<1	<1	<2	0.64	0.17	9
2024-04-02 13:20	<1	<1	<2	0.65	0.22	9
2024-04-08 13:15	<1	<1	<2	0.63	0.24	9
2024-04-15 13:15	<1	<1	2	0.64	0.13	10
2024-04-22 13:15	<1	<1	4	0.56	0.26	11
2024-04-29 13:15	<1	<1	6	0.53	0.13	10
2024-05-06 13:15	<1	<1	<2	0.54	0.14	11
2024-05-13 13:15	<1	<1	<2	0.42	0.17	11
2024-05-21 13:15	<1	<1	2	0.58	0.1	14
2024-05-27 13:15	<1	<1	<2	0.79	0.08	13
2024-06-03 13:15	<1	<1	<2	0.6	0.1	12
2024-06-10 13:15	<1	<1	<2	0.66	0.11	14
2024-06-17 13:15	<1	<1	14	0.54	0.14	14
2024-06-24 13:15	<1	<1	6	0.56	0.21	15
2024-07-02 13:15	<1	<1	<2	0.62	0.24	15
2024-07-08 13:15	<1	<1	<2	0.63	0.12	16
2024-07-15 13:15	<1	<1	140	0.61	0.22	17
2024-07-22 13:15	<1	<1	22	0.57	0.2	17
2024-07-29 13:15	<1	<1	8	0.66	0.13	18
2024-08-07 13:15	<1	<1	4	0.57	0.1	19
2024-08-12 12:45	<1	<1	12	0.56	0.12	19
2024-08-19 13:15	<1	<1	50	0.54	0.12	19
2024-08-26 13:15	<1	<1	24	0.63	0.09	19
2024-09-03 13:15	<1	<1	8	0.48	0.09	18
2024-09-09 13:15	<1	<1	16	0.59	0.12	19
2024-09-16 13:15	<1	<1	8	0.62	0.09	18
2024-09-23 13:15	<1	<1	2	0.6	0.13	18
2024-10-01 13:15	<1	<1	4	0.55	0.09	17
2024-10-07 13:15	<1	<1	6	0.59	0.11	17
2024-10-15 13:15	<1	<1	2	0.59	0.11	16
2024-10-21 13:15	<1	<1	8	0.6	0.11	15
2024-10-28 13:15	<1	<1	2	0.51	0.51	14
2024-11-04 13:15	<1	<1	6	0.43	0.15	13
2024-11-12 13:15	<1	<1	12	0.45	0.24	12
2024-11-18 13:15	<1	<1	<2	0.55	0.1	12
2024-11-25 12:50	<1	<1	<2	0.59	0.14	10
2024-12-02 13:15	<1	<1	<2	0.67	0.13	10
2024-12-09 13:15	<1	<1	<2	0.98	0.12	10
2024-12-16 13:15	<1	<1	<2	0.72	0.83	9
2024-12-23 13:15	<1	<1	NA	0.76	0.16	8
2024-12-30 13:15	<1	<1	NA	0.65	0.09	8

Water Sampling | Type: GRAB | Station Number: RMD-275 | Address: 5180 Smith Crescent

Sampled Date	Total Coliform (CFU/1000 ml)	E.coli (CFU/1000 ml)	HPC (CFU/ml)	Chlorine Free (mg/l)	Turbidity (NTU)	Temperature (C°)
2024-01-05 10:55	<1	<1	4	0.5	0.22	10
2024-01-11 11:15	<1	<1	<2	0.61	0.14	6
2024-01-25 10:45	<1	<1	<2	0.75	0.11	7
2024-02-02 10:55	<1	<1	<2	0.71	0.21	8
2024-02-08 11:15	<1	<1	<2	0.64	0.2	8
2024-02-16 10:55	<1	<1	<2	0.57	0.27	7
2024-02-22 10:55	<1	<1	<2	0.75	0.16	7
2024-03-01 10:45	<1	<1	2	0.61	0.14	7
2024-03-07 11:00	<1	<1	<2	0.6	0.13	6
2024-03-15 10:45	<1	<1	<2	0.66	0.18	7
2024-03-21 10:50	<1	<1	<2	0.7	0.19	11
2024-03-28 10:45	<1	<1	2	0.72	0.35	7
2024-04-04 11:15	<1	<1	<2	0.75	LA	8
2024-04-12 11:00	<1	<1	<2	0.73	0.09	9
2024-04-18 11:15	<1	<1	<2	0.64	0.12	9
2024-04-26 10:45	<1	<1	<2	0.66	0.08	9
2024-05-02 11:15	<1	<1	<2	0.65	0.11	10
2024-05-10 10:55	<1	<1	<2	0.64	0.21	10
2024-05-16 10:55	<1	<1	<2	0.43	0.27	12
2024-05-24 10:55	<1	<1	<2	0.55	0.12	12
2024-05-30 10:45	<1	<1	<2	0.66	0.11	11
2024-06-07 10:55	<1	<1	<2	0.59	0.12	12
2024-06-13 10:45	<1	<1	2	0.53	0.12	13
2024-06-21 10:55	<1	<1	<2	0.52	0.11	13
2024-06-27 11:15	<1	<1	4	0.55	0.18	12
2024-07-05 10:55	<1	<1	6	0.5	0.12	15
2024-07-11 10:55	<1	<1	<2	0.47	0.12	14
2024-07-25 11:00	<1	<1	6	0.5	0.13	17
2024-08-02 10:55	<1	<1	<2	0.48	0.17	16
2024-08-16 11:35	<1	<1	620	0.57	0.46	16
2024-08-22 10:45	<1	<1	8	0.61	0.25	16
2024-08-30 11:15	<1	<1	190	0.55	0.21	14
2024-09-05 11:15	<1	<1	160	0.6	0.24	15
2024-09-13 10:55	<1	<1	210	0.61	0.38	14
2024-09-19 10:45	<1	<1	50	0.54	0.22	15
2024-09-27 10:55	<1	<1	22	0.43	0.22	15
2024-10-03 11:25	<1	<1	40	0.38	0.21	14
2024-10-11 11:15	<1	<1	12	0.37	0.35	15
2024-10-17 10:45	<1	<1	<2	0.65	0.29	13
2024-10-25 10:45	<1	<1	<2	0.54	0.2	12
2024-10-31 10:55	<1	<1	28	0.46	0.22	13
2024-11-08 10:45	<1	<1	18	0.38	1	11
2024-11-14 10:45	<1	<1	6	0.38	0.9	10
2024-11-22 10:45	<1	<1	<2	0.42	0.52	9
2024-11-28 10:30	<1	<1	42	0.28	0.4	9
2024-12-06 10:55	<1	<1	30	0.32	0.39	9
2024-12-12 11:30	<1	<1	40	0.39	0.52	7
2024-12-20 10:55	<1	<1	NA	0.36	0.84	8
2024-12-23 10:45	<1	<1	NA	0.43	0.49	8

PMT_73

Water Sampling | Type: GRAB | Station Number: RMD-276 | Address: 22271 Cochrane Drive

Sampled Date	Total Coliform (CFU/1000 ml)	E.coli (CFU/1000 ml)	HPC (CFU/ml)	Chlorine Free (mg/l)	Turbidity (NTU)	Temperature (C°)
2024-01-05 10:40	<1	<1	2	0.22	0.22	10
2024-01-11 10:45	<1	<1	<2	0.69	0.23	7
2024-01-25 10:30	<1	<1	<2	0.76	0.2	7
2024-02-02 10:40	<1	<1	<2	0.66	0.15	8
2024-02-08 10:45	<1	<1	<2	0.65	0.24	8
2024-02-16 10:40	<1	<1	<2	0.63	0.25	6
2024-02-22 10:40	<1	<1	<2	0.72	0.3	7
2024-03-01 10:30	<1	<1	<2	0.6	0.14	7
2024-03-07 10:45	<1	<1	<2	0.63	0.19	6
2024-03-15 10:30	<1	<1	<2	0.75	0.19	6
2024-03-21 10:30	<1	<1	<2	0.74	0.23	11
2024-03-28 10:30	<1	<1	<2	0.72	0.33	7
2024-04-04 11:00	<1	<1	<2	0.76	0.12	8
2024-04-12 10:45	<1	<1	<2	0.74	0.09	9
2024-04-18 11:00	<1	<1	<2	0.68	0.11	9
2024-04-26 10:30	<1	<1	<2	0.67	0.17	10
2024-05-02 11:00	<1	<1	<2	0.64	0.11	9
2024-05-10 10:40	<1	<1	<2	0.81	0.33	9
2024-05-16 10:40	<1	<1	2	0.72	0.34	10
2024-05-24 10:40	<1	<1	2	0.7	0.14	11
2024-05-30 10:30	<1	<1	2	0.7	0.18	11
2024-06-07 10:40	<1	<1	<2	0.71	0.13	11
2024-06-13 10:30	<1	<1	4	0.73	0.15	11
2024-06-21 10:40	<1	<1	<2	0.65	0.19	14
2024-06-27 11:00	<1	<1	<2	0.64	0.39	12
2024-07-05 10:40	<1	<1	<2	0.63	0.3	12
2024-07-11 10:40	<1	<1	<2	0.53	0.12	13
2024-07-25 10:45	<1	<1	<2	0.74	0.14	16
2024-08-02 10:40	<1	<1	2	0.68	0.26	15
2024-08-07 15:20	<1	<1	2	0.64	0.13	16
2024-08-16 11:25	<1	<1	4	0.59	0.26	15
2024-08-22 10:30	<1	<1	6	0.59	0.21	16
2024-08-30 10:45	<1	<1	22	0.64	0.24	14
2024-09-05 11:00	<1	<1	24	0.6	0.3	15
2024-09-13 10:40	<1	<1	8	0.63	0.55	15
2024-09-19 10:30	<1	<1	2	0.51	0.24	15
2024-09-27 10:40	<1	<1	<2	0.4	0.2	15
2024-10-03 11:10	<1	<1	<2	0.4	0.18	14
2024-10-11 11:00	<1	<1	<2	0.4	0.23	15
2024-10-17 10:30	<1	<1	<2	0.67	0.29	13
2024-10-25 10:30	<1	<1	<2	0.57	0.27	12
2024-10-31 10:40	<1	<1	<2	0.68	0.15	11
2024-11-08 10:30	<1	<1	<2	0.57	0.96	11
2024-11-14 10:30	<1	<1	<2	0.43	0.68	10
2024-11-22 10:30	<1	<1	<2	0.48	0.48	10
2024-11-28 10:45	<1	<1	4	0.55	0.2	9
2024-12-06 10:40	<1	<1	2	0.33	0.36	9
2024-12-12 11:15	<1	<1	2	0.37	0.34	8
2024-12-20 10:40	<1	<1	NA	0.3	0.65	8
2024-12-23 10:30	<1	<1	NA	0.29	0.3	8

Water Sampling | Type: **GRAB** | Station Number: **RMD-277** | Address: **Across from 11280 Twigg Place**

Sampled Date	Total Coliform (CFU/1000 ml)	E.coli (CFU/1000 ml)	HPC (CFU/ml)	Chlorine Free (mg/l)	Turbidity (NTU)	Temperature (C°)
2024-01-03 13:00	<1	<1	<2	0.64	0.24	8
2024-01-10 13:00	<1	<1	<2	0.72	0.15	8
2024-01-24 12:45	<1	<1	<2	0.77	0.21	5
2024-01-31 13:00	<1	<1	<2	0.71	0.21	8
2024-02-07 12:45	<1	<1	<2	0.7	0.2	6
2024-02-14 12:45	<1	<1	<2	0.68	0.19	8
2024-02-21 12:45	<1	<1	<2	0.7	0.17	6
2024-02-28 12:45	<1	<1	<2	0.67	0.15	7
2024-03-06 12:45	<1	<1	<2	0.71	0.25	6
2024-03-20 13:00	<1	<1	2	0.72	0.15	7
2024-03-27 12:50	<1	<1	<2	0.58	0.17	8
2024-04-10 12:45	<1	<1	2	0.75	0.17	7
2024-04-17 13:00	<1	<1	<2	0.72	0.13	8
2024-04-24 12:45	<1	<1	<2	0.75	0.16	9
2024-05-01 13:00	<1	<1	<2	0.63	0.16	10
2024-05-08 12:45	<1	<1	<2	0.74	0.15	9
2024-05-15 13:00	<1	<1	<2	0.87	0.18	10
2024-05-22 13:15	<1	<1	<2	0.7	0.11	11
2024-05-29 12:45	<1	<1	<2	0.63	0.13	11
2024-06-05 13:00	<1	<1	<2	0.73	0.11	11
2024-06-12 13:00	<1	<1	<2	0.75	0.18	11
2024-06-19 12:45	<1	<1	2	0.74	0.13	11
2024-06-26 12:45	<1	<1	<2	0.81	0.16	12
2024-07-03 12:45	<1	<1	<2	0.73	0.14	12
2024-07-10 13:00	<1	<1	<2	0.54	0.13	14
2024-07-17 12:45	<1	<1	8	0.91	0.19	13
2024-07-24 12:45	<1	<1	<2	0.75	0.19	14
2024-07-31 13:15	<1	<1	<2	0.72	0.11	15
2024-08-07 12:45	<1	<1	4	0.81	0.12	15
2024-08-14 12:45	<1	<1	4	0.78	0.1	17
2024-08-21 13:00	<1	<1	22	0.6	0.1	17
2024-08-28 12:45	<1	<1	10	0.75	0.11	16
2024-09-04 13:00	<1	<1	<2	0.76	0.15	17
2024-09-11 13:00	<1	<1	<2	0.75	0.11	17
2024-09-18 13:00	<1	<1	4	0.53	0.11	17
2024-09-25 12:45	<1	<1	4	0.86	0.12	17
2024-10-02 12:45	<1	<1	2	0.63	0.12	16
2024-10-09 13:00	<1	<1	<2	0.76	0.14	15
2024-10-16 13:00	<1	<1	<2	0.58	0.16	15
2024-10-23 12:45	<1	<1	2	0.9	0.13	13
2024-10-30 12:45	<1	<1	<2	0.49	0.15	12
2024-11-07 13:00	<1	<1	<2	0.56	0.16	11
2024-11-13 13:00	<1	<1	<2	0.54	0.16	10
2024-11-20 13:00	<1	<1	2	0.52	0.21	10
2024-11-27 13:00	<1	<1	<2	0.35	0.16	9
2024-12-04 13:00	<1	<1	<2	0.75	0.16	8
2024-12-11 12:45	<1	<1	<2	0.82	0.15	7
2024-12-18 12:45	<1	<1	<2	0.82	0.11	8
2024-12-23 13:00	<1	<1	NA	0.73	0.12	8
2024-12-31 08:30	<1	<1	NA	0.71	0.09	8

PMT_74

Water Sampling | Type: **GRAB** | Station Number: **RMD-278** | Address: **6651 Fraserwood Place**

Sampled Date	Total Coliform (CFU/1000 ml)	E.coli (CFU/1000 ml)	HPC (CFU/ml)	Chlorine Free (mg/l)	Turbidity (NTU)	Temperature (C°)
2024-01-03 13:20	<1	<1	2	0.59	0.21	8
2024-01-10 13:35	<1	<1	16	0.65	0.14	8
2024-01-24 13:35	<1	<1	<2	0.66	0.17	5
2024-01-31 13:35	<1	<1	<2	0.75	0.21	8
2024-02-07 13:35	<1	<1	<2	0.67	0.14	6
2024-02-14 13:40	<1	<1	<2	0.65	0.18	7
2024-02-21 13:35	<1	<1	<2	0.63	0.17	6
2024-02-28 13:30	<1	<1	<2	0.65	0.15	7
2024-03-06 13:35	<1	<1	8	0.62	0.2	6
2024-03-20 13:35	<1	<1	2	0.73	0.22	6
2024-03-27 13:40	<1	<1	<2	0.42	0.15	8
2024-04-10 13:30	<1	<1	<2	0.61	0.12	7
2024-04-17 13:50	<1	<1	<2	0.69	0.22	9
2024-04-24 13:35	<1	<1	<2	0.68	0.13	9
2024-05-01 13:50	<1	<1	<2	0.67	0.14	9
2024-05-08 13:30	<1	<1	<2	0.66	0.2	9
2024-05-15 13:30	<1	<1	<2	0.88	0.38	10
2024-05-22 12:30	<1	<1	4	0.72	0.11	12
2024-05-29 13:35	<1	<1	2	0.74	0.14	10
2024-06-05 13:30	<1	<1	2	0.78	0.17	10
2024-06-12 13:30	<1	<1	2	0.64	0.25	12
2024-06-19 13:35	<1	<1	24	0.65	0.1	11
2024-06-26 13:35	<1	<1	2	0.62	0.32	11
2024-07-03 13:35	<1	<1	8	0.68	0.18	11
2024-07-10 13:35	<1	<1	10	0.73	0.16	14
2024-07-17 13:35	<1	<1	20	0.67	0.26	13
2024-07-24 14:00	<1	<1	10	0.71	0.2	14
2024-07-31 14:00	<1	<1	8	0.72	0.13	14
2024-08-07 13:45	<1	<1	6	0.64	0.11	15
2024-08-14 13:35	<1	<1	4	0.7	0.11	15
2024-08-21 13:35	<1	<1	18	0.47	0.51	16
2024-08-28 13:35	<1	<1	42	0.53	0.58	16
2024-09-04 13:30	<1	<1	28	0.5	1.4	17
2024-09-11 13:30	<1	<1	10	0.35	0.22	17
2024-09-18 13:35	<1	<1	46	0.38	0.39	15
2024-09-25 13:35	<1	<1	4	0.4	0.38	17
2024-10-02 13:35	<1	<1	4	0.42	0.36	15
2024-10-09 13:30	<1	<1	10	0.4	0.17	15
2024-10-16 13:35	<1	<1	2	0.25	0.44	15
2024-10-23 13:35	<1	<1	<2	0.58	0.18	13
2024-10-30 13:35	<1	<1	8	0.73	0.18	11
2024-11-07 13:35	<1	<1	10	0.58	0.41	12
2024-11-13 13:35	<1	<1	20	0.49	0.49	11
2024-11-20 13:35	<1	<1	2	0.46	0.34	10
2024-11-27 13:35	<1	<1	14	0.54	0.28	10
2024-12-04 13:35	<1	<1	<2	0.23	0.81	9
2024-12-11 13:35	<1	<1	<2	0.53	0.19	7
2024-12-18 13:35	<1	<1	2	0.52	0.12	8
2024-12-23 13:35	<1	<1	NA	0.23	0.2	8
2024-12-31 09:10	<1	<1	NA	0.41	0.12	8

Water Sampling | Type: GRAB | Station Number: RMD-279 | Address: Across from 20371 Westminster Highway

Sampled Date	Total Coliform (CFU/1000 ml)	E.coli (CFU/1000 ml)	HPC (CFU/ml)	Chlorine Free (mg/l)	Turbidity (NTU)	Temperature (C°)
2024-01-03 13:35	<1	<1	4	0.7	0.17	7
2024-01-10 13:50	<1	<1	<2	0.64	0.2	7
2024-01-24 13:50	<1	<1	<2	0.64	0.16	4
2024-01-31 13:50	<1	<1	<2	0.78	0.15	8
2024-02-07 13:50	<1	<1	<2	0.72	0.12	6
2024-02-14 13:55	<1	<1	4	0.66	0.16	7
2024-02-21 13:50	<1	<1	<2	0.65	0.13	5
2024-02-28 13:50	<1	<1	<2	0.7	0.24	6
2024-03-06 13:50	<1	<1	12	0.71	0.22	6
2024-03-20 13:50	<1	<1	<2	0.72	0.27	6
2024-03-27 13:55	<1	<1	<2	0.74	0.13	7
2024-04-10 13:45	<1	<1	<2	0.6	0.12	7
2024-04-17 14:10	<1	<1	<2	0.66	0.11	7
2024-04-24 13:50	<1	<1	<2	0.74	0.16	8
2024-05-01 14:05	<1	<1	2	0.68	0.19	9
2024-05-08 13:50	<1	<1	<2	0.75	0.39	9
2024-05-15 13:50	<1	<1	<2	0.91	0.29	9
2024-05-22 12:45	<1	<1	<2	0.73	0.19	10
2024-05-29 13:50	<1	<1	<2	0.7	0.17	10
2024-06-05 13:50	<1	<1	<2	0.76	0.18	10
2024-06-12 13:50	<1	<1	<2	0.68	0.17	11
2024-06-19 13:50	<1	<1	<2	0.61	0.12	11
2024-06-26 13:50	<1	<1	<2	0.67	0.16	11
2024-07-03 13:50	<1	<1	<2	0.63	0.16	11
2024-07-10 13:50	<1	<1	<2	0.56	0.09	12
2024-07-17 13:50	<1	<1	<2	0.75	0.27	12
2024-07-24 13:45	<1	<1	10	0.71	0.12	13
2024-07-31 14:15	<1	<1	<2	0.74	0.12	14
2024-08-07 14:00	<1	<1	<2	0.82	0.11	14
2024-08-14 13:50	<1	<1	<2	0.74	0.11	16
2024-08-21 13:50	<1	<1	2	0.74	0.1	16
2024-08-28 13:50	<1	<1	4	0.55	0.25	16
2024-09-04 13:50	<1	<1	8	0.64	0.2	17
2024-09-11 13:50	<1	<1	2	0.63	0.1	17
2024-09-18 13:50	<1	<1	<2	0.57	0.13	16
2024-09-25 13:50	<1	<1	<2	0.58	0.14	17
2024-10-02 13:50	<1	<1	<2	0.71	0.13	15
2024-10-09 13:50	<1	<1	2	0.67	0.12	15
2024-10-16 13:50	4	<1	4	0.69	0.34	14
2024-10-23 13:50	<1	<1	NA	0.62	0.43	11
2024-10-30 13:50	<1	<1	<2	0.76	0.18	11
2024-11-07 13:50	<1	<1	2	0.76	0.19	11
2024-11-13 13:50	<1	<1	<2	0.65	0.13	10
2024-11-20 13:50	<1	<1	2	0.73	0.12	8
2024-11-27 13:50	<1	<1	6	0.75	0.26	8
2024-12-04 13:50	<1	<1	<2	0.53	0.18	10
2024-12-11 13:50	<1	<1	6	0.73	0.26	8
2024-12-18 13:50	<1	<1	<2	0.79	0.13	7
2024-12-23 13:50	<1	<1	NA	0.68	0.11	7

PMT_75

Water Sampling | Type: GRAB | Station Number: RMD-280 Address: 11500 McKenzie Road

Sampled Date	Total Coliform (CFU/1000 ml)	E.coli (CFU/1000 ml)	HPC (CFU/ml)	Chlorine Free (mg/l)	Turbidity (NTU)	Temperature (C°)
2024-01-05 08:20	<1	<1	<2	0.47	0.2	9
2024-01-11 08:45	<1	<1	<2	0.67	0.22	7
2024-01-25 08:15	<1	<1	<2	0.63	0.12	8
2024-02-02 08:20	<1	<1	<2	0.66	0.16	8
2024-02-08 08:45	<1	<1	<2	0.6	0.13	9
2024-02-16 08:20	<1	<1	<2	0.68	0.27	7
2024-02-22 08:20	<1	<1	<2	0.62	0.15	7
2024-03-01 08:15	<1	<1	2	0.62	0.14	7
2024-03-07 08:45	<1	<1	<2	0.76	0.12	10
2024-03-15 08:15	<1	<1	<2	0.88	0.15	7
2024-03-21 08:15	<1	<1	<2	0.8	0.58	10
2024-03-28 08:30	<1	<1	<2	0.66	0.14	8
2024-04-04 08:40	<1	<1	2	0.61	0.31	9
2024-04-12 08:45	<1	<1	2	0.71	0.13	9
2024-04-18 08:45	<1	<1	4	0.73	0.17	9
2024-04-26 08:15	<1	<1	<2	0.69	0.12	10
2024-05-02 08:45	<1	<1	<2	0.65	0.22	10
2024-05-10 08:20	<1	<1	2	0.69	0.15	10
2024-05-16 08:20	<1	<1	<2	0.68	0.18	11
2024-05-24 08:20	<1	<1	2	0.67	0.14	12
2024-05-30 08:15	<1	<1	2	0.63	0.12	12
2024-06-07 08:20	<1	<1	<2	0.69	0.13	12
2024-06-13 08:15	<1	<1	4	0.62	0.14	13
2024-06-21 08:20	<1	<1	<2	0.59	0.17	13
2024-06-27 08:45	<1	<1	<2	0.48	0.13	14
2024-07-05 08:20	<1	<1	6	0.65	0.14	14
2024-07-11 08:20	<1	<1	<2	0.62	0.16	14
2024-07-25 08:45	<1	<1	<2	0.58	0.14	15
2024-08-02 08:20	<1	<1	<2	0.6	0.12	16
2024-08-07 13:15	<1	<1	<2	0.61	0.11	17
2024-08-16 08:45	<1	<1	6	0.61	0.13	17
2024-08-22 08:15	<1	<1	8	0.58	0.1	17
2024-08-30 08:45	<1	<1	<2	0.64	0.11	16
2024-09-05 08:45	<1	<1	4	0.61	0.13	17
2024-09-13 08:20	<1	<1	<2	0.61	0.11	18
2024-09-19 08:15	<1	<1	20	0.78	0.14	18
2024-09-27 08:20	<1	<1	6	0.63	0.12	17
2024-10-03 08:40	<1	<1	<2	0.66	0.14	16
2024-10-11 08:45	<1	<1	<2	0.65	0.17	15
2024-10-17 08:15	<1	<1	2	0.64	0.14	15
2024-10-25 08:15	<1	<1	2	0.67	0.2	13
2024-10-31 08:20	<1	<1	2	0.59	0.16	12
2024-11-14 08:15	<1	<1	2	0.58	0.13	12
2024-11-22 08:15	<1	<1	<2	0.63	0.15	9
2024-11-28 08:15	<1	<1	8	0.48	0.15	10
2024-12-06 08:20	<1	<1	<2	0.64	0.25	9
2024-12-12 08:50	<1	<1	<2	0.69	0.16	9
2024-12-20 08:20	<1	<1	NA	0.77	0.14	8
2024-12-23 08:15	<1	<1	NA	0.71	0.13	8

Appendix B | 2024 Trihalomethanes (THMs) and Haloacetic Acids (HAAs) Test Results

THM (ppb) Sample	Sampled Date	Bromodi-chloromethane	Bromoform	Chlorodibro-momethane	Chloroform	Total Trihalo-methanes	Total THM Quarterly Average (Guideline Limit 100 ppb)
RMD 250	2023-11-29	<1	<1	<1	33	35	**36**
	2024-02-01	<1	<1	<1	23	24	**28**
	2024-04-25	<1	<1	<1	27	28	**29**
	2024-09-11	1	<1	<1	29	32	**30**
	2024-11-28	<1	<1	<1	30	31	**28**
RMD 251	2023-11-29	<1	<1	<1	33	34	**35**
	2024-02-01	<1	<1	<1	24	25	**27**
	2024-04-25	<1	<1	<1	29	30	**29**
	2024-09-11	1	<1	<1	28	31	**30**
	2024-11-28	<1	<1	<1	31	32	**29**
RMD 258	2023-11-29	<1	<1	<1	37	38	**43**
	2024-02-01	<1	<1	<1	24	25	**31**
	2024-04-25	<1	<1	<1	31	32	**33**
	2024-09-11	1	<1	<1	31	34	**32**
	2024-11-28	<1	<1	<1	36	36	**30**
RMD 259	2023-11-29	<1	<1	<1	38	40	**40**
	2024-02-01	<1	<1	<1	24	24	**31**
	2024-04-25	<1	<1	<1	31	32	**32**
	2024-09-11	1	<1	<1	33	35	**33**
	2024-11-28	<1	<1	<1	34	36	**30**

HAA (ppb) Sample	Dibromo-acetic Acid	Dichloro-acetic Acid	Monobro-moacetic Acid	Monochloro-acetic Acid	Trichloro-acetic Acid	Total Halo-acetic Acid	Total HAA Quarterly Average (Guideline Limit 80 ppb)
RMD 250	<0.5	13	<0.5	1	8.3	22	**20**
	<0.5	11	<0.5	1.1	6	18	**19**
	<0.5	12	<0.5	1	7.7	21	**19**
	<0.5	10	<0.5	0.9	6.8	18	**20**
	<0.5	13	<0.5	0.8	11	24	**19**
RMD 251	<0.5	12	<0.5	0.5	8	21	**17**
	<0.5	11	<0.5	0.6	7.3	19	**18**
	<0.5	13	<0.5	0.9	8.3	22	**19**
	<0.5	9.7	<0.5	1.2	6.2	17	**20**
	<0.5	14	<0.5	0.9	11	26	**19**
RMD 258	<0.5	14	<0.5	1.1	9	24	**21**
	<0.5	11	<0.5	1.1	6.8	19	**20**
	<0.5	13	<0.5	0.6	8.3	22	**20**
	<0.5	10	<0.5	0.6	6.9	18	**21**
	<0.5	13	<0.5	0.6	12	25	**20**
RMD 259	<0.5	13	<0.5	0.8	9.2	23	**20**
	<0.5	12	<0.5	1.1	7.2	20	**20**
	<0.5	13	<0.5	0.7	9	23	**21**
	<0.5	9	<0.5	0.8	6.7	16	**21**
	<0.5	12	<0.5	0.5	12	25	**20**

PWT – 76

Appendix C | 2024 Metal Level Guidelines

Parameter	Canadian Guideline Limit	Reason Guideline Established	Guideline Recently Updated
Aluminium Total (µg/L)	2900	Health	2021
Antimony Total (µg/L)	6	Health	2024
Arsenic Total (µg/L)	10 (ALARA)	Health	
Barium Total (µg/L)	2000	Health	2020
Boron Total (µg/L)	5000	Health	2023
Cadmium Total (µg/L)	7	Health	2020
Calcium Total (µg/L)	none		
Chromium Total (µg/L)	50	Health	2018
Cobalt Total (µg/L)	none		
Copper Total (µg/L)	2000	Health	2019
Iron Total (µg/L)	≤ 300	Aesthetic	
Lead Total (µg/L)	5 (ALARA)	Health	2019
Magnesium Total (µg/L)	none		
Manganese Total (µg/L)	120	Health	2019
Mercury Total (µg/L)	1.0	Health	
Molybdenum Total (µg/L)	none		
Nickel Total (µg/L)	none		
Potassium Total (µg/L)	none		
Selenium Total (µg/L)	50	Health	
Silver Total (µg/L)	none		
Sodium Total (µg/L)	≤ 200,000	Aesthetic	
Zinc Total (µg/L)	≤ 5000	Aesthetic	

Guidelines Checked May 2, 2024
(ALARA)= As Low As Reasonably Achievable

PMT – 77

Appendix D | 2024 Metal Testing Results

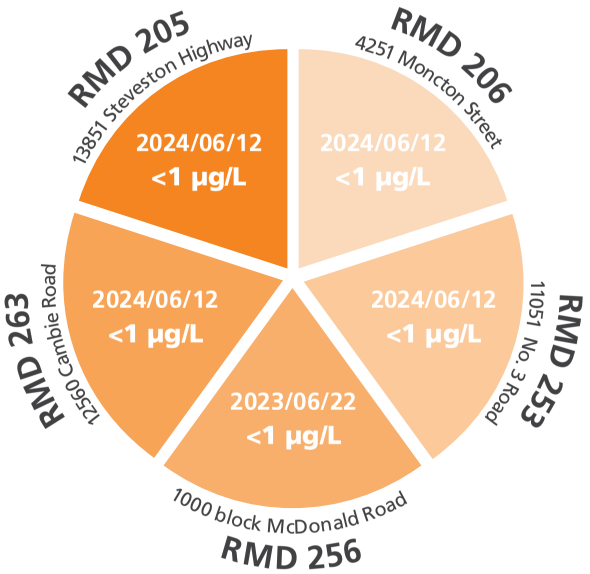
City of Richmond
Municipal Metals

Analysis	Units	RMD 250 6071 Azure Road		RMD 257 6640 Blundell Road		RMD 263 12560 Cambie Road	
Date		**2024-04-17**	**2024-10-11**	**2024-04-17**	**2024-10-11**	**2024-04-17**	**2024-10-11**
Aluminum Total	µg/L	24	22	23	21	24	27
Antimony Total	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Arsenic Total	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Barium Total	µg/L	2.9	3.5	2.9	3.4	2.9	3.5
Boron Total	µg/L	<10	<10	<10	<10	<10	<10
Cadmium Total	µg/L	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Calcium Total	µg/L	8790	8160	8700	7990	8870	7810
Chromium Total	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Cobalt Total	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Copper Total	µg/L	0.8	0.9	0.7	1	0.9	0.9
Iron Total	µg/L	<5	<5	6	<5	6	15
Lead Total	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Magnesium Total	µg/L	224	290	226	283	227	274
Manganese Total	µg/L	3.7	7.4	3.9	8.2	5.0	13.3
Mercury Total	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Molybdenum Total	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Nickel Total	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Potassium Total	µg/L	161	243	159	241	164	239
Selenium Total	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Silver Total	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Sodium Total	µg/L	1720	2700	1710	2700	1840	3000
Zinc Total	µg/L	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0

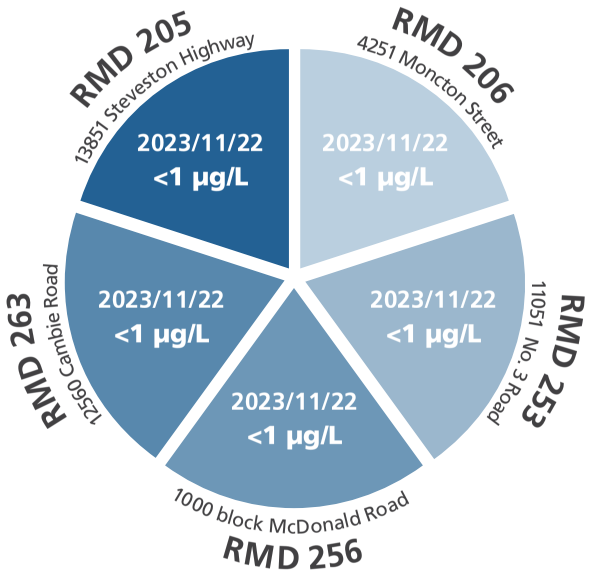
Appendix E | 2024 Vinyl Chloride Results

PWT – 78

June 2024



November 2024



Appendix F | Water Quality Testing Parameters

Weekly sampling is conducted at 40 specific locations throughout the City of Richmond. Sample testing is conducted at Metro Vancouver laboratories to ensure the City's drinking water meets the standards and parameters outlined in the British Columbia Drinking Water Protection Act. Testing is based on the parameters outlined below. Detailed testing results based on these parameters are included in Appendices A through G.

1. Bacterial Parameters

The City of Richmond and Metro Vancouver conduct bacteriological tests for total coliform, fecal coliform and heterotrophic plate counts (HPC). The presence of these organisms in drinking water indicates that the water may be contaminated and may contain potentially harmful bacteria, viruses or parasites.

TOTAL COLIFORMS

Total coliform bacteria reproduce in water, soil or digestive systems of animals. The presence of total coliforms indicates water may have been contaminated or that the disinfection process is inadequate. The number, frequency and location of samples for total coliform testing will vary depending on the type and size of the system and jurisdictional requirements. Provincial standards state that no sample contain more than 10 total coliforms per 100 ml, and that 90% of samples must have zero coliform bacteria in a sample over a 30-day period.

FECAL COLIFORMS

Fecal coliforms are present in large numbers in the feces and intestinal tracts of humans and other warm-blooded animals, and can enter bodies of water and water systems through contamination by human and animal waste. Due to the high risk of diseases and parasites, provincial standards state there can be no detectable fecal coliforms per 100 ml sample.

HETEROTROPHIC PLATE COUNT

HPC tests measure the level of the heterotrophic micro-organism population in the City's drinking water. HPC tests indicate the presence of nutrients that could facilitate the growth of harmful bacteria, and can be a sign of changes in water quality if levels are elevated during treatment and distribution. Higher than normal HPC levels inform operators that there is an unusual increase of stagnant water or low chlorine residuals in the watermains. By reducing the HPC levels through our flushing programs, the possibility of bacteriological growth is decreased because the pipes become an inhospitable environment for bacteria to thrive. The small amount of free chlorine residual in our water also disinfects and eliminates harmful substances within our distribution system.

2. Chemical Parameters

Testing is done for chemicals in the water to ensure the proper amount of chlorine is in the system, to confirm that by products from the disinfection process do not remain in the water and to ensure that naturally occurring chemicals in the water are at acceptable levels.

CHLORINE RESIDUAL

Chlorine residual is a measurement of the free chlorine remaining in the distribution system at the point of delivery to the customer. Chlorine is added to our drinking water by Metro Vancouver as part of the disinfection process to prevent bacterial growth during distribution. When the source lakes experience high turbidity (e.g., during a storm), Metro Vancouver will increase the chlorine that is added to the water at its plants to ensure that the water quality is maintained despite the higher-than-desired turbidity. Typically, the slightly higher concentration of free chlorine in the system dissipates by the time it reaches our system. Sometimes the higher concentration remains in the system and can cause a chlorine taste and smell in the water. Despite the increased chlorine, the water is still safe to drink.

There also needs to be a minimum level of chlorine residual to protect Richmond's water supply from bacteriological contamination or growth. The minimum parameter for free chlorine residual in the water is 0.2 mg/L. In recent years, the City has made great progress in improving chlorine residuals by executing our annual flushing program to clean and flush the watermains.

DISINFECTION BY PRODUCTS

Disinfection by products are potentially harmful compounds produced by the reaction of a water disinfectant (such as chlorine or ozone) with naturally occurring organic matter in water. Two common chlorination by products are trihalomethanes (THMs) and haloacetic acids (HAAs).

THMs that are present in drinking water can enter the human body via multiple routes of exposure. These include ingestion by consuming water and inhalation, and skin absorption from showering and bathing. Under the Guidelines for Canadian Drinking Water Quality (GCDWQ), the maximum acceptable concentration for THMs is 100 parts per billion (ppb). The maximum level for THMs is based on a running annual average of samples taken every three months. High levels on a particular day are not of concern unless they are consistently high over the latest four samples. Typically, THM levels will be highest in the summer and lowest in the winter months.

Under the GCDWD, the maximum acceptable concentration for HAAs is 80 ppb. Like THMs, HAAs are also monitored quarterly and are calculated on a running annual average of samples taken every three months.

The City utilizes the Metro Vancouver laboratory to perform quarterly tests for HAAs and THMs. These were carried out at representative sampling sites in accordance with a joint Metro Vancouver and City of Richmond monitoring plan.

ACIDITY (PH VALUE)

The measurement of acidity is known as pH. A pH below 7.0 is considered acidic, above 7.0 is considered basic and 7.0 is neutral. It is recognized that acidic water will accelerate the corrosion of metal pipes, often causing blue-green staining in household fixtures.

The acidity of our water is controlled by Metro Vancouver. The Seymour-Capilano filtration plant includes pH adjustment and corrosion control in its treatment processes. It is expected that the pH of drinking water will rise in the coming years as the filtration plant reaches its full capacity. Since natural acidity in water corrodes metal pipes over time, the pH increase will extend the lifespan of water plumbing systems and enhance water quality.

METALS

The City's water quality program also includes testing for metals that can be present in natural water sources, including copper, iron, lead and zinc.

Multiple water samples are collected and tested every week.

WT-80

3. Physical Parameters

Tap water in Richmond's distribution system is tested for turbidity and temperature on a weekly basis. Information is also collected on the taste and odour of Richmond's water by actively tracking water quality complaints.

TURBIDITY

Turbidity is a measure of water clarity and cloudiness in the water, and is caused by dissolved substances that are present in the water. Turbidity is measured in Nephelometric Turbidity Units (NTU). The guideline for turbidity should not exceed 5 NTUs in a distribution system providing that source water protection, monitoring and water treatment requirements are met, including increased levels of residual chlorine. Turbidity is a concern because increased turbidity compromises the drinking water disinfection process and can allow microbes to grow or indicate that there is a presence of microbes in the system.

In general, sites with elevated turbidity are located in sections of the distribution network where there is low demand on the water system or where dead-end watermains exist. The increase may be attributed to sediment disturbance in the distribution system.

TEMPERATURE

High temperatures in the distribution system can affect the amount of chlorine residual and can contribute to bacterial growth. Typically, the temperature of drinking water in the distribution system rises during summer months.

TASTE AND ODOUR

Taste and odour are monitored through customer complaints. If the water quality meets all the other parameters set out in this report, the taste and odour of the water should not change. Most of the time the different taste and odour will be the result of an increase in free chlorine, which is safe to drink. However, it's important for the City and Water Services staff to track and react to complaints because it could mean that contamination has occurred somewhere in the system.

Appendix G | Water Sampling Sites

MONDAY

RMD-250	6071 Azure Road
RMD-251	5951 McCallan Road
RMD-252	9751 Pendleton Road
RMD-253	11051 No. 3 Road
RMD-254	5300 No. 3 Road
RMD-255	6000 block Miller Road
RMD-256	1000 block McDonald Road
RMD-269	14951 Triangle Road
RMD-270	8200 Jones Road
RMD-271	3800 Cessna Drive
RMD-272	751 Catalina Crescent
RMD-273	Across from 8331 Fairfax Place
RMD-274	10920 Springwood Court

WEDNESDAY

RMD-257	6640 Blundell Road
RMD-258	7000 block Dyke Road
RMD-259	10020 Amethyst Avenue
RMD-260	11111 Horseshoe Way
RMD-261	9911 Sidaway Road
RMD-262	13799 Commerce Parkway
RMD-263	12560 Cambie Road
RMD-264	13100 Mitchell Road
RMD-266	9380 General Currie Road
RMD-268	13800 No. 3 Road
RMD-277	Across from 11280 Twigg Place
RMD-278	6651 Fraserwood Place
RMD-279	Across from 20371 Westminster Highway

FRIDAY

RMD-202	1500 Valmont Way
RMD-203	23260 Westminster Highway
RMD-204	3180 Granville Avenue
RMD-205	13851 Steveston Highway
RMD-206	4251 Moncton Street
RMD-208	13200 No. 4 Road
RMD-212	Across from 8600 Ryan Road
RMD-214	11720 Westminster Highway
RMD-216	11080 No. 2 Road
RMD-249	23000 block Dyke Road
RMD-267	17240 Fedoruk Road
RMD-275	5180 Smith Crescent
RMD-276	22271 Cochrane Drive
RMD-280	11500 McKenzie Road

Testing for sufficient levels of chlorine in water system.

Appendix H | Specific Emergency Response Plans

Specific Emergency Response Plans

Positive Response for E. Coli or Fecal Coliform

In the event of possible E. coli or fecal coliform contamination, all steps to ensure public health and safety will be taken, including banning water usage if necessary. If a water sample tests positive for fecal coliform, the following response plan will occur.

- The City of Richmond's water quality staff, the Drinking Water Officer and the Medical Health Officer will be notified by the Metro Vancouver laboratory.
- Interim samples from the site will be examined. Interim samples are samples in the period between when the fecal positive sample was taken and when it was determined to be fecal positive.
- Arrangements will be made for the immediate collection of a repeat sample, including, where possible, samples from upstream and downstream sources of the fecal-positive sample.
- Chlorine residual for the sample noted on the sampler's data sheet will be reviewed to determine if a localized loss of disinfectant occurred.
- Water Services staff will be contacted to determine if there was any loss of pressure or other unusual events that may have led to contaminants entering the system.
- The need for a boil-water advisory will be evaluated by the City, the Drinking Water Officer and the Medical Health Officer. If a boil water advisory is deemed necessary, the municipality will carry out various means to inform the public. Metro Vancouver will be informed of this public advisory.
- The City, in consultation with the Medical Health Officer, will determine the need for and extent of a boil water advisory.
- The Metro Vancouver laboratory will initiate procedures to identify species of the fecal positive organism with standard biochemical tests.
- The Medical Health Officer will be contacted with the repeat sample results and the results of the species identification on the fecal positive sample when these tests are complete.

Staff collecting a water sample in a vial for testing.

PWT – 81

A variety of tools are used to test water quality.

Chemical or Biological Contamination Response

In the event of chemical or biological contamination in source waters or the City's distribution system, the following actions will be taken by the City of Richmond and Metro Vancouver:

- Immediately notify Vancouver Coastal Health.
- Identify the chemical and any public health risk factors associated with its presence in potable water.
- Isolate the contaminated zone area and determine the level of contamination.
- Issue a public advisory in consultation with the Drinking Water Officer and Medical Health Officer.
- In the event of possible biological or chemical contamination, all steps to safety will be taken to ensure public health, including banning water usage if necessary.

Turbidity Response

Turbidity (cloudy water) occurs during periods of heavy rain at and surrounding Metro Vancouver water sources. The City of Richmond, in collaboration with Vancouver Coastal Health, developed a turbidity response plan, which considers the City's responsibility for due diligence without unreasonably constraining the water utility's ability to operate the system.

Should there be a turbidity event, the results will be assessed and staff will:

- begin a rigorous sampling program for microbiological activity and residual chlorine;
- monitor the City's supervisory control and data acquisition (SCADA) system with updates sent to Vancouver Coastal Health on a predetermined schedule;
- flush areas and re-test; and
- if necessary (in consultation with Vancouver Coastal Health), issue a public communication and issue a boil-water advisory to residents receiving turbid water.

Response to Interruption of Primary and/or Secondary Disinfection

Upon notification by Metro Vancouver Operations that an interruption in disinfection has occurred, City staff implement several response measures.

- **Staff will monitor residual levels of chlorine at strategic locations in the Metro Vancouver supply area.**
- **The City's SCADA system will be monitored, with updates sent to Vancouver Coastal Health on a predetermined schedule, as set by the health authority.**
- **In cases where chlorine residual is less than 0.2 ppm, City crews will flush the affected area until an acceptable level is achieved.**

These actions will continue until disinfection is resumed and adequate levels of residual chlorine have been reached in the distribution system.

PWT – 82

Response to Loss of Pressure Due to High Demand

Staff will implement several response measures in the event of a pressure loss due to high demand.

- **City staff will attempt to rectify the problem as soon as possible using various demand management techniques and by supplementing supply to problem areas.**
- **Metro Vancouver, the Drinking Water Officer and the Medical Health Officer will be notified of any water quality issues.**
- **City staff will perform chlorine residual tests at various locations to determine if adequate disinfectant is present in the distribution.**

All water quality complaints from the public will be thoroughly investigated due to the potential for water contamination during times of low water pressure.

RESPONSE TO WATERMAIN BREAKS WITH SUSPECTED CONTAMINATION

- **All watermain breaks where chemical or microbiological contamination of the system are suspected will be immediately reported to the Drinking Water Officer and the Medical Health Officer.**
- **The municipality will isolate the contaminated section from the rest of the distribution system. Once the watermain has been repaired, chlorine residual testing will be conducted at various locations affected by the main break.**

If low chlorine residuals are found, necessary actions to increase the levels of free chlorine will be carried out. If bacterial contamination is suspected, water samples will be analyzed and appropriate action taken.

Appendix I | References

1. Government of Canada – Canadian Drinking Water Guidelines
   www.hc-sc.gc.ca/ewh-semt/water-eau/drink-potab/index_e.html
2. BC Drinking Water Protection Act (2020)
   www.bclaws.gov.bc.ca/civix/document/id/complete/statreg/01009_01
3. BC Laws – Schedule A Water Quality Standard for Potable Water
   www.bclaws.ca/EPLibraries/bclaws_new/document/ID/freeside/200_2003#ScheduleA
4. Government of British Columbia – Source Drinking Water Quality Guidelines
   www2.gov.bc.ca/assets/gov/environment/air-land-water/water/waterquality/water-quality-guidelines/approved-wqgs/drinking-water-and-recreation/source_drinking_water_quality_guidelines_bcenv.pdf
4. Government of British Columbia –Drinking Water Officers Guide
   www2.gov.bc.ca/gov/content/environment/air-land-water/water/water-quality/drinking-water-quality/drinking-water-officers-guide
5. Government of British Columbia – Legislation – Drinking Water Protection Act
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6. Metro Vancouver – Water Services
   metrovancouver.org/services/water
7. Metro Vancouver – Drinking Water Treatment Facilities
   metrovancouver.org/services/water/water-treatment-facilities
8. Metro Vancouver – Coquitlam UV Disinfection Project
   metrovancouver.org/services/water/Documents/coquitlam-ultraviolet-fact-sheet-update.pdf
9. Metro Vancouver – Seymour-Capilano Filtration Project
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10. Metro Vancouver – We Love Water
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11. City of Richmond – Hot Facts
    www.richmond.ca/culture/discover-richmond/profile/demographics.htm

Issued April 2025

Richmond

PWT – 83

City of Richmond

Report to Committee

To:	Public Works and Transportation Committee	**Date:**	March 17, 2025
From:	Lloyd Bie, P.Eng. Director, Transportation	**File:**	10-6450-09-01/2025-Vol 01
Re:	**River Road - Traffic Assessment**		

Staff Recommendation

That the staff report titled "River Road – Traffic Assessment" dated March 17, 2025 from the Director, Transportation, be received for information.

Lloyd Bie, P.Eng.
Director, Transportation
(604-276-4131)

Att. 1

REPORT CONCURRENCE		
ROUTED TO:	**CONCURRENCE**	**CONCURRENCE OF GENERAL MANAGER**
Engineering	☑	
RCMP	☑	
SENIOR STAFF REPORT REVIEW	**INITIALS:**	**APPROVED BY CAO**

Staff Report

Origin

At the July 17, 2024 Public Works and Transportation Committee, staff received direction to:

> *That the presentation from John McKendry regarding traffic safety along River Road and Westminster Highway be referred to transportation and community safety staff to review the situation as it currently stands, including enforcement and possible other steps for improvement, especially from a safety point of view.*

This report addresses this referral.

This report supports Council's Strategic Plan 2022-2026 Focus Area #1 Proactive in Stakeholder and Civic Engagement:

> *Proactive stakeholder and civic engagement to foster understanding and involvement and advance Richmond's interests.*

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.*

Analysis

Background

River Road between No. 6 Road and Westminster Highway is classified as a Minor Arterial Road approximately 8.5 km in length. The corridor is primarily industrial in the west, agricultural in the middle, and residential/industrial in the east. The road is used by local residents as well as large truck operators and employees accessing industrial properties. On weekdays, some commuters may use the route to avoid traffic congestion on Highway 91 and Westminster Highway while on weekends the roadway is a popular destination for cyclists, particularly cycling clubs with larger groups of cyclists.

Over the past 15 years, a number of traffic safety enhancements have been implemented along this corridor including:

- Installation of digital driver feedback sign (2).
- Addition of "Single File" and "Caution Watch for Cyclists" signage.
- Construction of an asphalt walkway with concrete barrier between No. 6 Road and Burdette Street.
- Installation of six speed humps in the 18,000-block of River Road where a 30 km/h speed zone is in effect.
- Implementation of a 9-tonne load limit and 30 km/h speed limit for trucks is in effect between No. 7 Road and Westminster Highway.

Previous Consultations (2017)

In 2017, in response to speeding concerns, area residents and businesses were engaged to seek their feedback regarding the proposed installation of 20 speed humps along River Road between No. 7 Road and Westminster Highway. Based on the lack of support from the engagement process, speed humps were not implemented.

Current Conditions on River Road

Speed Study and Crash History

Table 1 provides a summary of the collision data and vehicle speeds on River Road.

Table 1: Results of River Road Traffic Assessment

Road Section	Collisions	Collisions involving Cyclists	85th Percentile Speed (km/h)
No. 6 Road/River Road	21	-	58
Between No. 6 Road and No. 7 Road	43	2	68
No. 7 Road and River Road	17	1	77
Between No. 7 Road and No. 8 Road	4	1	76
No. 8 Road and River Road	8	-	76
Between No. 8 Road and Nelson Road (existing speed humps and 30 km/h zone)	-	-	45
Between Nelson Road and Westminster Highway	18	-	73
Westminster Highway and River Road	21	1	65
Total	**132**	**5**	**67 km/h average**

During the five-year period of 2019 to 2023 (the most recent available crash data from ICBC), a total of 132 crashes were recorded on River Road between No. 6 Road and Westminster Highway. None of the incidents were identified to result in a fatality. Of the 132 crashes, approximately 61% occurred between No. 6 Road and No. 7 Road (including 21 crashes at No. 6 Road). 39% of the total collisions occurred between No. 7 Road and Westminster Highway (including 21 crashes at Westminster Highway).

The locations of the collisions are predominantly at the intersections along this corridor. The intersections of River Road and No. 6 Road and River Road and Westminster Highway experience the highest number of collisions with each having an average collision rate of four collisions per year. To be considered a collision prone intersection, a minimum frequency of 25 collisions per year[1] would have to be reached. Although, the data demonstrates the presence of speeding and collisions, River Road is not considered a collision prone area.

[1] Transportation Association of Canada Canadian Guide to In-service Road Safety Review (TAC Road Safety Review Guide)

Existing Speed Humps - 18,000 Block of River Road

There are six existing speed humps along the section of River Road between No. 8 Road and Nelson Road. The technical assessment confirmed the effectiveness of these speed humps as there are no recorded collisions in the latest 5-year crash data along this section. The vehicle speeds in this section are lower (45 km/h) compared to the rest of River Road, where the 85 percentile speeds range from 58 km/h to 77 km/h.

Potential Speed Management Options

Based on the technical assessment and road geometry, a potential traffic calming plan targeting speeding at the collision locations was developed (Attachment 1).

To address the majority of collisions (61%) occurring on the 1.5 kilometre section of River Road from No. 6 Road to No. 7 Road, five speed cushions with a minimum spacing of 400 metres were proposed. This data driven approach aims to address the conflicts between cyclists and the relatively higher volumes of trucks accessing the industrial businesses along this section of River Road.

For the remaining seven kilometres east of No. 7 Road, comprising 39% of the total collisions, four speed cushions, spaced no closer than one kilometre apart, were proposed.

The traffic calming plan with the options of speed cushions (9 total) and/or a reduced posted speed limit along the entire 8.5 kilometre stretch of River Road (Attachment 1), was presented to area residents and businesses for feedback.

Consultation on Proposed Speed Mitigation Options

Community Meeting

A meeting with area residents was held on December 5, 2024 at the Cambie Community Centre. The results of staff's technical assessment along with potential traffic calming measures were presented for feedback (Table 2).

Table 2: Results of Community Meeting

Attendees	Purpose	Feedback/Outcome
20	• Present staff's technical assessment. • Discuss concerns and options for traffic calming measures.	• Speeding was identified as the primary concern for residents. • Majority of attendees supported no road changes with a preference instead for increased enforcement. • 6 attendees indicated that they wanted speed cushions. • 3 attendees indicated that they wanted 30km/h speed limit reduction.

Results of Resident Survey

From January 16, 2025, to February 7, 2025, residents were surveyed to determine the level of support for the proposed traffic calming measures. A total of 184 surveys were mailed out to each discrete address, with 37 responses received for a 20% response rate.

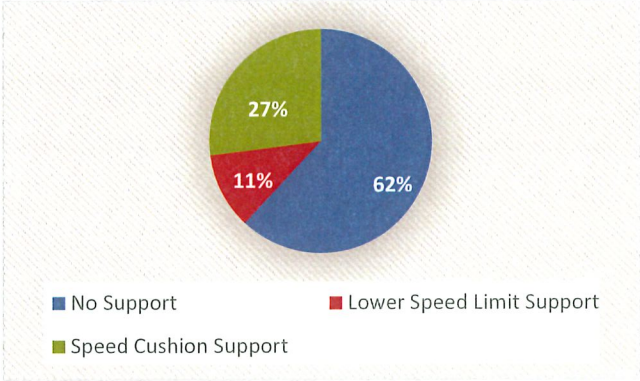


Figure 1: Results of Community Responses

Of the 37 respondents, 23 (62%) did not support any traffic calming measure or speed limit reduction on River Road. Four respondents (11%) supported lowering the speed limit and 10 respondents (27%) supported the speed cushions (Figure 1).

As the results of the survey did not support any traffic calming on River Road to address speeding, staff do not recommend the implementation of the nine speed cushions. Of the respondents who were not in favour of installing speed cushions, the most commonly cited concern was the inconvenience to residents. Increased enforcement was indicated by several respondents as a preferred solution to mitigate speeding.

The City also received correspondence via email from residents expressing opposition to any traffic calming on River Road.

Speed Enforcement

Resident feedback indicates a preference for increased enforcement on River Road in lieu of physical changes to the roadway.

Richmond RCMP

In 2024, Richmond RCMP issued a total of 29 tickets on River Road. This included a total of 15 tickets for speeding, and one for excessive speeding.

The Richmond RCMP advises that targeted enforcement with high visibility presence on River Road occurs when the opportunity affords. The RCMP is also committed to other higher priority "hotspots" in the city, identified as a result of higher collision statistics through intelligence led data analysis that they prioritize.

Automated Speed Enforcement

Automated enforcement is an important tool to remind drivers to slow down and drive safely. These programs utilize a camera for enforcement and have an advantage over traditional enforcement as they can operate 24 hours per day, seven days per week.

This would benefit River Road. The automated speed enforcement programs are within provincial jurisdiction and operated by ICBC. Letters to the Province requesting additional automated enforcement technology in Richmond have previously been sent by the City. A response received from the Province in 2023, indicated the Province's focus on monitoring and evaluating the existing cameras and exploring different approaches to maximize road safety. To date, the Province has not increased the number of locations with automated enforcement in the City.

Staff believe these cameras are an effective enforcement tool and will continue to work with the Province to encourage the implementation of more safety cameras within Richmond.

Future Dike

The majority of River Road between No. 6 Road and Westminster Highway sits on top of the existing dike. The City's Dike Master Plan Phase 4 identifies this section for future dike raising to enhance flood protection. As plans for dike upgrades progress, options to improve road safety will also be considered.

Financial Impact

None.

Conclusion

A presentation for speed mitigation and traffic safety was received from a resident of River Road. A traffic study confirmed speeding on River Road between No. 6 Road and Westminster Highway. Traffic calming measures to address speeding were presented to area residents and businesses. Comments received at an open house and responses from a survey demonstrated a lack of support for any physical changes to this roadway. 62% of the survey responses were opposed to any traffic calming measures on River Road. This negative outcome is consistent with the 2017 consultation results when residents opposed the installation of 20 speed humps along River Road.

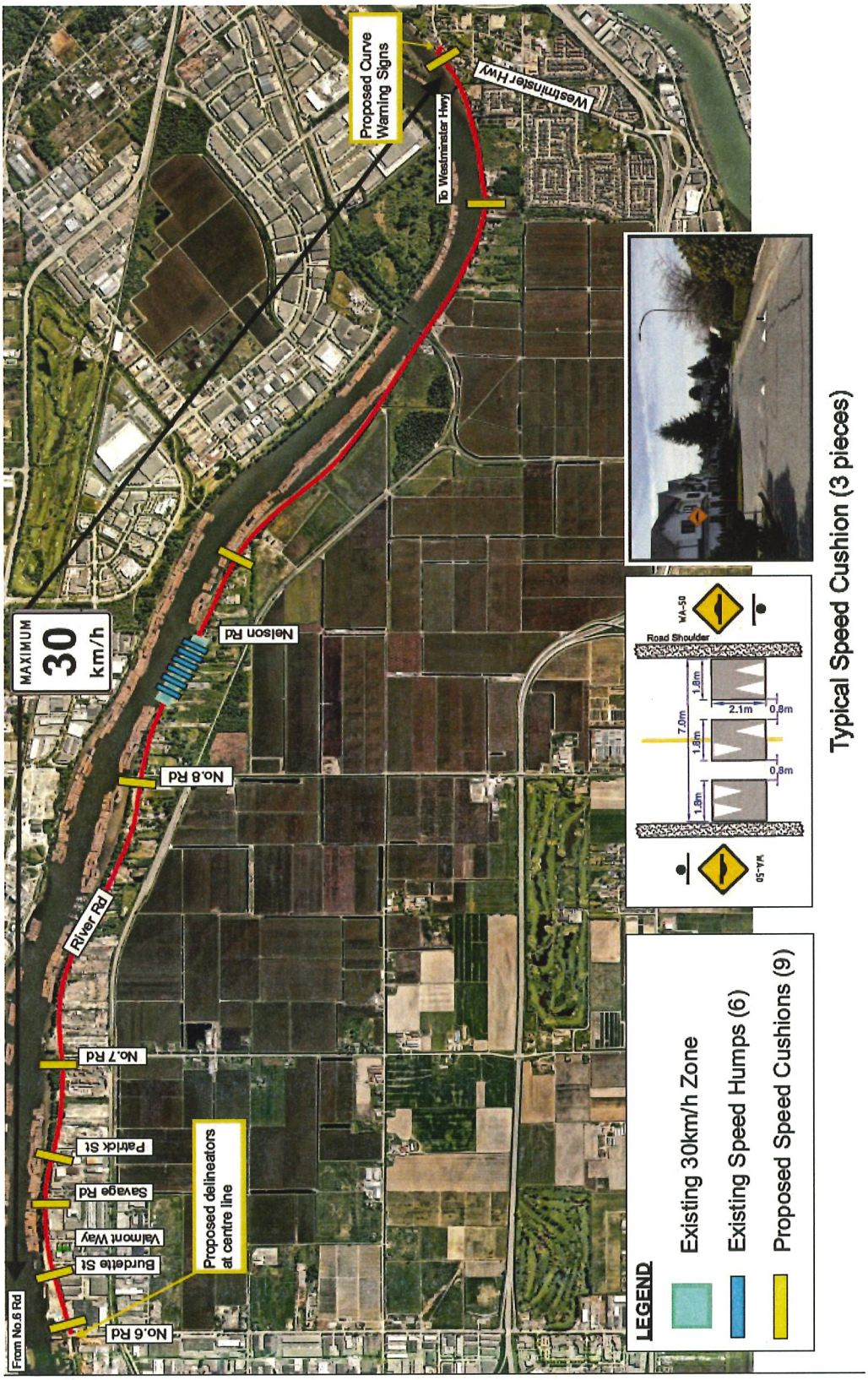
Without adding any physical traffic calming measures, speed compliance on River Road will rely on enforcement. Staff will also continue to advocate for increased automated enforcement locations in Richmond with the Province.

Sonali Hingorani, P.Eng
Manager, Transportation Planning and New Mobility
(604-276-4049)

SH:ck

Att. 1: Review of Potential Traffic Calming Options on River Road

Review of Potential Traffic Calming Options on River Road



City of Richmond

Report to Committee

To:	Public Works and Transportation Committee	**Date:**	March 19, 2025
From:	Suzanne Bycraft Director, Public Works Operations	**File:**	10-6370-01/2025-Vol 01
Re:	**Recycling and Solid Waste Management – Report 2024: Exploring New Ways to Reduce Waste**		

Staff Recommendations

1. That the planned initiatives as outlined in the report titled, "Recycling and Solid Waste Management - Report 2024: Exploring New Ways to Reduce Waste", dated March 19, 2025, from the Director, Public Works Operations, be endorsed; and

2. That the "Recycling and Solid Waste Management - Report 2024: Exploring New Ways to Reduce Waste" be made available to the community on the City's website and through various communication tools including social media channels and as part of community outreach initiatives.

Suzanne Bycraft
Director, Public Works Operations
(604-233-3338)

Att. 1

REPORT CONCURRENCE	
CONCURRENCE OF GENERAL MANAGER	
SENIOR STAFF REPORT REVIEW	INITIALS:
APPROVED BY CAO	

Staff Report

Origin

This report presents the City's annual progress in recycling and sustainable waste management practices, highlights results achieved in 2024 and provides insights into upcoming planned initiatives as outlined in the attached "Recycling and Solid Waste Management – Report 2024: Exploring New Ways to Reduce Waste".

This report supports Council's Strategic Plan 2022-2026 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.*
>
> *5.3 Encourage waste reduction and sustainable choices in the City and community.*

Analysis

With Council's leadership and commitment to fostering circularity through the *Richmond Circular City Strategy* and the *Community Energy and Emissions Plan*, the City remains dedicated to providing a wide array of reduction, recycling, and waste management services in support of this vision. Additionally, the City actively engages in communication and community outreach efforts to raise awareness about available services, promote proper recycling practices, and inspire positive behaviour change among residents.

"Recycling and Solid Waste Management – Report 2024: Exploring New Ways to Reduce Waste" ("Report") provides the City's annual progress update for 2024 (Attachment 1). The Report also includes detailed program information, insights into upcoming initiatives and a comprehensive section of tips and resources to support waste management efforts.

2024 Highlights

In 2024, the City prioritized continuous improvement to explore innovative ways to reduce waste and raise awareness about proper recycling practices. As part of this effort, the City introduced a range of tailored pilot programs aimed at enhancing recycling within the commercial sector, expanded outreach to collaborate with community members about sustainable waste management, and launched communication campaigns to encourage behaviour change to reduce and address challenges associated with materials requiring special handling. These initiatives contribute to a circular economy by decreasing reliance on raw materials and conserving valuable natural resources. Following are key highlights from 2024:

- **Business Recycling Resources Program:** Launched a pilot program which includes a robust toolkit to meet businesses where they are at on the waste management spectrum. Staff are available to perform site assessments alongside business owners/operators to identify waste management needs such as, recycling streams, bin placement, customer versus employee bins, waste reduction strategies, and more. Staff offer guidance and advice throughout the entire process, tailoring feedback to each business's unique needs. The program has reached over 14,000 Richmond businesses through various communication tactics including newsletters and business license renewals, with staff conducting 318 door-to-door visits.

- **Multi-Family Grease Collection Pilot:** Expanded to include "hidden fats" like butter, dressings, gravy, and mayonnaise, leading to a 35% increase or approximately 65.83 kg in collection compared to the previous year.

- **Textile Waste Reduction Initiative:** Expanded the "Let's Rethink Waste" campaign to focus on textiles, hosted pop-up Reuse events and expanded the Repair Fairs with teddy bear repair and sewing circles resulting in 395 pieces fixed at 11 events. Additionally, the City joined the Canadian Circular Textiles Consortium to advance circular practices and reduce textile waste nationwide.

- **Bike Reuse Pilot Program:** Launched a one-year pilot to refurbish and donate bikes and bike accessories collected at the Recycling Depot to the community.

- **Dog Waste Pilot Program:** Installed dedicated red bins for dog waste in three parks, diverting an estimated 11,000 kg of waste from landfills by the end of 2024, averaging 1,000 kg per month.

- **Communications and Outreach:** Received Gold Quill awards from the International Association of Business Communicators for two campaigns, "Rethink Waste: Think Tank & Ideas Hub" and "Richmond's Single-Use Plastic Ban". In 2024, staff supported 16,829 customer calls and delivered 54 outreach activities with 2,416 attendees.

- **Richmond Recycling Depot:** 275,439 vehicle visits occurred at the Recycling Depot, equating to an average of 755 vehicles per day. During their visits, customers dropped-off more than 6,945 tonnes of recyclable materials.

- **Public Spaces and Litter Management:** In City public spaces, garbage and recycling bins were attended 34,212 times per month, for a total of 470,448 bin visits per year to help keep our community clean.

- **Waste Diversion:** Residents in single-family homes continue to recycle about 79% of their household waste through various recycling and waste reduction programs. The Blue Box and Blue Cart programs recycled 6,996 tonnes of packaging, containers and paper, while the Green Cart program diverted 21,815 tonnes of food scraps and yard trimmings from the landfill, transforming them into nutrient-rich soil.

2025 Focus Areas

The City will continue to support the transition to a circular economy by exploring new technologies and implementing new initiatives to increase recycling and reduce waste. Key focus areas in 2025 will include:

- Explore the use of artificial intelligence to help identify contamination in collection trucks to collect data and enable timely recycling feedback to residents.
- Evaluate the Bike Reuse Pilot Program and bring forward recommendations for next steps.
- Explore camera technologies to reduce instances of illegal dumping in secluded public spaces. In 2024, the City responded to 891 illegal dumping calls, costing a total of $165,000.
- Evaluate the Dog Waste Pilot Program and present recommendations for next steps.
- Continue engagement efforts to encourage residents to recycle correctly, rethink waste and shift to a circular economy where materials we use stay in circulation.
- Install clothing and textile donations bins at the Recycling Depot.
- Report back on the development and implementation of the Business Recycling Resources Program with recommendations.
- Launch the refresh of the WeRecycle corporate recycling program to encourage greater program participation and improve recycling.

The impact of trade tariffs on the waste and recycling industry could include significant reductions in consumer purchasing as the cost of goods rise, particularly since consumption habits directly correlate with overall waste generation. This would translate to lower garbage and recycling volumes being generated. Similarly, tariffs could increase operating costs for machinery and equipment used in the waste/recycling industry. Tariffs on recycling commodities could cause a reduction in export opportunities for various materials such as aluminium, steel, paper, plastics, etc. resulting in a surplus of materials, reducing the value of these commodities. It is too early to assess these impacts at this time, however staff will continue to monitor the situation and advise if any changes to costs or recycling commodity markets occur which could have a material impact to any of the City's services or programs.

Proposed Communication

Subject to Council's endorsement, the annual "Recycling and Solid Waste Management – Report 2024: Exploring New Ways to Reduce Waste" will be accessible on the City's website and shared through various communication channels as part of community outreach initiatives.

Financial Impact

None. Programs and services identified in this report are funded through the City's utility fees as approved in the annual Sanitation & Recycling Utility budget.

Conclusion

The City is providing residents with an annual progress report through "Recycling and Solid Waste Management – Report 2024: Exploring New Ways to Reduce Waste". This report showcases Council's leadership and dedication to sustainable, circular waste management practices, while highlighting responsive services, responsible governance, and accessible information and communication.

Kristina Grozdanich
Manager Recycling and Waste Recovery
(604-244-1280)

KG:lh

Att. 1: Recycling and Solid Waste Management – Report 2024: Exploring New Ways to Reduce Waste

City of Richmond Recycling and Solid Waste Management

REPORT 2024

EXPLORING NEW WAYS TO REDUCE WASTE

Richmond

Environmental Programs is responsible for residential garbage and recycling services, including collection, drop-off services at the Richmond Recycling Depot, public spaces recycling and litter collection services.

With Council's leadership and commitment to strategic planning and policy, we strive to help create more sustainable waste management through our programs and services to support a circular economy. We believe that it is our responsibility to support our community and preserve our planet for future generations.

Through outreach and engagement, working with our residents and local businesses, and partnering with local agencies, we also strive to meet and exceed all regional waste diversion goals by continuously expanding our programs and service offerings.

Contents

Exploring New Ways to Reduce Waste

Recycling is only one aspect of sustainable waste management. To support a circular economy, it's equally important to reduce waste overall.

The City of Richmond is focusing on continuous improvement to explore new ways to reduce waste, including introducing new programs and services that make it easy to repair, reuse, donate and repurpose household items. These measures support a circular economy by reducing reliance on raw materials and conserving natural resources.

Other key strategies in the City's Community Energy and Emissions Plan 2050 and Richmond Circular City Strategy include maximizing the value of resources and reducing carbon emissions, as well as encouraging responsible consumption and minimizing waste. These actions are part of the global effort to be more sustainable and reduce environmental impacts.

Towards this goal, the City advocates for partnerships and regulatory measures that reflect its strategic priorities. This includes implementing community engagement campaigns and educational outreach programs to raise awareness about its programs and services, as well as tips and other resources to encourage actions that increase recycling, ensure recyclables are being sorted correctly, minimize impacts on the environment and reduce waste generated in our community.

By collaborating with the community, Richmond aims to be a fully circular city by 2050.

1

LET'S REDUCE REUSE RECYCLE

PWT – 99

1.0 Annual Outlook

While the City of Richmond provides multiple programs, services and educational outreach opportunities, it takes community action to generate successful recycling and waste reduction outcomes.

Richmond residents with curbside collection have demonstrated their commitment to recycling, consistently achieving 79% waste diversion levels. However, there are always opportunities to improve the quality and quantity of recycling and help reduce waste overall.

In 2024, the City continued to explore new ways to leverage these opportunities and raise awareness about how to recycle correctly and reduce waste. Some of the key focus areas included creating a new program to support increased recycling in the commercial sector, expanding outreach to collaborate with community members who share an interest in sustainable waste management, and developing customized pilot programs and communication campaigns to help reduce waste and address challenges with waste that requires special handling.

Following the completion of the commercial recycling services review, the City launched a new Business Recycling Resources program for a one-year pilot that includes a toolkit to guide businesses through the steps of how to assess their waste, determine the right mix of recycling bins and create a Recycling and Waste Reduction Plan to help recycle correctly and reduce waste.

The program includes outreach by City staff to raise awareness about the new resources and why it is important to recycle, including regulatory requirements such as regional bans. The goals are to increase the commercial recycling rate, which is currently lower than residential recycling, and ensure that the commercial sector in Richmond is adhering to all regulatory requirements. The program has already reached more than 14,000 Richmond businesses through the door-to-door visits, phone calls, and promotion through various City channels and local associations.

Continued >

PWT – 100

Over the past year, Richmond remained focused on supporting a circular economy by encouraging community members to rethink waste.

Recognizing that recycling in multi-family complexes has a higher rate of issues with materials being recycled incorrectly, the City also began an assessment of its Recycling Champion program in 2024 and completed a refresh and relaunch that included recruiting residents to lead the program in their building. This outreach program is a collaborative process that supports the Recycling Champions with the tips, information and resources they need to help residents in their building recycle correctly.

The City also continued its pilot program to collect used cooking oil, fats and grease from multi-family complexes. Approved in 2022, the Multi-Family Grease Collection pilot was rolled out to six multi-family complexes with 934 units having access to participate in the program. In an effort to encourage usage, the City expanded the program in 2024 to include "hidden fats" such as butter, salad dressings, gravy and mayonnaise. This material expansion resulted in a 35% increase in the volume collected over the same period the year prior.

In addition to these initiatives to increase waste diversion and support recycling correctly, the City is also continuing to explore new ways to reduce waste to support Richmond's Community Energy and Emissions Plan 2050 and the Richmond Circular City Strategy.

One of the new target areas in 2024 focused on reducing textile waste. Textile waste is increasing significantly due in large part to "fast fashion" that capitalizes on quick changing trends to fuel the manufacturing of low-quality textiles with quick production times, decreased durability and lower prices.

Textile waste includes residential and commercial fabrics; however, clothing represents more than 60% of textiles. Staff estimate Richmond clothing waste is about 1,800 tonnes per year. Not only is there significant growth in textile waste, there are limited options for recycling these materials. Extending the life of textiles through reuse, repair and repurposing is one of the key ways the City can help to reduce this waste.

On April 22, 2024, Council approved a textile waste reduction initiative, which includes a multi-faceted approach to increase collection opportunities, enhance education and outreach, address internal processes and advocate for a provincially regulated program to manage post-consumer textiles. In addition to its advocacy measures, the City also leveraged its "Let's Rethink Waste" community education and outreach campaign with a focus on clothing and other textiles.

The City also hosted pop-up Reuse events at its popular Repair Fair events in the fall to provide opportunities to donate/swap clothing and other textiles and joined the Canadian Circular Textiles Consortium to collaborate with other interested organizations to help advance circular practices and foster collective actions to reduce textile waste nationwide.

As another measure to support a circular economy through repair and reuse initiatives, the City launched a Bike Reuse Pilot Program in August 2024. This one-year program is designed to promote reuse by refurbishing bikes and bike accessories collected at the Recycling Depot and then donating them back to the community. For more information about this pilot program, see page 25.

While residential and commercial recycling remains a significant portion of waste management in Richmond, the City also provides recycling and waste collection in public spaces. In 2024, the City introduced a pilot program for dog waste, which involved installing dedicated red bins for dog waste within the off-leash dog areas at McLean Neighbourhood Park, Aberdeen Neighbourhood Park and Steveston Community Park. From the launch of the program in March to the end of 2024, an estimated 11,000 kg of dog waste has been diverted from the landfill, averaging to approximately 1,000 kg per month.

Together, these expanded services and new programs are designed to target key areas for improving recycling and reducing waste in Richmond as part of supporting a circular economy and more sustainable waste management.

LET'S RETHINK WASTE

Changing our habits to think differently about purchases, avoiding unnecessary waste and finding ways to reuse and recycle products contribute directly to positive outcomes like reducing reliance on raw materials.

Ultimately, it's about shifting to a circular economy, where the materials we use stay in circulation to be used, reused or repaired, and recycled multiple times into new products.

TOP TIPS TO REDUCE WASTE:

- Avoid single-use items – choose reusable instead
- Choose products with minimal packaging
- Buy, sell, trade or donate household items
- Choose products with recycled content
- Repair products when possible
- Rethink – take a moment to assess:
  - Do I need this item?
  - Will it create unnecessary waste?
  - How can it be reused or recycled?

Together we can change habits and make better choices that support a circular economy.

PWT – 102

1.1 2024 Top Accomplishments

This report showcases some of the key achievements in 2024 and looks back on the City's top accomplishments over the past 30-plus years.

RECYCLING MILESTONES

1990
Launched Blue Box program

1991
Opened parking lot recycling depot at 5599 Lynas Lane

1992
Launched backyard compost bin distribution program

1993
Opened Richmond Recycling Depot at 5555 Lynas Lane

1995
Launched Blue Cart program

1996
Launched weekly curbside yard trimmings collection

2010
Launched Green Can program

2013
Launched Green Cart program for single-family homes and townhomes

Launched Large Item Pick Up program

2015
Launched Green Cart program for multi-family complexes

1 LAUNCHED A BIKE REUSE PILOT PROGRAM

Program supported the repair of 10 donated bikes, with 445 spare parts and accessories recovered for reuse.

2 IMPLEMENTED BUSINESS RECYCLING RESOURCES PROGRAM PILOT PROJECT

Provided support and resources to help Richmond businesses increase recycling and manage their waste.

3 WON INTERNATIONAL AWARDS FOR TWO CAMPAIGNS

"Rethink Waste: Think Tank & Ideas Hub" and "Richmond's Single-Use Plastic Ban" received Gold Quill awards from the International Association of Business Communicators.

4 EXPANDED GREASE COLLECTION PILOT PROGRAM

Added fats to the program and engaged with participating complexes, resulting in an overall increase in volume collected.

5 ADVANCED TEXTILE WASTE REDUCTION AND AWARENESS

Joined a national textile consortium and expanded Repair Fairs with teddy bear repair and sewing circles, resulting in 395 pieces fixed at 11 events.

6 HOSTED TWO SUCCESSFUL SHRED-A-THON EVENTS

Helped residents shred important confidential documents and recycle 11.62 tonnes of paper.

7 IMPLEMENTED DOG WASTE COLLECTION PILOT PROJECT

Added seven containers at three dog parks to divert and properly dispose of dog waste at the Iona Wastewater Treatment Plant.

8 REFRESHED THE RECYCLING CHAMPION PROGRAM

Updated outreach materials and hosted two workshops to recruit, engage and support volunteers in multi-family complexes with the goals of increasing recycling and reducing contamination.

2016

Launched biweekly Garbage Cart program

2019

Introduced *Single-Use Plastic and Other Items Bylaw No. 10000*

Expanded Large Item Pick Up Program

Expanded hours and items accepted at Richmond Recycling Depot

2020

Renovated Recycling Depot and expanded items accepted

2021

Adopted *Single-Use Plastic and Other Items Bylaw No. 10000*

Extended Recycling Depot operations to 7 days a week and expanded items accepted

2022

Implemented *Single-Use Plastic and Other Items Bylaw No. 10000*

Expanded items accepted at Recycling Depot

2023

Earned national awards for the Rethink Waste and Single-Use Plastic Ban engagement campaigns

2024

Launched a business recycling pilot program

Earned international awards for two campaigns

PWT – 104

1.2 Setting Goals

Richmond's long-term goal is to support a circular economy through sustainable waste management, and the annual goals listed here are designed to help achieve this target.

1 ENHANCE TEXTILE RECYCLING

Incorporate textile messaging into "Rethink Waste" outreach, review textile use at City events and install textile donation bins at the Recycling Depot.

2 USE DATA TO IMPROVE RESIDENT RECYCLING

Explore the use of artificial intelligence on collection trucks to collect data and enable timely recycling feedback to residents.

3 ADDRESS SMALL-SCALE MULTI-UNIT HOUSING

Develop guidelines and billing system for single-family properties with multiple units.

4 EVALUATE BIKE REUSE PILOT PROGRAM

Assess pilot program introduced in 2024 and bring forward recommendations for next steps.

5 ASSESS BUSINESS RECYCLING PROGRAM

Report on development and implementation of the Business Recycling Resources Program, a one-year pilot project, and make recommendations for next steps.

6 REDUCE ILLEGAL DUMPING

Explore camera technologies to reduce illegal dumping in public spaces.

7 REFRESH CORPORATE RECYCLING PROGRAM

Update WeRecycle program to encourage greater participation and improve recycling quality.

8 CONTINUE COMMUNITY ENGAGEMENT

Continue engagement efforts to encourage residents to recycle correctly, rethink waste and shift to a circular economy where materials we use stay in circulation.

1.3 Inspiring Newcomers to Recycle

Newcomers to Canada face many challenges including adapting to new languages, regulations and culture. Even everyday tasks, such as managing household waste, can be different.

That's why S.U.C.C.E.S.S. and the City of Richmond partner to help newcomers learn the do's and don'ts of recycling – including City-led workshops and tours of the Richmond Recycling Depot, where newcomers become recycling experts.

"We've been benefitting from this program for so many years," says April Toh, an instructor with LINC (Language Instruction for Newcomers to Canada), a program operated by S.U.C.C.E.S.S to teach newcomers English and important skills to help navigate day-to-day life. "Our newcomers are so appreciative of the opportunity to learn about recycling."

In the last three years alone, Richmond has provided workshops and/or Recycling Depot tours to nearly 1,000 newcomers. The latest group of LINC participants recently visited the Recycling Depot, where they first learned the "why, how and what" about recycling in a fun, interactive workshop, before touring the Recycling Depot to see firsthand the wide range of items that can be recycled there.

As part of the workshop and tour, City staff members do more than just explain what goes into the bins; they provide the bigger picture about why it is important to keep waste out of the landfill and emphasize that the success of recycling programs starts at home. They also explain that when recyclables are placed in the wrong bin or put in the garbage, it is considered contamination. The City may be fined or the City's contractors may not collect the bins as recycling processors will not accept contaminated recycling loads.

The latest LINC group mostly consisted of newcomers from China, but also included newcomers from Korea and Russia. They were eager to learn, and the in-person tour provides opportunities to ask questions with the support from S.U.C.C.E.S.S. providing translation assistance on the spot. They enthusiastically took on a team challenge to sort a large bag of disposable items into the right bin.

Quick learners, the group scored well, with only a few misplaced items. The learning is also assisted by fun animated videos, with plenty of tips about avoiding common mistakes such as not properly rinsing food containers, failing to flatten cardboard boxes or stacking items together in your Blue Box.

Another common error is buying bags labelled compostable or bio-degradable to use in disposing of food scraps in the Green Cart. These bags aren't accepted at Richmond's organic waste processor as they take too long to decompose.

"I really enjoyed the opportunity to learn about recycling," said newcomer Grace Shin. "I feel a little bit guilty because I was doing some things wrong, but after today I think we can do a better job of recycling."

The newcomers learned some easy tips to make recycling easier, such as using the Richmond Recycling app to search how and where to recycle thousands of items, plus set up reminders about garbage and recycling pick-up dates. The group also came alive when shown samples of new products that had been created from recycled materials.

"This is so cool," said Shin, handling a fabric lanyard made from recycled plastics. The group was also fascinated by crown moulding made of recycled Styrofoam and news that the Minoru Oval track is made of recycled rubber tires.

While the newcomers said they had recycling programs in their homelands, the opportunities in Richmond are much broader, particularly thanks to the ability to take so many items to the Recycling Depot. They all welcomed the opportunity to learn more about Richmond's programs.

"I thought I knew everything (about recycling)," said fellow newcomer Jenny Shan. "But I didn't know so many things could be recycled." Shan said she not only plans to be a better recycler, but will share what she learned with her neighbours.

S.U.C.C.E.S.S. is a key partner in Richmond's community outreach program. Richmond also partners with schools and Scouts Canada for workshops and/or Depot tours to raise awareness about how to recycle correctly and reduce waste.

All Richmond residents and community groups can take advantage of free in-person and virtual workshops on recycling, as well as tours of the Recycling Depot. Residents can also become community champions, helping to empower themselves and neighbours to recycle correctly. Learn more at richmond.ca/recycle.

2

EXPLORING NEW WAYS TO REDUCE WASTE

2.0 Tracking Our Progress

As part of tracking its progress, the City of Richmond collects data across a broad spectrum of programs, services and activities. This data shows changes in resident recycling and waste diversion over the years, and how new programs are contributing to a circular economy.

The mix of data reported reflects the amount of recycling handled through residential collection programs, the usage and types of materials dropped off at the Richmond Recycling Depot, and a breakdown of the different types of recyclable materials that are being diverted from the landfill through multiple recycling programs.

As well, the City has a number of outreach initiatives that are aimed at increasing awareness and understanding about how to recycle correctly and consistently, and how to reduce waste overall.

PWT – 108

2.1 Diversion Statistics

Richmond residents in single-family homes diverted 79.2% of their waste from the landfill in 2024.

79.2%

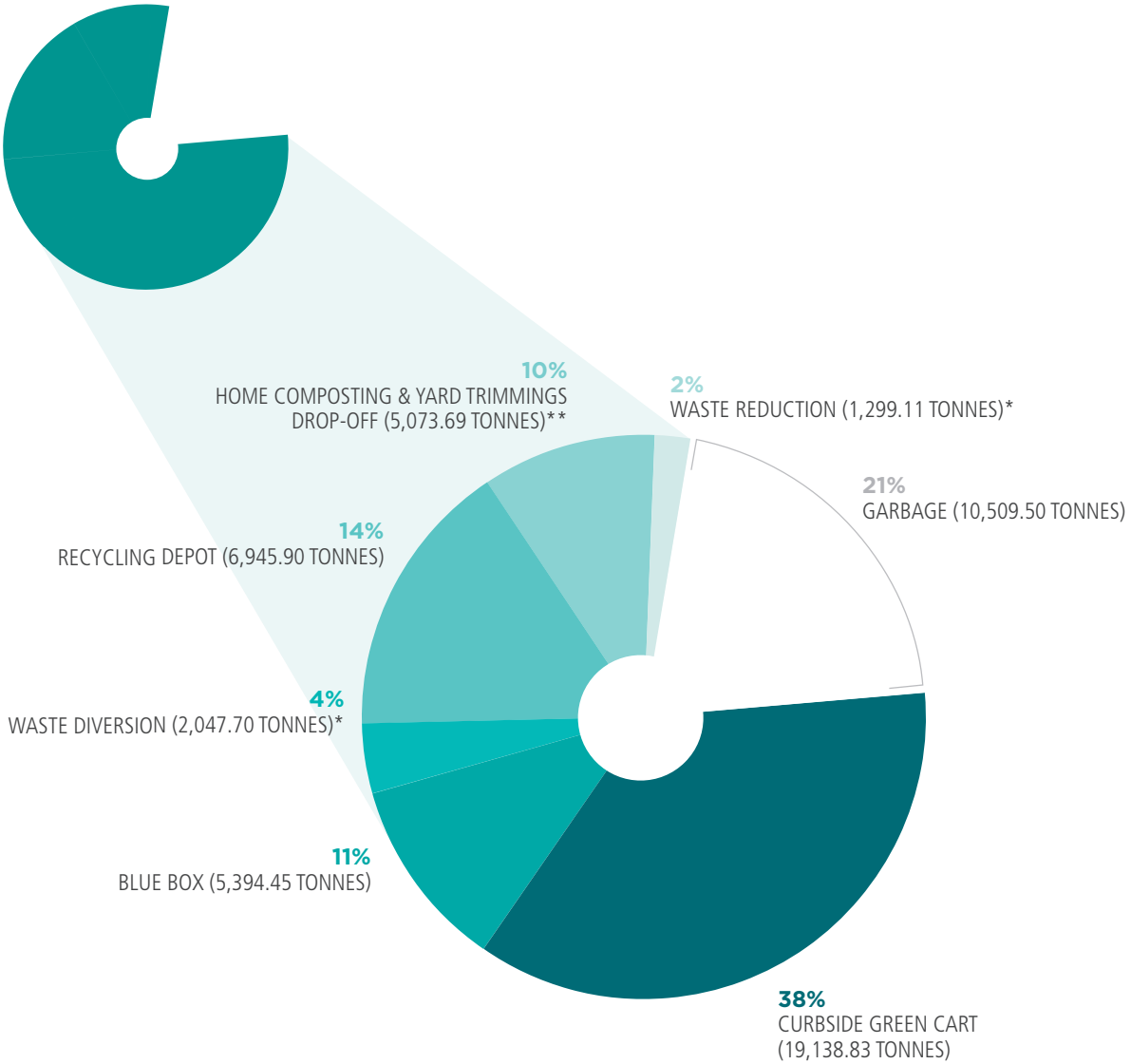
WASTE DIVERSION ACHIEVED!

PWT – 109

SINGLE-FAMILY RECYCLING IN 2024

Residents took advantage of a variety of programs to divert **79.2% of their waste** from the landfill in 2024.

Residents were able to achieve this waste diversion through a number of recycling and waste reduction opportunities, including curbside and Richmond Recycling Depot collection as well as composting programs.



* Estimated

** Includes estimates for home composting, tree chipping and leaf drop-off programs.

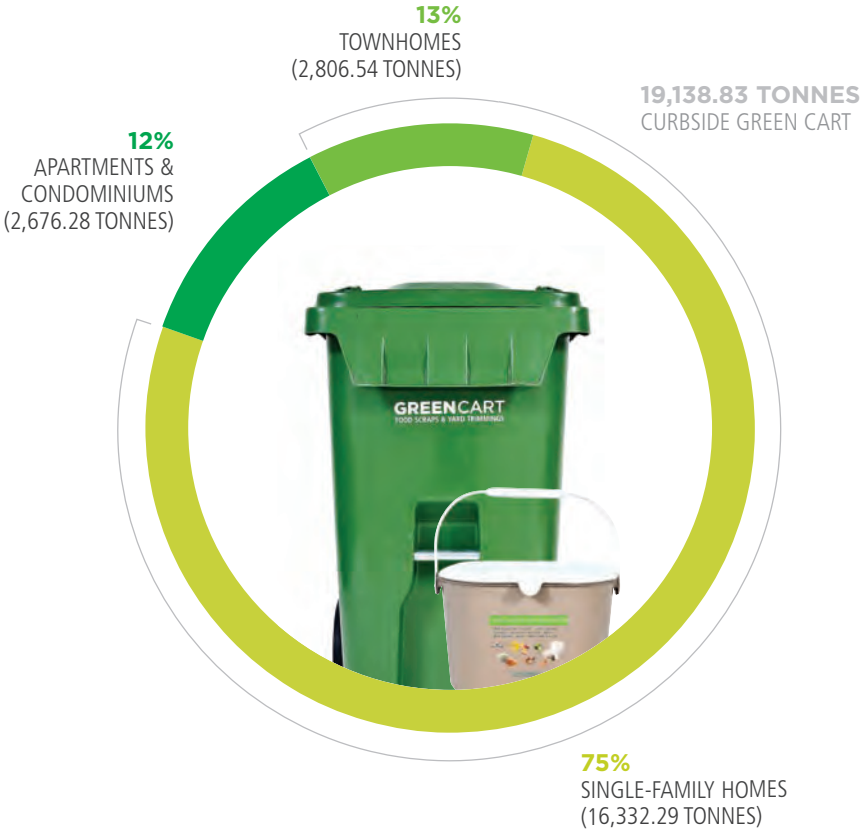
PWT – 110

BLUE BOX AND BLUE CART PROGRAMS RECYCLING MIX IN 2024

Through the Blue Box and Blue Cart programs, residents recycled a total of **6,996.00 tonnes** of recyclable materials.

PWT – 111

RESIDENTIAL GREEN CART RECYCLING IN 2024



Residents diverted **21,815.11 tonnes** of food scraps and yard trimmings from the landfill in 2024 to be composted into new resources.

Richmond's Green Cart program is for residents in single-family homes, townhomes, apartments and condominiums.

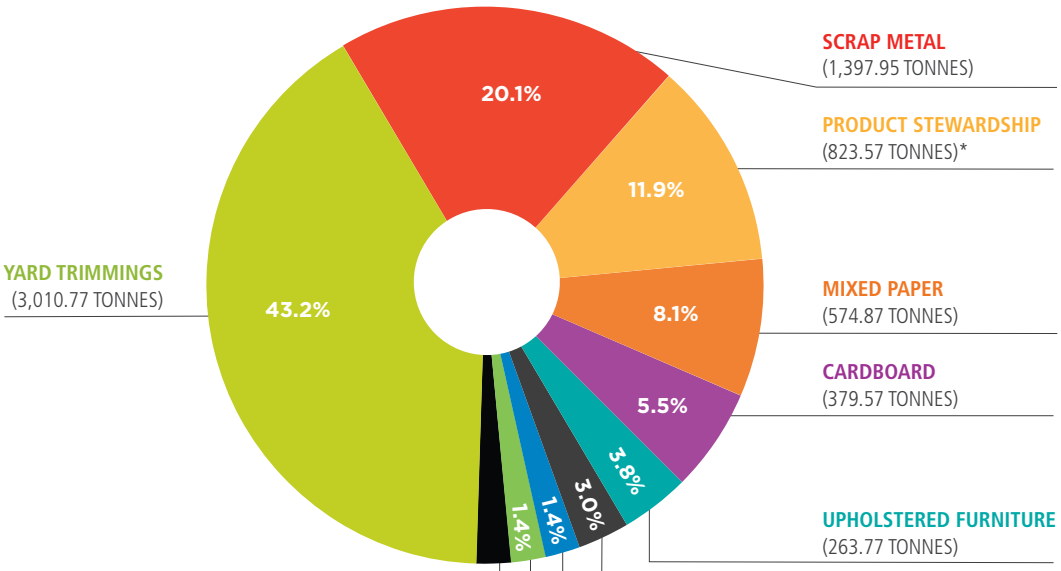
76,673 residential units received weekly collection in 2024.

In 2024, **7,061.13 tonnes** of yard trimmings were collected at the Richmond Recycling Depot and through the Ecowaste residential and commercial drop-off service.

PWT – 112

MATERIALS COLLECTED AT THE RICHMOND RECYCLING DEPOT

In 2024, **6,945.90 tonnes** of recyclable materials were collected at the Recycling Depot.



SCRAP METAL (1,397.95 TONNES)

PRODUCT STEWARDSHIP (823.57 TONNES)*

MIXED PAPER (574.87 TONNES)

CARDBOARD (379.57 TONNES)

UPHOLSTERED FURNITURE (263.77 TONNES)

PLASTIC MATERIALS (207.93 TONNES)

MATTRESSES (97.46 TONNES)**

FLEXIBLE PLASTIC PACKAGING (96.44 TONNES)***

YARD TRIMMINGS (3,010.77 TONNES)

INCLUDES:

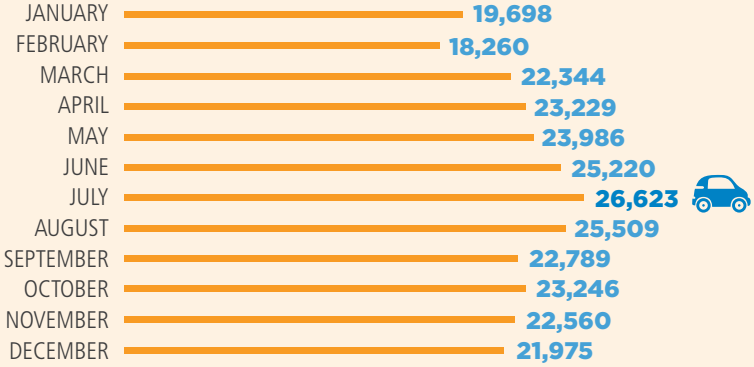
POLYSTYRENE (STYROFOAM™) (34.41 TONNES) **0.5%**
GLASS (28.36 TONNES) **0.4%**
PROPANE/BUTANE & FIRE EXTINGUISHERS (16.90 TONNES) **0.2%**
CAR SEATS (13.90 TONNES) **0.2%**

* Includes tires, electronics, paints, solvents, pesticides, lights, small appliances, batteries, cellphones, smoke and carbon monoxide alarms, cooking oil, motor oil, antifreeze, lead acid batteries and thermostats.

** Collected via the Large Item Pick Up Program, not at the Recycling Depot.

*** Includes plastic bags.

MONTHLY VEHICLE VISITS TO THE RICHMOND RECYCLING DEPOT



In 2024, there were **275,439** vehicle visits to the Richmond Recycling Depot, an average of **755** visits per day.

PWT – 113

RECYCLE MORE AT THE RICHMOND RECYCLING DEPOT

Open seven days a week, the Recycling Depot provides a convenient one-stop recycling service. The City continues to increase the list of accepted items to support waste diversion.

PAINT
253,584 EQUIVALENT LITRES

AEROSOLS
7,520 EQUIVALENT LITRES

SOLVENTS & PESTICIDES
16,880 EQUIVALENT LITRES

CFLS
892 BOXES

FLUORESCENT TUBES
4' – 637 BOXES
8' – 80 BOXES

COOKING OIL
11.84 TONNES

SMALL APPLIANCES
207.97 TONNES

BATTERIES & CELLPHONES
21.70 TONNES

LEAD ACID BATTERIES
27.68 TONNES

ELECTRONICS
285.27 TONNES

SMOKE & CO ALARMS
0.62 TONNES

MOTOR OIL & ANTIFREEZE
67.73 TONNES

TIRES
49.33 TONNES

THERMOSTATS
0.13 TONNES

PWT – 114

LARGE ITEM PICK UP IN 2024

15,321
ITEMS COLLECTED

43,908 residential units received the service through their curbside programs.

12,879
REQUESTS FOR SERVICE

662.9
TONNES COLLECTED

492.49
TONNES RECYCLED

3,458
MATTRESSES & BOXSPRINGS

352
WASHERS & DRYERS

169
TELEVISIONS

591
FRIDGES & FREEZERS

285
BARBECUES

179
DISHWASHERS

2,774
UPHOLSTERED FURNITURE

226
STOVES & MICROWAVES

1,743
OTHER RECYCLABLE ITEMS

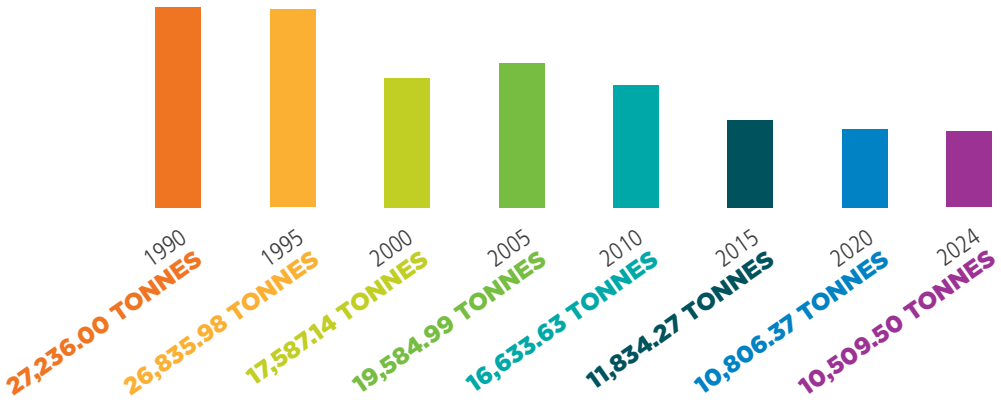
5,544
NON-RECYCLABLE HOUSEHOLD ITEMS COLLECTED FOR SAFE HANDLING AND DISPOSAL

PWT – 115

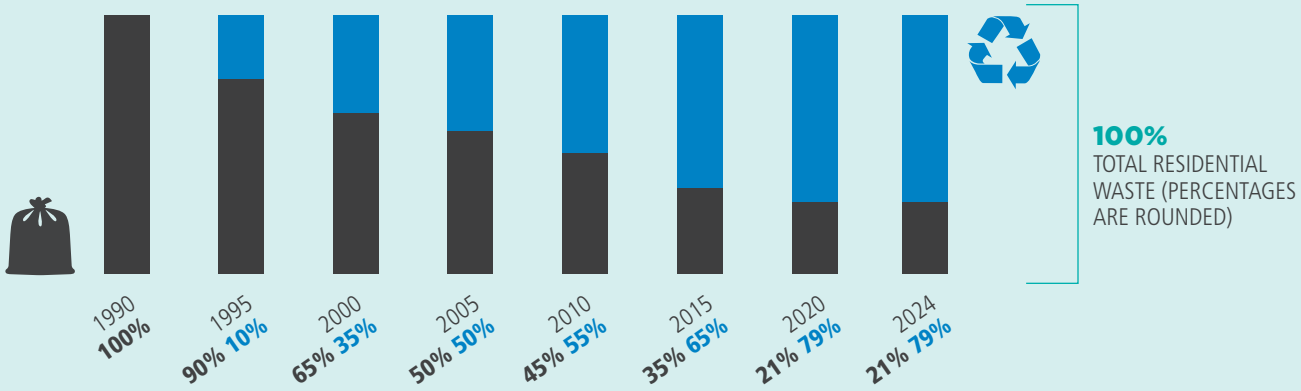
FROM GARBAGE DISPOSAL TO DIVERSION

35,163 residential units received Garbage Cart service in 2024.

SINGLE-FAMILY HOMES GARBAGE COLLECTION OVER 20-PLUS YEARS:



SINGLE-FAMILY HOMES DIVERSION OVER TIME:



- % OF WASTE GOING TO LANDFILL
- % OF WASTE BEING RECYCLED (INCLUDING RESIDENTIAL RECYCLING AND ORGANICS COLLECTION AND DROP-OFF AT THE RICHMOND RECYCLING DEPOT)

PWT – 116

2.2 Outreach and Customer Service

Statistics in this section are related to our successful outreach and customer service programs, which are designed to turn education and information into action.

CUSTOMER SERVICE AND OUTREACH

Richmond's Environmental Programs staff share information, tips and resources by phone as well as through outreach events and on the website.

16,829
CUSTOMER SERVICE CALLS SUPPORTED

2,416
ATTENDEES

2,416 attendees for **54 outreach activities** on various topics.

1,532
HOURS

1,532 participant hours of youth volunteering and training.

PWT – 117

COMMUNITY OUTREACH

54
OUTREACH ACTIVITIES

11
REPAIR FAIRS

11 Repair Fairs partially funded by a Metro Vancouver contribution agreement resulted in **36 hours of repair** by volunteers, fixing **232 items of clothing**, **30 bikes** and **3 lawnmowers**.

16
RECYCLING WORKSHOPS

16 recycling workshops with a total of **488 participants**.

19
RECYCLING DEPOT TOURS

19 Richmond Recycling Depot tours with a total of **353 participants**.

7
INFORMATION DISPLAYS

7 information displays at community events with a total of **1,180 participants**.

GARBAGE, LITTER AND COMMUNITY GARDEN COLLECTION

Crews **travelled 3,222 kilometres per week** to inspect and service bins, and **cleaned up 891 cases of illegal dumping**.

13,884
BIN INSPECTIONS PER MONTH

20,328
BINS SERVICED PER MONTH

48
COMMUNITY GARDEN GREEN CARTS SERVICED BIWEEKLY

470,448
BIN VISITS PER YEAR, INCLUDING LITTER AND GREEN CARTS

COMPOST BINS, GARBAGE TAGS AND VOUCHERS

57
COMPOST BINS SOLD

10,017
GARBAGE TAGS SOLD

1,784
GARBAGE DISPOSAL VOUCHERS SOLD

PWT – 118

STUDENT OUTREACH

GREEN AMBASSADOR (GA) YOUTH PROGRAM

144 GREEN AMBASSADORS WITH 1,532 HOURS OF VOLUNTEERING & TRAINING

9 special events were supported by GAs, for a total of 922 hours.

922 HOURS

4 GA team-led meetings and planning sessions were held, for a total of 90 hours.

90 HOURS

520 HOURS

10 GA sessions for training and networking were held, for a total of 520 training hours.

Richmond's friendly and helpful Green Ambassadors are a common sight at events and festivals in the community, supporting increased recycling and teaching members of the public how to sort waste correctly.

PWT – 119

ONLINE SEARCH AND TIPS TOOLS

The Richmond Recycling app has been installed **15,344 times** to date, and used a total of **105,355 times**.

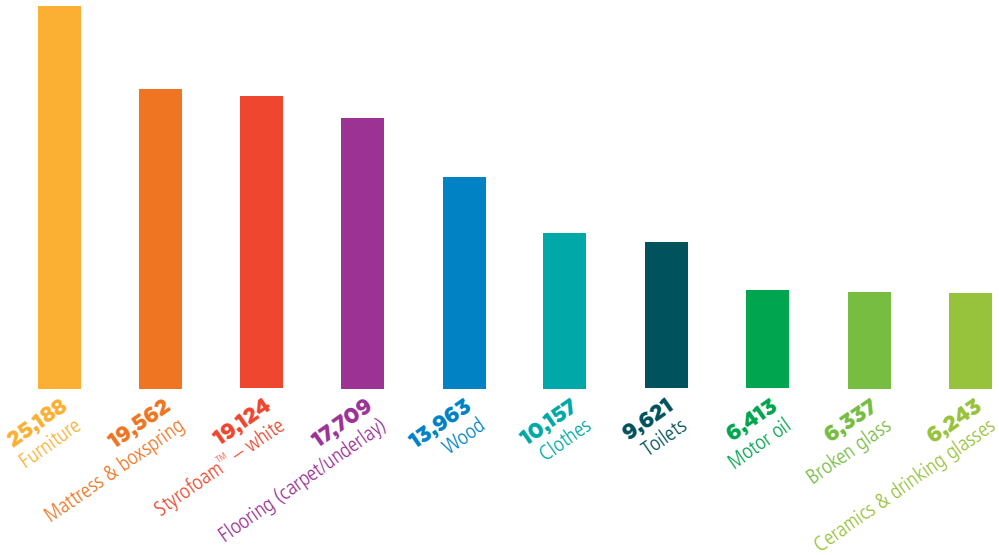
24,342
REMINDERS

21,514
PDF CALENDAR DOWNLOADS

10,864
RECYCLING GAMES PLAYED

41,043
ANNUAL RECYCLING WIZARD SEARCHES

TOP MATERIALS SEARCHED ON THE RECYCLING WIZARD – ALL TIME



PWT – 120

Samples of free business resources provided by Richmond's award-winning Single-use Plastic Ban campaign.

AWARD-WINNING COMMUNITY ENGAGEMENT

The City of Richmond received two international Gold Quill Awards of Excellence from the International Association of Business Communicators (IABC) for its communication and community engagement to increase awareness and compliance with the Single-Use Plastic Ban, and for its Rethink Waste Think Tank engagement campaign to generate ideas for reducing waste.

IABC's Gold Quill Awards have long been established as the pinnacle achievement for professional communicators across the globe. Rigorously evaluated by seasoned professionals, they endow significant credibility to the winning individuals and teams. Receiving a Gold Quill places the City of Richmond among some of the best communicators in the field from around the world. The two winning programs were also recognized in 2023 with national Silver Leaf Awards from the IABC.

RETHINK WASTE THINK TANK & COMMUNITY IDEAS HUB

Richmond implemented a multi-year communication and engagement campaign to support the City's goals to reduce waste and support a circular economy. Residents were encouraged to share their waste reduction ideas as part of a "Think Tank" and viable ideas were used to create a Community Ideas Hub. The campaign far exceeded expectations, generating more than 300 ideas with practical tips and resources to support sustainable waste management.

SINGLE-USE PLASTIC BAN

Richmond implemented a multi-year communication and engagement campaign as part of introducing a new bylaw banning single-use plastic items to support businesses in the transition, increase awareness about the new bylaw and promote reusable options in the community, with a goal to reduce unnecessary waste and pollution. The successful campaign resulted in an informed and engaged business community, broad awareness about the new ban and the benefits of choosing reusable options, and a high compliance rate when the bylaw was implemented. This has resulted in reduced use of single-use plastic items and reduced waste going to the landfill.

PWT – 121

TESTING NEW PROGRAMS TO REDUCE WASTE

Richmond's commitment to continuous improvement includes trying new ways to divert and reduce waste. This often involves implementing pilot programs to test how different programs serve the community and support the City's goals in the Community Energy and Emissions Plan 2050 and Richmond Circular City Strategy.

In 2024, the City coordinated several pilot programs, each with targeted outcomes that will be assessed to determine whether these initiatives are effectively meeting the needs of the community and supporting the City's goals and objectives. The summary below outlines two of the pilot programs and some of the recorded outcomes to date.

BUSINESS RECYCLING RESOURCES PROGRAM

This comprehensive program includes a mix of resources designed to support increased recycling in the commercial sector, which currently lags behind residential recycling. The program includes a mix of resources, such as toolkits to guide business in assessing their recycling requirements, tips for implementing expanded recycling options and guides for preparing a Recycling and Waste Reduction Plan. City staff also provide coaching and on-site assistance with waste audits.

14,000+ BUSINESSES REACHED IN FIRST 8 MONTHS

Based on preliminary feedback from business, staff have identified a need to communicate directly with property managers as they often control waste management contracts for businesses and malls. As such, staff are in the process of building a new toolkit section for property managers and reaching out directly to property management agencies operating in Richmond. In 2025, the City will also host educational workshops for businesses, covering topics such as How to Contract a Waste Hauler and Creating Recycling and Waste Reduction Plans.

There will be a full evaluation of the program after it has been implemented for a year. During this time, staff will engage with businesses to assess participation and effectiveness, and gather overall feedback. Once the evaluation is complete, staff will report back to Council with recommendations for next steps.

BIKE REUSE PILOT PROGRAM

While the City has offered free bike repair through its highly successful Repair Fair events, staff identified an opportunity to reduce waste and support the community through a Bike Reuse Pilot program.

This one-year pilot program is designed to foster and promote reuse, with the aim to refurbish bikes and bike accessories collected at the Recycling Depot to a safe and dependable standard and donate them to Richmond residents facing ongoing financial hardship. The pilot launched August 23, 2024 and in the first four months of the pilot, 61 bikes were collected at the Recycling Depot and through Richmond's Large Item Pick Up program. Of these, 10 bikes (16%) were fully repaired and donated back to the community. From the remaining collected bikes and bike accessories, 445 bike parts and bike accessories were recovered for reuse.

61 USED BIKES COLLECTED IN FIRST 4 MONTHS

The Pedal Foundation is contracted to assess, repair, refurbish and redistribute appropriate bikes and bike accessories to the Richmond community. This pilot program will be reviewed at the end of its one-year term in 2025 to determine the viability of continuing this service.

PWT – 122

LET'S RECYCLE CORRECTLY

PWT – 123

3.0 Programs and Services

Richmond residents in single-family homes divert most of their waste, and recycling is increasing in townhomes and other multi-family complexes.

To support residents and their commitment to recycling, Richmond continues to expand services to help residents reduce their garbage and create incentives to promote increased recycling. Green Cart and Blue Box/Blue Cart recycling remain core services to help residents recycle. Residents can also use the Large Item Pick Up program or bring a growing list of recyclable items to the Richmond Recycling Depot and other drop-off facilities.

Richmond works with residents, industry partners, product stewardship groups and businesses to achieve its goal to support a circular economy by implementing sustainable waste management. Through partnerships and community engagement, Richmond's commitment to continuous improvement results in enhanced services to benefit residents.

The City is contractually required to collect residential recycling on behalf of Recycle BC and, in return, receives incentives to help reduce recycling costs for residents. However, the City must also comply with Recycle BC's standards regarding the quality of recycling. If banned items are found in the garbage or contamination is found in recycling, the City can be charged fines and other penalties. These requirements are based on the City's *Solid Waste and Recycling Regulation Bylaw No. 6803*, contract requirements with Recycle BC and organics processing facilities, and Metro Vancouver disposal bans for items that must be recycled as they are not permitted in the garbage.

3.1
Program and Service Overview

Richmond delivers a wide range of recycling and waste management services for residents to ensure that all waste is managed safely and efficiently. The following page summarizes the key recycling and waste management services offered through the City of Richmond.

PWT – 125

RESIDENT COLLECTION AND RECYCLING SERVICES

BLUE BOX
PAGE 30

Weekly curbside collection for paper, newsprint, glass bottles and glass jars, plastic containers, empty aerosol cans, plastic/paper drink cups, spiral wound containers, and tin and aluminium containers. This program is provided to single-family homes and townhomes with curbside pickup.

BLUE CART
PAGE 30

Weekly centralized collection for paper, newsprint, glass bottles and glass jars, plastic containers, empty aerosol cans, plastic/paper drink cups, spiral wound containers, and tin and aluminium containers. This service is provided to townhomes and multi-family complexes with a common recycling room.

GREEN CART
PAGE 36

Weekly collection for foods scraps and yard trimmings. This program is provided to residents in single-family homes, townhomes and multi-family complexes.

BACKYARD COMPOSTING
PAGE 39

Support for residential composting includes the sale of backyard compost bins and a composting demonstration garden. These services are available to all residents.

GARBAGE CART
PAGE 40

Biweekly collection of garbage, not including banned items such as hazardous waste and materials that can be recycled, is available to residents in single-family homes and some townhomes. Garbage Tags and Disposal Vouchers for the Vancouver Landfill provide options for disposal of additional garbage.

RICHMOND RECYCLING DEPOT
PAGE 42

Accepts products ranging from yard trimmings and household items to hazardous materials and take-back program products. This service is available to all residents and in limited quantities to commercial operators. Backyard compost bins, rain barrels, and Garbage Tags and Garbage Disposal Vouchers for the Vancouver Landfill are also for sale.

LARGE ITEM PICK UP
PAGE 46

Residents with the City Blue Box and/or City Garbage Cart program can arrange for collection of large household items.

PUBLIC SPACES AND OUTREACH SERVICES

PUBLIC SPACES AND EVENT RECYCLING
PAGE 48

Recycling bins in the community make it easy to recycle on the go, such as in parks, at community centres, in the Steveston business district and at Canada Line stations and Richmond central bus stops. Richmond supports community events by loaning garbage and recycling bins for local events at no charge.

LITTER COLLECTION
PAGE 49

Litter Attendants are on the road seven days a week to inspect or service garbage and recycling bins almost 7,900 times each week throughout the city. They also collect additional litter along the way to help maintain a clean and livable community for Richmond residents.

COMMUNITY AND SCHOOL ENGAGEMENT
PAGE 50

Through partnerships with students, teachers and the School District, Richmond delivers educational workshops, awareness programs and volunteer opportunities to increase understanding of recycling and the benefits of reducing waste.

3.2 Blue Box and Blue Cart Programs

Richmond's Blue Box and Blue Cart recycling programs provide convenient collection of a wide variety of materials, including mixed paper, plastic containers, paper and plastic drink cups, empty aerosol cans and spiral wound cans like frozen juice concentrate containers as well as glass bottles and glass jars.

Richmond's Blue Box program for door-to-door curbside collection includes a Blue Box for containers, yellow Mixed Paper Recycling Bag for paper and small, flattened cardboard items, and a grey Glass Recycling Bin for glass bottles/jars. The Blue Cart program for centralized collection has separately labeled carts for containers, mixed paper and glass.

It is important to ensure materials are sorted correctly into the proper recycling receptacles. For example, recyclables must be placed individually in bins – not stacked, nestled or in plastic bags. Glass bottles/jars must be placed in the Glass Recycling Bin/Cart – not the Blue Box or Containers Recycling Cart.

Also, some items are not accepted in the Blue Cart/Blue Box program, such as non-packaging plastics like toys and laundry baskets, hazardous items like butane cylinders, propane tanks and batteries, and non-packaging metal items like scissors and pans. These items are accepted at the Richmond Recycling Depot.

PWT – 127

CONTAINER RECYCLING: BLUE BOX/CONTAINERS RECYCLING CART

✓ ACCEPTED

Metals
- ✓ Aerosol cans (empty) & caps (food items, air fresheners, shaving cream, deodorant, hairspray)
- ✓ Aluminium cans & lids
- ✓ Aluminium foil & foil containers (foil wrap, pie plates, food trays)
- ✓ Metal storage containers (such as for candy)
- ✓ Tin cans & lids

Paper
- ✓ Paper food containers & cartons
- ✓ Paper cups & lids, plates & bowls
- ✓ Paper garden pots & trays
- ✓ Spiral wound paper cans & lids (frozen juice, potato chips, cookie dough, coffee, nuts, baby formula)

Plastic
- ✓ Plastic bottles & caps (food items, condiments such as ketchup & mustard, dish soap, mouthwash, shampoos, conditioners)
- ✓ Plastic containers, trays & caps (bakery & deli foods)
- ✓ Plastic cups & lids
- ✓ Plastic food storage containers
- ✓ Plastic garden pots & trays
- ✓ Plastic hangers
- ✓ Plastic jars & lids
- ✓ Plastic microwavable bowls, cups & lids
- ✓ Plastic plates & bowls
- ✓ Plastic straws, utensils and stirsticks
- ✓ Plastic tubs & lids (margarine, spreads, dairy products such as yogurt, cottage cheese, sour cream, ice cream)

✕ NOT ACCEPTED

Take to Richmond Recycling Depot
- x Aerosol cans with hazardous materials (spray paint)
- x Butane cylinders
- x Containers for motor oil, vehicle lubricant or wax products
- x Plastic bags & overwrap
- x Polystyrene (Styrofoam™) packaging
- x Propane tanks

Repurpose, Sell, Share or Put in Garbage
- x Ceramic plant pots
- x Compostable/biodegradable plastic bags & containers
- x Foil-lined cardboard lids from take-out containers
- x Garden hoses
- x Plastic string or rope

TIPS TO RECYCLE CORRECTLY

Place materials separately in the bins – don't put recyclables into plastic bags. Bagged items will go in the garbage.

Empty, rinse and flatten containers. Food or other materials in the containers contaminate the recycling. Remove lids and recycle separately.

Avoid stacking or nestling items together, instead place them separately in the bins. For example, don't nestle an aluminium can inside a plastic container.

Separate glass jars and glass bottles and recycle in the grey Glass Recycling Bin or Glass Recycling Cart. Their metal or plastic lids go in the Blue Box/Containers Cart.

PWT – 128

PAPER PRODUCTS: MIXED PAPER RECYCLING BAG/CART

✓ ACCEPTED

Boxboard and Cardboard
- ✓ Cardboard boxes (flattened)
- ✓ Cereal boxes
- ✓ Corrugated cardboard (small pieces)
- ✓ Moving and storage boxes
- ✓ Paper egg cartons
- ✓ Paper gift boxes
- ✓ Paper takeout containers (including those with a shiny coating)
- ✓ Pizza boxes (clean)

Paper
- ✓ Catalogues, magazines & telephone books
- ✓ Envelopes (with or without window)
- ✓ Flyers & junk mail
- ✓ Miscellaneous paper (notepads, loose leaf paper, white or coloured paper, printed paper, copier/printer paper)
- ✓ Newspapers
- ✓ Paper bags (lunch, groceries)
- ✓ Paper gift bags
- ✓ Paper gift wrap & greeting cards
- ✓ Paper party hats and decorations
- ✓ Shredded paper (inside a paper bag to avoid scattering)

✕ NOT ACCEPTED

Take to Richmond Recycling Depot
- x Foil/metallic wrapping paper
- x Plastic bags used to cover newspapers/flyers
- x Plastic or foil candy wrappers

Repurpose, Sell, Share or Put in Garbage
- x Cardboard boxes with wax coating
- x Greeting cards with non-paper items (glitter, plastic attachments, music devices, batteries)
- x Padded envelopes
- x Ribbons or bows

TIPS TO RECYCLE CORRECTLY

- Remove plastic liners/covers and/or any food residue.
- Put shredded paper in a paper bag before placing in the Mixed Paper Recycling Bag/Cart to avoid scattering.
- Cut cardboard into small pieces and flatten boxes to take up less space in the Mixed Paper Recycling Bag/Cart and in the collection truck.
- Oversized/excessive amounts of cardboard can be dropped off at the Richmond Recycling Depot.

PWT – 129

GLASS JARS & GLASS BOTTLES: GLASS RECYCLING BIN/CART

✓ ACCEPTED

✓ Clear or coloured glass bottles and glass jars (pickle jars, jam jars, spaghetti sauce jars, soy sauce bottles)

✕ NOT ACCEPTED

Repurpose, Sell, Share or Put in Garbage

x Broken glass (wrap and put in garbage)
x Ceramic products
x Drinking glasses, glass dishes and cookware
x Lids and caps (remove from the glass bottle/jar and place in Blue Box/Containers Recycling Cart)
x Mirrors and window glass

TIPS TO RECYCLE CORRECTLY

Remove plastic and metal lids and recycle separately in the Blue Box/ Containers Recycling Cart.

Empty and rinse jars and bottles. Make sure no food is left inside because it contaminates the recycling.

Set Out Time

Before 7:30 a.m. every week on collection day.

Note: For centralized Blue Cart service, the collection details are arranged between the City and the Strata Council or Property Manager. Residents do not have to set the Blue Carts out for collection.

Report a Missed Collection

Call 604-276-4010 or email garbageandrecycling@richmond.ca.

How to Get More Free Recycling Supplies

Supplies include:
- Blue Boxes
- Glass Recycling Bins
- Indoor Collection Bags
- Mixed Paper Recycling Bags

Four ways to order supplies:
1. Pick up at Richmond Recycling Depot
2. Call 604-276-4010
3. Order at richmond.ca/recyclesearch
4. Order in the Richmond Recycling app, free at Apple and Android app stores.

Richmond Recycling Depot
5555 Lynas Lane
Open 7 days a week
(Closed on statutory holidays)
9:00 a.m. to 6:15 p.m.

PWT – 130

How to Recycle Correctly

SIMPLE STEPS FOR BETTER RECYCLING

COMMON MISTAKES	HOW TO RECYCLE CORRECTLY
 Glass bottles and glass jars are placed incorrectly in the Blue Box or Containers Recycling Cart	Recycle in grey Glass Recycling Bin or Glass Recycling Cart.
 Plastic straws, utensils and stir sticks are placed in the garbage	Place them in the Blue Box or Containers Recycling Cart.
 Containers with food residue are not rinsed before recycling	Remove food and rinse before placing in Blue Box or Containers Recycling Cart.
 **Recyclable items that are not accepted in residential collection are placed incorrectly in the Blue Box / Blue Cart, such as:** • Batteries and cellphones • Electronics • Paints and solvents • Plastic bags • Polystyrene (Styrofoam™) packaging • Propane tanks and butane containers • Non-packaging plastics like toys	Drop off at Richmond Recycling Depot – 5555 Lynas Lane.

PWT – 131

Get the free Richmond Recycling app

Helpful resources and info at your fingertips

- **SEARCH** how and where to correctly recycle and dispose of items
- **FIND** drop-off locations for recyclables
- **SCHEDULE** collection day reminders
- **ORDER** recycling supplies, play games and more

Available free at Apple and Android app stores.

richmond.ca/RecycleSearch

PWT – 132

3.3 Green Cart Program

Food scraps are banned from the garbage, which means they must be recycled or composted, and the City can be charged fines and other penalties when organics are found in the garbage. With the Green Cart program, all Richmond residents have access to food scraps recycling and when recycling with a Green Cart, residents are helping turn food scraps and yard trimmings into compost for nutrient-rich soil.

Richmond also encourages organics recycling by providing Green Cart service at no charge at the City-sponsored community gardens.

It is important to ensure that only food scraps, food soiled paper, and yard and garden trimmings go in the Green Cart. When items like plastic bags, polystyrene (Styrofoam™) or biodegradable/compostable plastic bags are found in the Green Cart, the load is considered contaminated as these materials are not accepted at processing facilities because they compromise the quality of the compost.

Residents can also create their own compost at home to keep these organic materials out of landfills. Residents can purchase a backyard compost bin at the Richmond Recycling Depot.

PWT – 133

GREEN CART FOR FOOD SCRAPS & YARD TRIMMINGS

✓ ACCEPTED

Food Scraps & Food Soiled Paper

- ✓ Breads, pasta, rice & noodles
- ✓ Coffee grounds & filters
- ✓ Dairy products
- ✓ Fruit
- ✓ Eggshells
- ✓ Meat, poultry, fish, shellfish & bones
- ✓ Paper tea bags
- ✓ Paper towels, napkins & plates
- ✓ Pizza delivery boxes
- ✓ Small amounts of grease/oil absorbed into paper towel
- ✓ Solid grease
- ✓ Table scraps & food scrapings
- ✓ Vegetables

Yard Trimmings

- ✓ Flowers
- ✓ Leaves
- ✓ Grass clippings
- ✓ Other organic yard materials
- ✓ Plants (living or dead/dried)
- ✓ Plant trimmings
- ✓ Tree & hedge prunings (branches must be no more than 10 cm (4 in) in diameter and cut short enough to fit in the Green Cart with the lid closed)

✕ NOT ACCEPTED

- x Coffee cups
- x Compostable & biodegradable plastic bags
- x Garden hoses or flower pots
- x Liquid grease
- x Lumber
- x Pet feces or kitty litter
- x Plastic bags & plastic overwrap
- x Plastic mesh tea bags
- x Plastic wraps
- x Polystyrene (Styrofoam™) cups, meat trays or takeout containers
- x Prunings over 10 cm (4 in) in diameter
- x Rocks, dirt, sod or soil

Why can't I put plastic bags in my green cart?

Plastic bags (including compostable or biodegradable bags) do not break down during the composting process and leave behind flecks of plastic that contaminate the compost.

TIPS TO RECYCLE CORRECTLY

- Collect food scraps in your kitchen container. Wrap food scraps in small amounts of newspaper or used paper towel before adding to kitchen container.
- Sprinkle kitchen container with baking soda to reduce odours and consider freezing food scraps until you're ready to empty them into the Green Cart.
- Keep kitchen container clean by lining it with a few sheets of newspaper, a paper bag liner or used paper towel.
- Empty materials from your kitchen container into your Green Cart.
- Place yard trimmings into Green Cart along with your food scraps. Extra yard trimmings can go in large paper bags or additional labelled Green Cans.

PWT – 134

MULTIPLE GREEN CART SIZES AVAILABLE

Richmond provides Green Carts in multiple sizes to meet residents' recycling needs. Residents can exchange their Green Cart for a different size by contacting the Environmental Programs Information Line at 604-276-4010 or email garbageandrecycling@richmond.ca. There is a $25 fee for cart exchanges.

SINGLE-FAMILY HOMES CART SIZE SELECTION

STANDARD

Extra Large
360 litres
D 34.5 x W 25 x H 44.5 inches

Large
240 litres
D 27.5 x W 24.5 x H 43 inches

Medium
120 litres
D 21 x W 19 x H 37.5 inches

Small
80 litres
D 21.5 x W 16 x H 34.5 inches

TOWNHOMES CART SIZE SELECTION

STANDARD

Small
80 litres
D 21.5 x W 16 x H 34.5 inches

Compact
46.5 litres
D 12 x W 11 x H 27 inches

PWT – 135

BACKYARD COMPOSTING PROGRAMS

Backyard Compost Bins: Backyard compost bins are available for sale at the Richmond Recycling Depot for $25 plus tax.

Demonstration Garden: To help residents learn about composting, the City hosts a Compost Demonstration area in the Terra Nova Rural Park at 2631 Westminster Highway just west of No. 1 Road. It is open from dawn to dusk year-round.

Compost Hotline: For tips, call 604-736-2250 or email composthotline@telus.net.

YARD TRIMMINGS DROP-OFF

Richmond residents and commercial landscapers can drop off yard trimmings at the following locations.

Ecowaste Industries
15500 Blundell Road
(access from Blundell via No. 8 Road and Westminster Hwy., or via Nelson Road and Highway 91)

Commercial operators can be pre-approved for dropping off materials at no charge when they are servicing residential properties with Richmond Green Cart service. Visit ecowaste.com or call 604-277-1410 for information.

City Recycling Depot
5555 Lynas Lane
Open 7 days a week
(Closed on statutory holidays)
9:00 a.m. to 6:15 p.m.

There is no charge for dropping off amounts less than one cubic yard (a car, station wagon or minivan load). Large loads are charged a fee of $25 per cubic yard. Commercial operators will be charged a fee of $25 per cubic yard at the Richmond Recycling Depot.

Set Out Time

Before 7:30 a.m. every week on collection day.

Note: For centralized Green Cart service, the collection details are arranged between the City and the Strata Council or Property Manager. Residents do not have to set the carts out for pick-up.

Report a Missed Collection or Damaged Green Cart

Call 604-276-4010 or email garbageandrecycling@richmond.ca.

How to Exchange your Green Cart

Various cart sizes are on display at the Richmond Recycling Depot. Please note there is a $25 charge to exchange your cart. To change to an alternative size, please call 604-276-4010.

New/Replacement Kitchen Containers

Four ways to order supplies:
1. Pick up at Richmond Recycling Depot.
2. Call 604-276-4010.
3. Order at richmond.ca/recyclesearch.
4. Order in the Richmond Recycling app, free at Apple and Android app stores.

PWT – 136

3.4 Garbage Cart Program

Richmond's curbside Garbage Cart program provides residents with convenient options for waste disposal. Household garbage is collected biweekly. The Garbage Cart program includes City-provided carts with wheels and lids, and is designed to lower costs for residents who are reducing the amount of garbage they produce by recycling their household waste.

Most household items are recyclable. Residents are encouraged to think twice before putting items in the garbage to help keep recyclables out of the landfill.

It's important to secure or wrap loose garbage to prevent materials from being scattered by wind or animals. Garbage must be securely packed in plastic bags. This includes ashes, kitty litter, disposable diapers, vacuum cleaner sweepings, disposable masks and gloves, and other loose household garbage.

All garbage must be placed at curbside before 7:30 a.m. on collection day but no earlier than 8:00 p.m. the day before. Do not place receptacles or other items on the road.

Residents are responsible for cleaning up any loose materials that have been scattered over the ground by animals, wind or vandalism.

EXTRA ITEM DISPOSAL OPTIONS

Garbage Disposal Vouchers
Richmond residents may purchase a Garbage Disposal Voucher for $5 at all City facilities. These vouchers are good for up to $25 at the Vancouver Landfill, and are valid anytime. They are limited to one per household per year.

$2 Garbage Tags
Garbage Tags for curbside collection are available for purchase at all City facilities. One Garbage Tag is good for an additional garbage bag or can.

Visit richmond.ca/garbage for a list of City facilities selling Garbage Tags and Garbage Disposal Vouchers.

GARBAGE CART SIZE OPTIONS

Residents who select smaller cart sizes are generating less garbage and, as a result, pay less for their annual garbage collection.

Residents can exchange their cart for a different size, and their garbage collection fees will be adjusted according to the size selected. Residents can exchange their Garbage Cart for a different size for $25 by calling 604-276-4010.

Extra Large
360 litres
D 34.5 x W 25 x H 44.5 in

Large
240 litres
D 27.5 x W 24.5 x H 43 in
Standard size for single-family homes

Medium
120 litres
D 21.5 x W 19 x H 37.5 in
Standard size for townhomes

Small
80 litres
D 20 x W 16 x H 34.5 in

PWT – 138

3.5 Richmond Recycling Depot

The Richmond Recycling Depot is located at 5555 Lynas Lane and is open from 9:00 a.m. to 6:15 p.m., seven days a week for drop-off of a broad range of materials.

The Recycling Depot is owned and operated by the City of Richmond, with both full-time staff and additional staff support as needed to manage increased recycling volumes. Staff on site are available to answer questions and provide assistance with unloading awkward or heavy items.

The City continues to increase the number of items accepted at the Recycling Depot to make it a convenient, one-stop drop-off location for multiple items. Richmond residents can bring a wide range of recyclable materials at no charge.

Richmond Recycling Depot
5555 Lynas Lane
Open 7 days a week
9:00 a.m. to 6:15 p.m.
(except statutory holidays)

PWT – 139

RECYCLING DEPOT SERVICES

Residents are encouraged to use their weekly collection bins to recycle household items like glass bottles and glass jars, mixed containers and mixed paper. Businesses are encouraged to set up contracts for on-site collection services if they produce a large quantity of recyclable materials. However, residents and small business operators can also drop off recyclable materials at the Recycling Depot.

This facility accepts a wide range of materials, including cardboard, yard and garden trimmings, mixed paper and newspapers as well as polystyrene (Styrofoam™), used books, cellphones, household batteries, plastic bags and metal items (e.g., bike frames, barbecues and lawn mowers).

The facility is also a product stewardship (take-back) collection site for large and small appliances, paints, solvents, flammable liquids, pesticides, lights and lighting fixtures, tires, electronics, motor oil, batteries, thermostats, fire extinguishers, and smoke and carbon monoxide alarms.

The City receives revenues from the sale of materials collected from the Recycling Depot or from product stewards for materials the City collects on their behalf. All revenues from commodities and other materials are applied to the operating cost of the program to return the value directly to Richmond taxpayers.

For Sale at the Recycling Depot

- Compost bins - $25 each + tax
- Rain barrels - $30 each + tax
- Extra Garbage Tags - $2 each
- Garbage Disposal Vouchers - $5 for Richmond residents and value is up to $25 at the Vancouver Landfill

Free Recycling Supplies Available at the Recycling Depot

- Food Scraps Kitchen Containers
- Grey Glass Recycling Bins
- Blue Boxes
- Yellow Mixed Paper Recycling Bags
- Indoor Collection Bags
- Green Can Decals

PWT – 140

Welcome to the Richmond Recycling Depot!

You'll be amazed by how much you can take – for free – to the Richmond Recycling Depot.

Use the map below to see where to take your items once you arrive at the Recycling Depot.
The icons are colour-coded to match the signs at the Depot and help you quickly find your way.

There are always attendants available to help you and to safely handle hazardous recyclable items.

PWT – 141

MATERIALS ACCEPTED

- ✓ Aerosol & spiral wound cans
- ✓ Aluminium materials
- ✓ Appliances
- ✓ Baby car seats/booster seats*
- ✓ Batteries (lead acid car batteries)
- ✓ Batteries (small household batteries less than 5 kg)
- ✓ Books
- ✓ Butane cylinders
- ✓ Cellphones (including batteries)
- NEW! ✓ Clothing and other textiles
- ✓ Cooking oil & animal fat
- ✓ Corrugated cardboard (flattened, clean corrugated boxes)
- ✓ Electronics
- ✓ Exercise & hobby machines
- ✓ Fire extinguishers
- ✓ Flammable aerosols
- ✓ Flammable liquids
- ✓ Flexible plastic packaging, plastic bags & plastic overwrap
- ✓ Flower pots (paper & plastic pots/trays)
- ✓ Gasoline (in approved ULC containers)
- ✓ Glass bottles/jars (clear & coloured)
- ✓ Lights
- ✓ Lighting fixtures
- ✓ Magazines
- ✓ Metal items
- ✓ Mixed paper
- ✓ Motor oil & antifreeze
- ✓ Newspaper
- ✓ Paints (household paints)
- ✓ Paint aerosols
- ✓ Pesticides (domestic pesticides)
- ✓ Plastic containers
- ✓ Plastic recycling bags
- ✓ Polystyrene (Styrofoam™) packaging
- ✓ Power tools
- ✓ Propane tanks
- ✓ Sewing, knitting & textile machines
- ✓ Smoke & carbon monoxide alarms
- ✓ Thermostats
- ✓ Tin & aluminium cans
- ✓ Tires (passenger & light-duty trucks only)
- ✓ Upholstered furniture*
- ✓ Yard & garden trimmings

All materials must be sorted into different containers at the Recycling Depot. See richmond.ca/depot for details.

** Proof of residency required.*

PWT – 142

3.6 Large Item Pick Up Program

Richmond's Large Item Pick Up program provides a convenient curbside collection service for up to six large household items per year, including mattresses, furniture and appliances. This program is designed to make it more convenient for residents to dispose of large household items and to help reduce illegal dumping. As well, through this program, large household items that can be recycled will be diverted from the landfill.

The Large Item Pick Up program is provided to residents in single-family homes as well as townhomes and multi-family complexes with the City's Garbage Cart and/or Blue Box program.

This service makes it easier for residents who do not have access to a vehicle to dispose of large items.

PWT – 143

HOW THE PROGRAM WORKS

1. To schedule collection of up to six items per year, residents can contact the City's service provider, Sierra Waste Services, at 604-270-4722 or schedule online at richmond.ca/largeitem.

2. Sierra Waste Services will contact you to provide a pick-up date and confirmation number.

3. On your scheduled pick-up date only, place items at the curb, or for multi-family complexes, in the area designated by the strata or property manager, before 7:30 a.m. or no earlier than 8:00 p.m. the night before.

LARGE ITEM PICK UP PROGRAM

✓ ACCEPTED

- ✓ Appliances (stove, dishwasher, washer and/or dryer, hot water tank, refrigerator, freezer, microwave)
- ✓ Barbecues (remove lava rock briquettes and/or propane tank)
- ✓ Bed frames
- ✓ Electric lawnmowers
- ✓ Exercise equipment (treadmill, elliptical, stationary bike, stair climber, weight set)
- ✓ Furniture (e.g., couch, coffee table, chair, desk, dresser, TV stand, cabinet, table, hutch, crib, high chair, entertainment centre)
- ✓ Headboards
- ✓ Mattresses or boxsprings
- ✓ Outdoor furniture (chair, patio table, patio umbrella)
- ✓ Small household goods, provided they are boxed or bundled and are a reasonable size (one box or bundle is equal to one of the resident's six allotted items)
- ✓ Tires (car and light-duty truck)

! PREPARATION REQUIREMENTS

- ! Wrap mattresses in plastic and seal with tape to prevent them from getting wet. Cover boxsprings and upholstered furniture with tarps or plastic to keep them dry. Tarps will be left behind for reuse.
- ! Confirm mattresses, boxsprings and upholstered furniture are free of bedbugs to ensure they are accepted for recycling at the facility.
- ! Remove latch/door from freezers, refrigerators or any other container equipped with a door, latch or locking device.

✕ NOT ACCEPTED

- x Car bodies or parts
- x Carpets
- x Construction and demolition waste (drywall)
- x Gas lawnmowers*
- x Hazardous waste
- x Home renovation items (sinks, flooring, doors, windows)
- x Lumber
- x Mattresses/boxsprings and upholstered furniture that are wet or infested with bed bugs or vermin
- x Propane tanks*
- x Tree stumps

*Take to Richmond Recycling Depot

Not sure where to recycle an item? Use the Recycling Wizard tool on the free Richmond Recycling app to find out where to recycle your item.

PWT – 144

3.7 Public Spaces Programs

Maintaining a litter-free community and encouraging recycling in parks and other public spaces is an essential part of responsible and sustainable waste management. Not only does this help keep the City a beautiful place to live and visit, it also helps to reduce the amount of plastic and other garbage going into oceans and other waterways.

The City has three primary services to support recycling and a litter-free community: Public Spaces services, Litter Collection services and Special Event Recycling.

Because building community pride and increasing responsible behaviours involve working together with the community, the City also works with volunteers through the Partners for Beautification program and community clean-up events.

PUBLIC SPACES SERVICES

The City of Richmond has recycling and garbage bins located throughout the community in public spaces that include parks and business districts. Recycling and garbage bins are serviced or inspected almost 7,900 times each week.

The City's bins include instructional bin labels to help inform people about how to sort items correctly. Many of the recycling bins feature images that complement the surrounding scenery, and others feature custom artwork by local artists. To further improve capacity and operational efficiency, the City also has large, in-ground garbage collection bins in high-traffic areas.

SPECIAL EVENT RECYCLING

Recycling stations are recommended for special event bookings taking place in Richmond. For some major events, the City hosts recycling stations with assistance from Green Ambassador volunteers. This involves setting up recycling stations and having recycling volunteers at the event to advise people on how to recycle.

The City also supports events by providing organizers with recycling bins and garbage carts at no charge, as well as complimentary collection services. This makes it easy for event organizers to keep the venue clean and recyclables out of the landfill.

In addition, the City participates in community clean-up events each year.

LITTER COLLECTION SERVICES

Maintaining a litter-free city is a key focus area to ensure residents can enjoy clean parks and public spaces. The City of Richmond has made efforts to ensure that there are garbage bins, and in many cases recycling options, in public spaces throughout the city.

In addition, City crews work seven days a week to collect litter from parks, school grounds, roadsides, sidewalks and boulevards.

They inspect or service garbage and recycling from litter and recycling receptacles in the community 34,200 times every month. Crews also assist with removing graffiti from City garbage bins, and they collect illegally dumped materials found on City property and provide safe disposal and recycling of these items.

The extensive work to maintain public spaces and collect litter may go unnoticed but City staff work hard seven days a week to maintain a clean and livable community for Richmond residents.

3.8 Outreach and Customer Service

Richmond's successful outreach and customer service programs are designed to help turn information and education into action.

By working with children and youth through school programs and the Green Ambassadors, Richmond creates a learning environment where students gain a better understanding about recycling and sustainable waste management, and then apply their skills as volunteers and through school activities. The City is also offering more virtual outreach opportunities.

Providing outreach, customer support services and information materials also assists residents by increasing their understanding of how to recycle correctly along with new tools and services to promote recycling at home and on the go.

The Environmental Programs Information Line staff assist customers on the phone, via email and at community events to answer questions, assist with requests relating to garbage and recycling, and provide guidance on where to find additional information and resources. Richmond staff also assist customers directly at the Recycling Depot, and through its outreach programs in the community.

At the Recycling Depot, staff provide assistance about where and how to recycle using its drop-off options, answer questions about City programs and services, and sell products such as compost bins and rain barrels as well as Garbage Tags and Garbage Disposal Vouchers. Through outreach, Richmond goes into the community to connect with residents to share information and respond to questions.

PWT – 147

Richmond held 11 free Repair Fairs in 2024 that encouraged residents to repair usable items rather than sending them to the landfill.

COMMUNITY WORKSHOPS

Richmond's free community workshops provide education and tips that support recycling and waste reduction techniques. A summary of workshops is provided below.

For information on the workshops, call the Environmental Programs Information Line at 604-276-4010, email garbageandrecycling@richmond.ca, or visit the Community Outreach section at richmond.ca/recycle.

RICHMOND GREEN AMBASSADORS

Richmond's Green Ambassadors are dedicated high school students who participate in monthly symposiums to learn about environmental sustainability and apply what they have learned as volunteers at City events and activities. These energetic and environmentally conscious individuals also manage green initiatives in their schools.

STUDENT OUTREACH

Richmond sponsors programs, contests and other activities for local students to raise awareness about the importance of reducing waste and how to recycle correctly. These activities inspire them to feel that taking care of the planet is fun.

To encourage youth involvement beyond the Green Ambassador program, the City will explore collaborating with agencies to create work opportunities that support young people in advancing in green career paths, supporting sustainable City initiatives.

SEARCH & TIPS TOOLS

Richmond offers the Recycling Wizard to help residents find where they can recycle household items. The Recycling Wizard is available online at richmond.ca/recyclesearch and in the Richmond Recycling app, free from the Apple and Android app stores.

TYPE OF WORKSHOP	DESCRIPTION
Recycling Workshops	Learn how to reduce reliance on single-use items and sort household recyclables properly to reduce contamination. Understand the recycling process and the importance recycling has for the environment, including the impact of marine plastic and other hot topics in solid waste management.
Richmond Recycling Depot Tours	Interactive tour of the Richmond Recycling Depot designed to teach residents about the drop-off options available and materials accepted for recycling.

4 TIPS TO RECYCLE AND REDUCE WASTE

PWT – 149

4.0 Tips and Resources

In Richmond, we care about our community, and we are working together with residents and local organizations to reduce waste and promote a circular economy. These Tips and Resources highlight the City's community partners, and provide a guide for how to deal with hazardous waste and other items not accepted in curbside and centralized recycling programs.

With the help of community resources and partnerships, Richmond residents have access to easy and convenient drop-off services and programs to support recycling, safe disposal and waste reduction. This section includes contact information and locations for Richmond services and community partners involved in take-back collection through product stewardship programs. Together, these Tips and Resources help to support maximum recycling and reduce the amount of waste going to the landfill.

PWT – 150

4.1 Community Resources and Partnerships

PWT – 151

ECOWASTE INDUSTRIES

The City offers residents the option to drop off unlimited quantities of yard and garden trimmings for free at Ecowaste Industries. Proof of Richmond residency is required.

Ecowaste Industries:
15500 Blundell Road
604-277-1410
ecowaste.com

RECYCLING COUNCIL OF BRITISH COLUMBIA (RCBC)

RCBC provides information and resources to support recycling in the community.

Recycling Hotline
Monday to Friday, 9 a.m. to 4 p.m.
604-RECYCLE (604-732-9253)
hotline@rcbc.bc.ca
rcbc.ca

COMPOST HOTLINE

The Compost Hotline is a community program operated by City Farmer that provides support and tips for best practices in home composting.

Compost Hotline:
604-736-2250
composthotline@telus.net

METRO VANCOUVER RECYCLES

Metro Vancouver Recycles helps you find options for recycling products and get helpful links to online services.

Metro Vancouver Recycling Directory:
metrovancouverrecycles.org or recycling.metrovancouver.org

CITY OF RICHMOND FOOD RECOVERY NETWORK

Partnering with FoodMesh, this program safely and easily diverts surplus food by bringing together local food businesses with charities and farmers.

Richmond Food Recovery Network:
foodmesh.ca/services-regional/richmond

PWT – 152

4.2 Banned and Hazardous Materials

Careless handling of hazardous products can cause serious injury as well as damage to the environment. Hazardous products that are dumped in sewers or green spaces can injure livestock, wildlife and plant life. Careful and often specialized disposal is essential for these materials.

There are certain materials that Metro Vancouver disposal facilities do not accept, either because there are already recycling programs set up for these items or because they are hazardous to waste collection workers, the public and the environment.

At disposal sites, garbage loads are inspected for banned and prohibited materials. Loads that arrive at the disposal sites containing prohibited materials are assessed a $76 minimum surcharge, plus the cost of removal, clean-up or remediation. Loads containing banned materials are assessed a 50% tipping fee surcharge.

For a list of drop-off locations, use the City's Recycling Wizard available on the Richmond Recycling app and at richmond.ca/recyclesearch, or call the RCBC Recycling Hotline at 604-732-9253.

BANNED HAZARDOUS AND OPERATIONAL IMPACT MATERIALS

- x Agricultural waste
- x Asbestos
- x Automobile bodies and parts
- x Barrels, drums, pails or large (205 litres or greater) liquid containers, full or empty
- x Biomedical waste
- x Dead animals
- x Gypsum
- x Hazardous waste
- x Inert fill material, including soil, sod, gravel, concrete and asphalt exceeding 0.5 cubic metres per load
- x Liquids or sludge
- x Refuse that is on fire, smouldering, flammable or explosive
- x Wire and cable exceeding 1% of load

BANNED MATERIALS THAT ARE RECYCLABLE WITH CITY SERVICES

- x Beverage containers
- x Containers made of glass, metal or banned recycled plastic 1 2 4 5
- x Corrugated cardboard
- x Electronics
- x Expanded polystyrene packaging
- x Food waste
- x Green waste
- x Mattresses
- x Motor oil & antifreeze
- x Propane tanks
- x Recyclable paper
- x Tires (passenger & light-duty truck only)

For a complete list of banned materials, please visit metrovancouver.org/services/solid-waste/recycling-programs/disposal-ban

PWT – 154

4.3 Recycling and Disposal Directory

Many common hazardous household and automotive products must be recycled or disposed through special depots. Disposal sites and take-back collection options for hazardous, banned and other materials are listed on the following pages.

Please note that this information is provided as a reference for your convenience; however, it is not guaranteed. Please call first to confirm that the site is still open to accept these take-back products and to check hours of operation.

ANTIFREEZE AND EMPTY CONTAINERS

DROP-OFF LOCATION	PHONE
Richmond Recycling Depot 5555 Lynas Lane	604-276-4010
Jiffy Lube 10991 No. 4 Road	604-448-0142

List of accepted items: 604-732-9253 or interchangerecycling.com/find-a-recycling-centre.

APPLIANCES – SMALL

DROP-OFF LOCATION	PHONE
Richmond Recycling Depot 5555 Lynas Lane	604-276-4010
Ironwood Bottle & Return-It Depot 110-11020 Horseshoe Way	604-275-0585
OK Bottle Depot 145-5751 Cedarbridge Way	604-244-0008
Regional Recycling 13300 Vulcan Way	1-855-701-7171

List of accepted items: electrorecycle.ca or 604-732-9253.

BABY CAR SEATS

DROP-OFF LOCATION	PHONE
Richmond Recycling Depot 5555 Lynas Lane	604-276-4010
$ City of Vancouver Landfill 5400 72nd Street, Delta	604-873-7000
$ Pacific Mobile Depots (third Saturday of every month)	
Britannia Community Centre 1661 Napier Street, Vancouver	250-893-8383
Lord Byng Secondary School 3939 W 16th Avenue, Vancouver	250-893-3851
$ Queensborough Landing Return-it Depot Unit A-409 Boyne Road, New Westminster	604-540-4467

Watch for the **blue** listings for items recyclable through the City of Richmond. See Programs and Services starting on page 28 to find out what is accepted through the City's collection and drop-off services.

Disposal Ban – Banned from the landfill and recyclable through retailers, stewardship or take-back programs

Disposal Ban – Banned from the landfill and recyclable through the City and other services

Not Banned – Recyclable through the City and other services

Not Banned – Recycling options are available

$ **A fee is charged**

PWT – 155

BATTERIES – AUTOMOTIVE

DROP-OFF LOCATION	PHONE
Richmond Recycling Depot 5555 Lynas Lane	604-276-4010
Canadian Tire 11388 Steveston Highway	604-271-6651
Kal Tire 2633 No. 5 Road	604-278-9181
Regional Recycling 13300 Vulcan Way	1-855-701-7171

Note: All retailers accept a used battery for each one purchased. Collection sites: recyclemybattery.ca

BATTERIES – HOUSEHOLD AND MOBILE PHONES

Batteries weighing 5 kg or less

DROP-OFF LOCATION	PHONE
Richmond Recycling Depot 5555 Lynas Lane	604-276-4010
Best Buy Lansdowne Centre 700-5300 No. 3 Road	604-273-7335
Best Buy Richmond Centre 113-6551 No. 3 Road	604-273-1475
Costco 9151 Bridgeport Road	604-270-3647
Home Depot 2700 Sweden Way	604-303-9882
Kwantlen Student Association 8771 Lansdowne Road	604-599-2865
London Drugs 5971 No. 3 Road 3080-11666 Steveston Highway	 604-448-4811 604-448-4852
Pharmasave 105-12420 No. 1 Road 116-10151 No. 3 Road	 604-232-0159 604-241-2898
Regional Recycling 13300 Vulcan Way	1-855-701-7171
Rona (batteries only) 7111 Elmbridge Way	604-273-4606
Staples 8171 Ackroyd Road 110-2780 Sweden Way	 604-270-9599 604-303-7850

Batteries accepted: call2recycle.ca or 1-888-224-9764.

Mobile phone drop-off sites: call2recycle.ca/locator.

All cellular/mobile phone stores accept used cellular/mobile phones for refurbishing or recycling.

BUTANE CYLINDERS

DROP-OFF LOCATION	PHONE
Richmond Recycling Depot 5555 Lynas Lane	604-276-4010

CARBON MONOXIDE (CO), SMOKE AND COMBINATION SMOKE & CO ALARMS

DROP-OFF LOCATION	PHONE
Richmond Recycling Depot 5555 Lynas Lane	604-276-4010
London Drugs 5971 No. 3 Road 3200-11666 Steveston Highway	 604-448-4811 604-448-4852
Regional Recycling 13300 Vulcan Way	1-855-701-7171

Complete list of alarms accepted: productcare.org or 1-877-592-2972 ext. 401.

ELECTRONICS: Audio-visual equipment, computers, monitors, televisions, printers, fax machines, scanners, video games and accessories

DROP-OFF LOCATION	PHONE
Richmond Recycling Depot 5555 Lynas Lane	604-276-4010
Best Buy Lansdowne Centre 700-5300 No. 3 Road	1-866-237-8289
Blundell Return-It Centre 130-8180 No. 2 Road	604-274-1999
Ironwood Bottle & Return-It Depot 11020 Horseshoe Way	604-275-0585
OK Bottle Depot 145-5751 Cedarbridge Way	604-244-0008
Regional Recycling 13300 Vulcan Way	1-855-701-7171

Complete list of materials accepted: return-it.ca/electronics or 604-473-2400.

EXERCISE AND HOBBY MACHINES

DROP-OFF LOCATION	PHONE
Richmond Recycling Depot 5555 Lynas Lane	604-276-4010
Regional Recycling 13300 Vulcan Way	1-855-701-7171

Complete list of materials accepted: return-it.ca/electronics or 604-473-2400.

EYEGLASSES

DROP-OFF LOCATION

Drop off at any local optometrist or eye care professional.

FIRE EXTINGUISHERS

DROP-OFF LOCATION	PHONE
Richmond Recycling Depot 5555 Lynas Lane	604-276-4010
$ Fire Radius 22131 Fraserwood Way	604-232-3473

FLAMMABLE LIQUIDS, PESTICIDES, SOLVENTS AND GASOLINE

DROP-OFF LOCATION	PHONE
Richmond Recycling Depot 5555 Lynas Lane	604-276-4010
Regional Recycling 13300 Vulcan Way	1-855-701-7171

Complete list of accepted items: productcare.org or 1-877-592-2972 ext. 406.

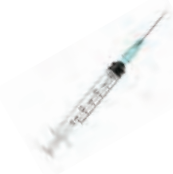
GENERAL HAZARDOUS MATERIALS

DROP-OFF LOCATION	PHONE
$ Secure Energy 160-13511 Vulcan Way	604-214-7000

GYPSUM DRYWALL

No other materials attached to or on drywall

DROP-OFF LOCATION	PHONE
$ City of Vancouver Landfill 5400 72nd Street, Delta	604-873-7000
$ New West Gypsum Recycling 38 Vulcan Street New Westminster	604-534-9925
Vancouver Transfer Station (maximum 1/2 sheet with a paid load of garbage) 377 W. Kent Avenue N., Vancouver	604-873-7000



HYPODERMIC NEEDLES

DROP-OFF LOCATION

Purchase a "Sharps Container" from a pharmacy and return the container to same pharmacy when full. Complete list of drop-off locations: healthsteward.ca/returning-medical-sharps.

LIGHTS AND LIGHTING FIXTURES

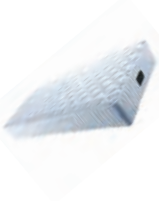
DROP-OFF LOCATION	PHONE
Richmond Recycling Depot 5555 Lynas Lane	604-276-4010
OK Bottle Depot 145-5751 Cedarbridge Way	604-244-0008
Regional Recycling 13300 Vulcan Way	1-855-701-7171
Rona 7111 Elmbridge Way	604-273-4606

Complete list of accepted items: productcare.org or 1-877-592-2972 ext. 407.

LUBRICATING OIL (USED), OIL FILTERS AND PLASTIC OIL CONTAINERS

DROP-OFF LOCATION	PHONE
Richmond Recycling Depot 5555 Lynas Lane	604-276-4010

Accepted items: 604-732-9253 or interchangerecycling.com/find-a-recycling-centre.



MATTRESSES AND BOXSPRINGS

DROP-OFF LOCATION	PHONE
$ City of Vancouver Landfill 5400 72nd Street, Delta	604-873-7000
$ Vancouver Transfer Station 377 W. Kent Avenue N., Vancouver	604-873-7000

Richmond's Large Item Pick Up Program: Contact Sierra Waste at 604-270-4722. Some restrictions apply. Program details: richmond.ca/largeitem.

MEDICAL DEVICES AND EQUIPMENT

DROP-OFF LOCATION	PHONE
Richmond Recycling Depot 5555 Lynas Lane	604-276-4010
OK Bottle Depot 145-5751 Cedarbridge Way	604-244-0008
Regional Recycling 13300 Vulcan Way	1-855-701-7171

MUSICAL INSTRUMENTS (ELECTRONIC)

DROP-OFF LOCATION	PHONE
Richmond Recycling Depot 5555 Lynas Lane	604-276-4010
OK Bottle Depot 145-5751 Cedarbridge Way	604-244-0008
Regional Recycling 13300 Vulcan Way	1-855-701-7171

PAINT AND PAINT AEROSOL CONTAINERS

DROP-OFF LOCATION	PHONE
Richmond Recycling Depot 5555 Lynas Lane	604-276-4010
Ironwood Bottle & Return-It Depot 110-11020 Horseshoe Way	604-275-0585
Regional Recycling 13300 Vulcan Way	1-855-701-7171

Complete list of accepted items: productcare.org or 1-877-592-2972 ext. 405.

PHARMACEUTICAL

DROP-OFF LOCATION

All pharmacies accept leftover or outdated prescription drugs, non-prescription medications, herbal products, mineral supplements, vitamin supplements and throat lozenges for safe disposal.

For a list of pharmacies and/or drugs, medications, herbal products and mineral supplements accepted, visit healthsteward.ca/returning-medications or call 604-732-9253.

Note: Please do not wash these items down the drain or throw them in the garbage.

POLYSTYRENE (STYROFOAM™) - MOLDED PACKAGING & FOOD CONTAINERS

DROP-OFF LOCATION	PHONE
Richmond Recycling Depot 5555 Lynas Lane	604-276-4010
Ironwood Bottle & Return-It Depot 110-11020 Horseshoe Way	604-275-0585
London Drugs (only accepts materials purchased in-store) 5971 No. 3 Road 3200-11666 Steveston Highway	604-448-4811 604-448-4852
Queensborough Landing Return-it Depot Unit A-409 Boyne Road, New Westminster	604-540-4467

POLYSTYRENE (STYROFOAM™) - PEANUTS/CHIPS

DROP-OFF LOCATION	PHONE
Packaging Depot 6360 Kingsway, Burnaby 5524 Cambie Street, Vancouver	 604-451-1206 604-325-9966

PROPANE TANKS: Refillable & Disposable

DROP-OFF LOCATION	PHONE
Richmond Recycling Depot 5555 Lynas Lane	604-276-4010
$ City of Vancouver Landfill 5400 72nd Street, Delta	604-873-7000

Note: Free drop-off of up to four disposable tanks and two refillable tanks.

OUTDOOR POWER EQUIPMENT

DROP-OFF LOCATION	PHONE
Richmond Recycling Depot 5555 Lynas Lane	604-276-4010
Regional Recycling 13300 Vulcan Way	1-855-701-7171

SEWING, KNITTING & TEXTILE MACHINES

DROP-OFF LOCATION	PHONE
Richmond Recycling Depot 5555 Lynas Lane	604-276-4010
Ironwood Bottle & Return-It Depot 110-11020 Horseshoe Way	604-275-0585
OK Bottle Depot 145-5751 Cedarbridge Way	604-244-0008
Regional Recycling 13300 Vulcan Way	1-855-701-7171

PWT – 158

TELUS EQUIPMENT (RENTAL OR RETAIL)

DROP-OFF LOCATION

All TELUS rental or retail equipment such as cordless/corded phones, Voice Over IP (VOIP) phones, Global Positioning System (GPS) equipment and video/telephone conference equipment can be returned via Canada Post. Call 1-888-811-2323 for more information.

THERMOSTATS

DROP-OFF LOCATION	PHONE
Richmond Recycling Depot 5555 Lynas Lane	604-276-4010
Andrew Sheret Ltd. 4500 Vanguard Road	604-278-3766
Vancouver Zero Waste Centre (maximum 2) 8588 Yukon Street, Vancouver	604-873-7000

Drop-off locations: hrai.ca/public-drop-off-locations or 1-800-267-2231 ext 224.

TIRES – VEHICLES (OFF-RIM UNLESS NOTED)

DROP-OFF LOCATION	PHONE
Richmond Recycling Depot 5555 Lynas Lane	604-276-4010
Canadian Tire 3500 No. 3 Road 11388 Steveston Highway	 604-273-2939 604-271-6651
Kal Tire (limit of 4) 2633 No. 5 Road	604-278-9181
Metro Tires 13320 Mitchell Road	604-783-4435
OK Tire (limit of 4 per household) 5831 Minoru Boulevard	604-278-5171
Vancouver Landfill (Passenger/light truck, with/without rims, limit of 10) 5400 72nd Street, Delta	604-873-7000

Richmond's Large Item Pick Up Program: Contact Sierra Waste at 604-270-4722. Some restrictions apply. Program details: richmond.ca/largeitem.

Complete list of locations: tsbc.ca/recycle-your-tires/ or 1-866-759-0488.

All retail locations accept a used tire for a new one purchased.

TIRES AND TUBES – BICYCLES

DROP-OFF LOCATION	PHONE
Richmond Recycling Depot 5555 Lynas Lane	604-276-4010
Village Bikes (small amounts) 3891 Moncton Street	604-274-3865

List of locations: tsbc.ca/bike.php or 1-866-759-0488.

TOOLS - POWER (ELECTRONIC & ELECTRICAL)

DROP-OFF LOCATION	PHONE
Richmond Recycling Depot 5555 Lynas Lane	604-276-4010
Ironwood Bottle & Return-It Depot 110-11020 Horseshoe Way	604-275-0585
OK Bottle Depot 145-5751 Cedarbridge Way	604-244-0008
Regional Recycling 13300 Vulcan Way	1-855-701-7171

TOYS (ELECTRONIC & ELECTRICAL) INCLUDING VIDEO GAMING SYSTEMS & ACCESSORIES

DROP-OFF LOCATION	PHONE
Richmond Recycling Depot 5555 Lynas Lane	604-276-4010
Best Buy Lansdowne Centre 700-5300 No. 3 Road	1-866-237-8289
Ironwood Bottle & Return-It Depot 110-11020 Horseshoe Way	604-275-0585
OK Bottle Depot 145-5751 Cedarbridge Way	604-244-0008
Regional Recycling 13300 Vulcan Way	1-855-701-7171

UPHOLSTERED FURNITURE (COUCHES, ARMCHAIRS, ETC)

DROP-OFF LOCATION	PHONE
Richmond Recycling Depot 5555 Lynas Lane	604-276-4010
($) City of Vancouver Landfill 5400 72nd Street, Delta	604-873-7000

Richmond's Large Item Pick Up Program: Contact Sierra Waste at 604-270-4722. Some restrictions apply. Program details: richmond.ca/largeitem.

Our thanks go to Richmond residents who have helped us divert the majority of our household waste from the landfill through consistent recycling as well as their continued efforts to reduce waste.

Together, we are making continuous improvements that support a circular economy and more sustainable waste management.

CITY OF RICHMOND

Environmental Programs Information Line:
604-276-4010

richmond.ca/recycle

Printed on Rolland Enviro Print, which contains 100% post-consumer recycled fibre, is FSC Certified and is acid- and elemental chlorine-free.

Richmond

PWT – 161

City of Richmond

Report to Committee

To:	Public Works and Transportation Committee	**Date:**	March 19, 2025
From:	Chad Paulin Director, Climate & Environment Suzanne Bycraft Director, Public Works Operations	**File:**	10-6125-01/2025-Vol 01
Re:	**Public EV Charging Network - Energy Based User Fees**		

Staff Recommendations

1. That, as described in the staff report titled "Public EV Charging Network – Energy Based User Fees", dated March 19, 2025, from the Director, Climate & Environment, and Director, Public Works Operations, energy-based user fees be implemented for all city-owned public EV chargers;

2. That the Chief Administrative Officer or General Manager, Engineering and Public Works be authorized to apply for Temporary Dispensation from Measurement Canada for the sale of electricity for EV charging; and

3. That each of the following bylaws be introduced and given first, second and third readings in order to implement energy-based user fees, including ticketing provisions:

    a. Consolidated Fees Bylaw No. 8636, Amendment Bylaw No. 10657;
    b. Parking (Off-Street) Regulation Bylaw No. 7403, Amendment Bylaw No. 10658;
    c. Traffic Bylaw No. 5870, Amendment Bylaw No. 10659; and
    d. Notice of Bylaw Violation Dispute Adjudication Bylaw No. 8122, Amendment Bylaw No. 10660.

Chad Paulin,
Director, Climate & Environment
(604-247-4672)

Suzanne Bycraft
Director, Public Works Operations
(604-233-3338)

REPORT CONCURRENCE		
ROUTED TO:	**CONCURRENCE**	**CONCURRENCE OF GENERAL MANAGER**
Communications	☑	
Finance Department	☑	
Community Bylaws	☑	
Law	☑	
SENIOR STAFF REPORT REVIEW	**INITIALS:**	**APPROVED BY CAO**

Staff Report

Origin

This report outlines a proposal for the adoption of energy-based user fees for all City-owned public electric vehicle (EV) charging stations in Richmond. The transition from time-based to energy-based fees aligns with regional practices and reflects advancements in EV charging technology, as well as Richmond's commitment to providing equitable and accessible public charging services. This report outlines the necessary bylaw amendments, required compliance measures, and communications to EV charging users to implement the new fee structure, if endorsed.

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.*
>
> *2.4 Enhance Richmond's robust transportation network by balancing commercial, public, private and active transportation needs.*

This report supports Council's Strategic Plan 2022-2026 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.*

Analysis

Current Fee Structure

Under the authority of the *Electricity and Gas Inspection Act*, Measurement Canada regulates energy-based billing at public EV charging stations. The City currently employs a time-based fee structure for its public EV charging stations. This model charges users based on the duration that their vehicle is connected to the charger, regardless of the amount of electricity consumed. The current, time-based, fee schedule is outlined in Table 1 below.

Table 1: Current time-based user fees for City-owned EV chargers in Richmond

Level 2 Charging Stations:	$2.25/hour initial 2 hours; $5.25/hour after 2 hours
Level 3 DC Fast Charging Stations:	$16.50/hour

Time-based rates were originally introduced in 2020 to encourage the efficient use of charging infrastructure and ensure user turnover. Options for energy-based user fees were not permitted at that time under the *Electricity and Gas Inspection Act*. Time-based pricing has remained the standard practice and only option for municipalities and private operators before changes were

made in 2023. Time-based fees, while designed to encourage efficient use of charging stations, have several notable limitations:

- They can result in inequitable costs, as different EV models have varying charging capabilities. Vehicles with slower charging rates pay more per kWh of electricity compared to those with faster charging rates, creating disparities among users.
- These fees may discourage EV adoption, particularly among potential owners of vehicles with slower charging capabilities, who face higher costs and reduced convenience.
- The system can also lead to overcharging concerns, as users may disconnect before their vehicle is adequately charged to avoid higher fees, causing inconvenience and range anxiety. Conversely, some users may occupy charging spots longer than necessary, reducing availability for others.

To address some of these limitations, Measurement Canada introduced new regulations in 2023 that allow EV charging providers a regulatory pathway to transition to energy-based billing per kilowatt-hour (kWh).

Energy-based fees provide several key benefits over the current time-based system. They align costs with actual energy consumption, ensuring users only pay for the electricity their vehicle consumes. This eliminates inequities associated with differing vehicle charging capabilities, where slower-charging vehicles, like older plug-in hybrid vehicles (PHEVs), are penalized under a time-based system.

Proposed Energy-Based Fees

Staff recommend the adoption of an energy-based fee structure for all City-owned public electric vehicle (EV) charging stations in Richmond. If endorsed, the proposed rates would align with existing energy-based rate structures in the region such as BC Hydro and the City of Vancouver, and with other major charging providers in the province. The proposed energy-based rates for Richmond are outlined in Table 2 below.

Table 2: Proposed energy-based user fees for city-owned EV chargers in Richmond

Level 2 Charging Stations Idle fee (7am – 11pm)	$0.2865 per kWh $0.05 per minute (after 5-minute grace period)
Level 3 DC Fast Charging Stations Idle fee	$0.3479 per kWh $0.40 per minute (after 5-minute grace period)

A higher rate is proposed for Level 3 DCFCs to offset higher equipment and operating costs in relation to Level 2 chargers. This tiered approach ensures that the higher operating costs of DCFCs are accounted for, while still achieving cost recovery for our EV charging network.

To promote efficient use of charging infrastructure, the implementation of an idle fee of $0.05 per minute for Level 2 stations and $0.40 per minute for Level 3 stations is recommended to discourage vehicles from occupying charging spots once charged. The idle fee for Level 2 stations will apply between 7:00 AM – 11:00 PM to prevent users from using charging spots as long-term parking

during peak hours. However, this fee will be removed overnight (11:00 PM – 7:00 AM) to allow EV drivers who rely on public charging to charge for extended periods in the evening.

Implementation

The next steps in transitioning from time-based to energy-based fees for the City's EV charging network include obtaining temporary dispensation from Measurement Canada, updating the relevant bylaws, and implementing a communications plan to ensure EV users are aware and informed of the changes.

Temporary Dispensation from Measurement Canada

Measurement Canada ensures that devices used for billing—like EV chargers that charge by energy consumption—are accurate and properly certified. Under the *Electricity and Gas Inspection Act*, providers must either use certified devices or obtain a temporary dispensation. Currently, most existing EV chargers aren't fully covered by these certification standards, as the certification and approval process is still being developed.

Should Council endorse the transition to energy-based billing, the General Manager, Engineering and Public Works (GM), or Chief Administrative Officer (CAO) will apply for a temporary dispensation on behalf of the City. This dispensation allows municipalities and private operators to begin using energy-based fees, while manufacturers and regulators finalize compliance. By securing this authorization, the City can adopt the proposed fee structure while meeting regulatory requirements during the transitional period.

Bylaw Updates

Several bylaw amendments are necessary to reflect the transition from time-based to energy-based fees.

Consolidated Fees Bylaw	The Parking (Off-Street) Regulation Schedule and the Traffic Bylaw Schedule will be amended to calculate fees based on energy consumption (kWh) rather than the duration of charging sessions.
Parking (Off-Street) Regulation Bylaw	Language in sections 3.5.2 and 3.5.3 currently refers to "parking rates," which will no longer apply under the new model. These sections will be updated to reflect fees for electricity rather than parking time.
Traffic Bylaw	Several amendments will be made to remove references to "parking rates" and ensure consistency with energy-based terminology. Specifically: • The definition of "Charging Session" will be updated to reflect energy-based fees. • The definition of "EV Supply Equipment" will refer to fees for electricity consumption rather than parking rates. • Sections 12D.2 and 12D.4 will be revised to maintain consistency across the bylaw language.

Notice of Bylaw Violation Dispute Adjudication Bylaw	The schedules referencing infractions for non-payment of "parking rates" will be revised to refer to non-payment of energy-based fees.

Communication Plan

Following approval of the City's temporary dispensation, staff will implement a 30-day public notification period before transitioning to energy-based fees. Messaging at EV stations and through City communications will outline the new rates, idle fees, and implementation date. Related bylaw amendments will be adopted to align with the end of this period, with changes applied across the public charging network.

Financial Impact

The shift to energy-based fees is expected to have minimal financial impact. Although the Level 2 rate is lower, users may stay longer and draw more energy overall. The Level 3 rate is about 5% higher but remains competitive, so no decline in usage is anticipated. Idle fees will improve station turnover, and all adjustments support cost recovery. Future changes will be addressed through the annual Consolidated Fee Bylaw update.

Conclusion

Transitioning to energy-based EV charging fees will improve equity, transparency, and consistency with regional practices. This change aligns costs with actual energy use, supports efficient station use, and maintains affordability. Pending Measurement Canada's approval and a 30-day notification period, the City will implement new fees—ensuring continued leadership in sustainable transportation and supporting EV adoption.

Arzan Balsara
Senior Climate Action Specialist
(604-247-4615)

Dinos Ramos
Program Manager, Fleet Operations
(604-233-3302)

City of Richmond

Bylaw 10657

Consolidated Fees Bylaw No. 8636, Amendment Bylaw No. 10657

The Council of the City of Richmond enacts as follows:

1. Consolidated Fees Bylaw No. 8636, as amended, is further amended at Schedule – Parking (Off-Street) Regulation, by deleting the table labeled "Parking (Off-Street) Regulation Bylaw No. 7403 EV Charging – City EV Parking Stall User Fees Section 3.5.3" and replacing it with the following:

Parking (Off-Street) Regulation Bylaw No. 7403
EV Charging – City EV Parking Meter Fees
Section 3.5.3

Description	**Fee**
Charging Level of EV Supply Equipment	*Per kilowatt-hour (kWh) while charging* *Per minute following full charge or stoppage of charging*
Level 2 Charging Session Metered Rate (24 hrs/day) Idle fee (7am – 11pm)	 $0.2865/kWh $0.05 per minute after a five minute grace period following a full charge or stoppage of charging
Level 3 Charging Session Metered Rate (24 hrs/day) Idle fee (24 hrs/day)	 $0.3479/kWh $0.40 per minute after a five minute grace period following a full charge or stoppage of charging

2. Consolidated Fees Bylaw No. 8636, as amended, is further amended at Schedule – Traffic, by inserting the following below the table for Sections 12B.1 and 12B.4:

Traffic Bylaw No. 5870
Metered Fees
Section 12D.4

Description	**Fee**
Charging Level of EV Supply Equipment	*Per kilowatt-hour (kWh) while charging* *Per minute following full charge or stoppage of charging*
Level 2 Charging Session Metered Rate (24 hrs/day) Idle fee (7am – 11pm)	 $0.2865/kWh $0.05 per minute after a five minute grace period following a full charge or stoppage of charging
Level 3 Charging Session Metered Rate (24 hrs/day) Idle fee (24 hrs/day)	 $0.3479/kWh $0.40 per minute after a five minute grace period following a full charge or stoppage of charging

3. This Bylaw is cited as **"Consolidated Fees Bylaw No. 8636, Amendment Bylaw No. 10657".**

FIRST READING _____

SECOND READING _____

THIRD READING _____

ADOPTED _____

CITY OF RICHMOND

APPROVED for content by originating Division

APPROVED for legality by Solicitor BRB

_____ MAYOR

_____ CORPORATE OFFICER

City of Richmond

Bylaw 10658

Parking (Off-Street) Regulation Bylaw No. 7403, Amendment Bylaw No. 10658

The Council of the City of Richmond enacts as follows:

1. Parking (Off-Street) Regulation Bylaw No. 7403, as amended, is further amended at Section 3.5 City EV Parking Stalls, by deleting sections 3.5.2 and 3.5.3 and replacing them with the following:

"3.5.2 A person may only **park** an **electric vehicle** in any of the **City EV parking stalls** while the **electric vehicle** is connected to the **EV Supply Equipment** via conductive or inductive means to facilitate a **charging session**, and must pay the applicable metered rates to the **City** through the **EV Supply Equipment** payment system.

3.5.3 The metered rates payable for **parking** and charging an **electric vehicle** in a **City EV parking stall** are set out in the **City's** *Consolidated Fees Bylaw No. 8636.*"

2. Parking (Off-Street) Regulation Bylaw No. 7403, as amended, is further amended at Section 4.1 Exceptions to General Overnight Parking Prohibition, by:

(a) deleting the word "or" at the end of section 4.1.1(c);

(b) deleting the period at the end of section 4.1.1(d) and replacing it with "; or"; and

(c) inserting the following new sections after section 4.1.1(d):

"(e) a **vehicle** parked in a **pay parking lot,** as identified in Schedule C, that has a valid **parking permit** issued pursuant to Part Six, parked in compliance with Section 5.1.2(c) and 6.2; or

(f) an **electric vehicle** which is parked in a **City EV parking stall** in accordance with sections 3.5.2 and 3.5.3".

3. Parking (Off-Street) Regulation Bylaw No. 7403, as amended, is further amended at Section 5.2 Pay Parking Exceptions, by deleting section 5.2.2 and replacing it with the following:

"5.2.2 The provisions of subsections 5.1.2(a) and 5.1.2(b) do not apply to:

(a) any vehicle which:

(i) displays British Columbia **veterans' speciality licence plates**; and

(ii) displays a **veterans' decal;** or

(b) any **electric vehicle** parked in a **City EV parking stall** in compliance with sections 3.5.2 and 3.5.3."

4. Parking (Off-Street) Regulation Bylaw No. 7403, as amended, is further amended at section 8.1 by deleting the definitions of "Charging Session" and "EV Supply Equipment" and replacing them with the following:

"**CHARGING SESSION**	means the period of time an **electric vehicle** is connected to the **EV supply equipment,** commencing once the **owner** or occupant of the **electric vehicle** has authorized payment of the **City's** applicable metered rates through the **EV supply equipment** payment system, and terminating once the **electric vehicle** is no longer connected to the **EV supply equipment.**
EV SUPPLY EQUIPMENT	means a complete assembly consisting of conductors, connectors, devices, apparatus, and fittings installed specifically for the purpose of power transfer and information exchange between a branch electric circuit and an **electric vehicle**, including the ability to collect authorized payments of the applicable metered rates."

5. This Bylaw is cited as **"Parking (Off-Street) Regulation Bylaw No. 7403, Amendment Bylaw No. 10658"**.

FIRST READING _____

SECOND READING _____

THIRD READING _____

ADOPTED _____

CITY OF RICHMOND

APPROVED for content by originating Division

APPROVED for legality by Solicitor BRB

_____ MAYOR

_____ CORPORATE OFFICER

City of Richmond

Bylaw 10659

Traffic Bylaw No. 5870, Amendment Bylaw No. 10659

The Council of the City of Richmond enacts as follows:

1. Traffic Bylaw No. 5870, as amended, is further amended at Section 1 Interpretation, by deleting the definitions of "Charging Session" and "EV Supply Equipment" and replacing them with the following:

"**CHARGING SESSION**	means the period of time an **electric vehicle** is connected to the **EV supply equipment,** commencing once the **owner** or occupant of the **electric vehicle** has authorized payment of the **City's** applicable metered rates through the **EV supply equipment** payment system, and terminating once the **electric vehicle** is no longer connected to the **EV supply equipment.**
EV SUPPLY EQUIPMENT	means a complete assembly consisting of conductors, connectors, devices, apparatus, and fittings installed specifically for the purpose of power transfer and information exchange between a branch electric circuit and an **electric vehicle**, including the ability to collect authorized payments of the applicable metered rates."

2. Traffic Bylaw No. 5870, as amended, is further amended at Section 12D. Electric Vehicle Parking, by:

   (a) deleting the words "user fees" in section 12D.2(a) and replacing them with the words "metered rates"; and

   (b) deleting the words "user fee" in section 12D.4 and replacing them with the words "metered rates".

3. This Bylaw is cited as **"Traffic Bylaw No. 5870, Amendment Bylaw No. 10695".**

FIRST READING _____

SECOND READING _____

THIRD READING _____

CITY OF RICHMOND

APPROVED for content by originating Division

APPROVED for legality by Solicitor

BRB

7951461

ADOPTED

MAYOR

CORPORATE OFFICER

City of Richmond

Bylaw 10660

Notice of Bylaw Violation Dispute Adjudication Bylaw No. 8122, Amendment Bylaw No. 10660

The Council of the City of Richmond enacts as follows:

1. Notice of Bylaw Violation Dispute Adjudication Bylaw No. 8122, as amended, is further amended by deleting in its entirety the content of the following lines in Schedule – Parking (Off-Street) Regulation Bylaw No. 7403 (2002) of Schedule A:

Description of Contravention	Section	Compliance Agreement Available	Penalty	Early Payment Option	Late Payment Option	Compliance Agreement Discount
Parking in a City EV parking stall when not engaged in a charging session (incl. payment of parking rates)	3.5.2	No	$75.00	$65.00	$110.00	n/a

and adding in its place the following line:

Description of Contravention	Section	Compliance Agreement Available	Penalty	Early Payment Option	Late Payment Option	Compliance Agreement Discount
Parking in a City EV parking stall while not connected to EV Supply Equipment or without paying the applicable metered rate	3.5.2	No	$75.00	$65.00	$110.00	n/a

2. Notice of Bylaw Violation Dispute Adjudication Bylaw No. 8122, as amended, is further amended by deleting in its entirety the content of the following lines in Schedule – Traffic Bylaw No. 5870 (1992) of Schedule A:

Description of Contravention	Section	Compliance Agreement Available	Penalty	Early Payment Option	Late Payment Option	Compliance Agreement Discount
Parking in a City EV parking stall when not engaged in a charging session (incl. payment of user fees)	12D.2(a)	No	$75.00	$65.00	$110.00	n/a

and adding in its place the following line:

Description of Contravention	Section	Compliance Agreement Available	Penalty	Early Payment Option	Late Payment Option	Compliance Agreement Discount
Parking in a City EV parking stall when not engaged in a charging session (incl. payment of metered fees)	12D.2(a)	No	$75.00	$65.00	$110.00	n/a

3. This Bylaw is cited as **"Notice of Bylaw Violation Dispute Adjudication Bylaw No. 8122, Amendment Bylaw No. 10660"**.

FIRST READING _____

SECOND READING _____

THIRD READING _____

ADOPTED _____

CITY OF RICHMOND

APPROVED for content by originating Division

APPROVED for legality by Solicitor

BRB

_____ MAYOR

_____ CORPORATE OFFICE

City of Richmond

Report to Committee

To:	Public Works and Transportation Committee	**Date:**	March 19, 2025
From:	Chad Paulin, Director, Climate and Environment	**File:**	10-6160-07-01/2025-Vol 01
Re:	**2025 Provincial Pesticide Use Permit Renewal Application**		

Staff Recommendation

That the comments regarding a provincial Pesticide Use Permit application to manage invasive cordgrass and perennial pepperweed outlined in the report titled "Provincial Pesticide Use Permit Renewal Application", dated March 19, 2025, from the Director, Climate and Environment, be endorsed for submission to the provincial Ministry of Forests.

Chad Paulin, M. Sc., P. Ag
Director, Climate and Environment
(604-247-4672)

Att. 1

REPORT CONCURRENCE		
ROUTED TO:	**CONCURRENCE**	**CONCURRENCE OF GENERAL MANAGER**
Parks Services	☑	
SENIOR STAFF REPORT REVIEW	**INITIALS:**	**APPROVED BY CAO**

Staff Report

Origin

The provincial Ministry of Forests has applied to renew a regional Pesticide Use Permit to continue the management of two highly invasive plant species in coastal foreshore areas across the Lower Mainland. The permit application process requires consultation with affected groups including the City of Richmond. The Ministry of Forests are seeking the City's comments as part of the consultation process that is scheduled from February 28, 2025, to April 29, 2025. This report summarizes the Ministry of Forests' proposed treatment program, renewal application and outlines comments that will be submitted to the Ministry of Forests, if endorsed.

This report supports Council's Strategic Plan 2022-2026 Focus Area #1 Proactive in Stakeholder and Civic Engagement:

> *Proactive stakeholder and civic engagement to foster understanding and involvement and advance Richmond's interests.*
>
> *1.1 Continue fostering effective and strategic relationships with other levels of government and Indigenous communities.*

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.*

This report supports Council's Strategic Plan 2022-2026 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.*
>
> *5.2 Support the preservation and enhancement of Richmond's natural environment.*

Analysis

Cordgrass is an aquatic grass that establishes on intertidal mudflats and has the ability to reduce open habitat for shorebirds; outcompete native vegetation; and alter the natural functions of estuaries. Three species of invasive cordgrass (*Spartina anglica, S. densiflora, S. patens*) have migrated north from California since the 1980's, and the first infestations were detected in BC in 2003. Cordgrass has since spread aggressively in Boundary Bay, Robert's Bank, Burrard Inlet and Puget Sound. Cordgrass was identified within Richmond's municipal boundaries in 2013 and again 2024.

Perennial pepperweed (pepperweed) was detected in the intertidal areas of Boundary Bay in 2023 and was likely introduced to North America through shipping activities. It tolerates a range of saline and alkaline soils and often invades sensitive areas, such as marsh lands. Pepperweed spreads quickly and can reduce suitable nesting habitats for birds. Pepperweed has been added to the Ministry of Forests' pesticide use permit renewal application for treatment alongside cordgrass. There are currently no detections of pepperweed within or near Richmond's municipal boundaries.

Provincial Management Program

The Ministry of Forests, in partnership with Ducks Unlimited, have been monitoring, mapping, and managing invasive cordgrass infestations in the Lower Mainland since 2003. Early management approaches, including excavation and light-shading techniques, all yielded poor results leading to the introduction of herbicides in 2013. The Ministry of Forests integrated herbicide management approach has been successful in limiting the spread of cordgrass in Boundary Bay, Robert's Bank, and Burrard Inlet by reports of declining populations since herbicide was introduced.

The Province regulates pesticide use in BC pursuant to the *Weed Control Act* and the *Integrated Pest Management Act*. The *Weed Control Act* is administered by the Ministry of Forests and requires all landowners, including municipalities, to control the spread of noxious weeds. The *Integrated Pest Management Act* is administered by the Ministry of Environment and Parks and is used to regulate the use of herbicides to manage invasive species, including noxious weeds listed in the *Weed Control Act*. The Ministry of Forests' current pesticide use permit, renewed in 2022, will expire on June 28, 2025. The Ministry of Forests is seeking comments from the City on the proposed renewal application.

Proposed Pesticide Use Permit Renewal

Staff have reviewed the proposed renewal application in conjunction with past pesticide use permits and associated comments endorsed by the City in 2019 and 2022. The total area proposed in the 2025 application includes a geographic boundary that covers all intertidal areas of the Fraser River Delta and Baynes Sound, including within the municipal boundaries of Richmond (Attachment 1). The proposed 2025 boundary has been extended in this renewal application to include areas at risk of introduction. Within the boundary, a maximum treatment area of 2.5 hectares is proposed. Consistent with previous permits, herbicide will be manually applied directly to individual cordgrass plants during the growing season (typically July to September). The renewal application notes that herbicide application will only be conducted by

certified pesticide applicators and strict treatment and monitoring practices that protect sensitive intertidal conditions will be followed. Staff acknowledge that this program is regionally-significant and has reduced the regional spread of cordgrass and pepperweed by incorporating herbicide in its integrated management approach. The following comments are recommended for endorsement and submission to the Ministry of Forests:

- That the City receive a copy of the permit and its conditions if issued by the Ministry of Environment and Parks, and that the conditions of the pesticide use permit, including best management practices, are strictly enforced. This includes ensuring that appropriate signage is posted at treatment sites in accordance with regulatory requirements;
- That the City be notified, within the same growing season, of any future records of cordgrass or pepperweed within or near Richmond's municipal boundaries and that the City receive an annual treatment summary when available;
- That the City be notified in advance of planned treatment within Richmond's municipal boundaries, pursuant to the notification requirements outlined within the permit, if approved; and
- That the Province provide the City with provincial contact information for public inquiries related to the proposed treatment program, including those concerning Spartina and pepperweed distribution in Richmond, public notifications, herbicide use and herbicide applications.

Financial Impact

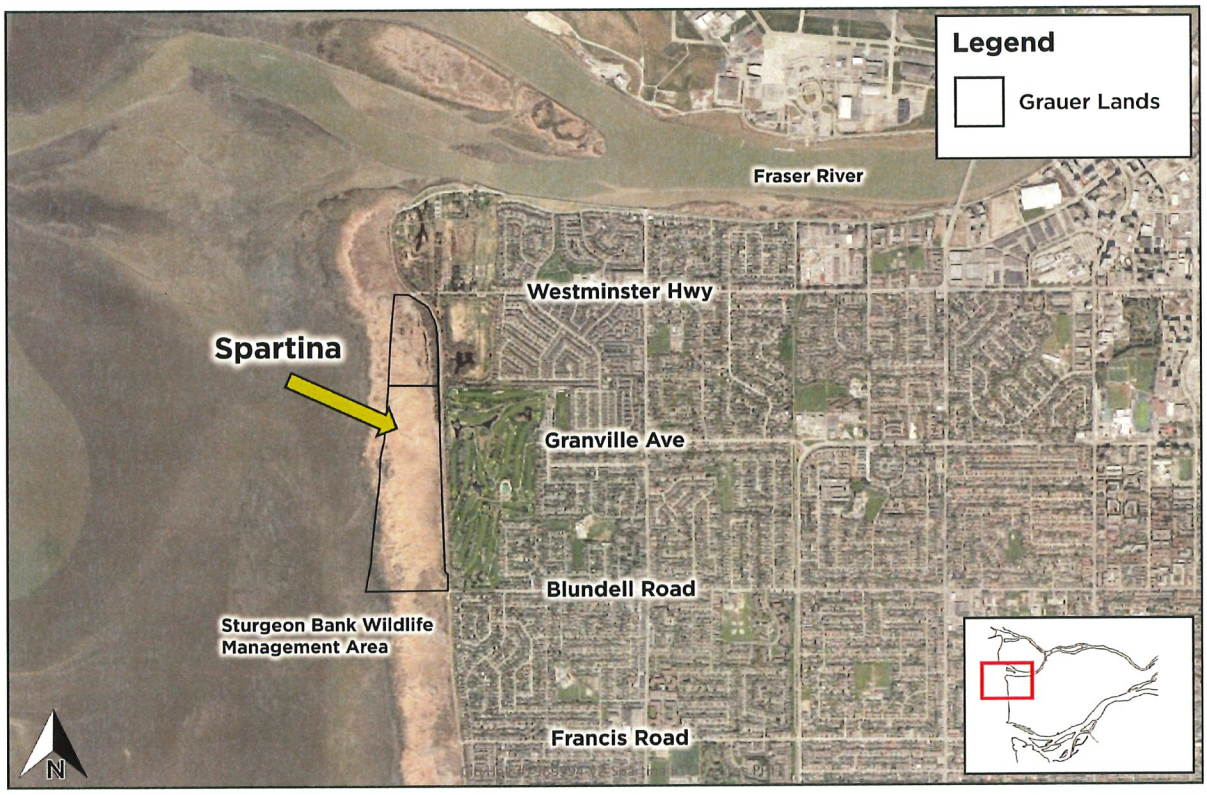
None.

Conclusion

The Ministry of Forests is currently managing invasive species of plants, cordgrass and perennial pepperweed, regionally with the use of herbicides under an active pesticide use permit that will expire on June 28, 2025. The Ministry of Forests is seeking comments from the City related to the 2025 pesticide use permit renewal application that will allow treatment to continue until 2028 if provincially approved. The Ministry of Forests' historical monitoring data implies that their management efforts have significantly reduced the spread of the cordgrass since the inclusion of herbicide. Staff have reviewed the application and recommend that the comments be forwarded to the Ministry of Forests, if endorsed.

Nadia Chan
Manager, Environment
(604-238-8036)

Att. 1: Municipal Boundaries for the Regional Pesticide Use Permit (2025 – 2028)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Grauer Lands
Fraser River
Westminster Hwy
Spartina
Granville Ave
Blundell Road
Sturgeon Bank Wildlife Management Area
Francis Road
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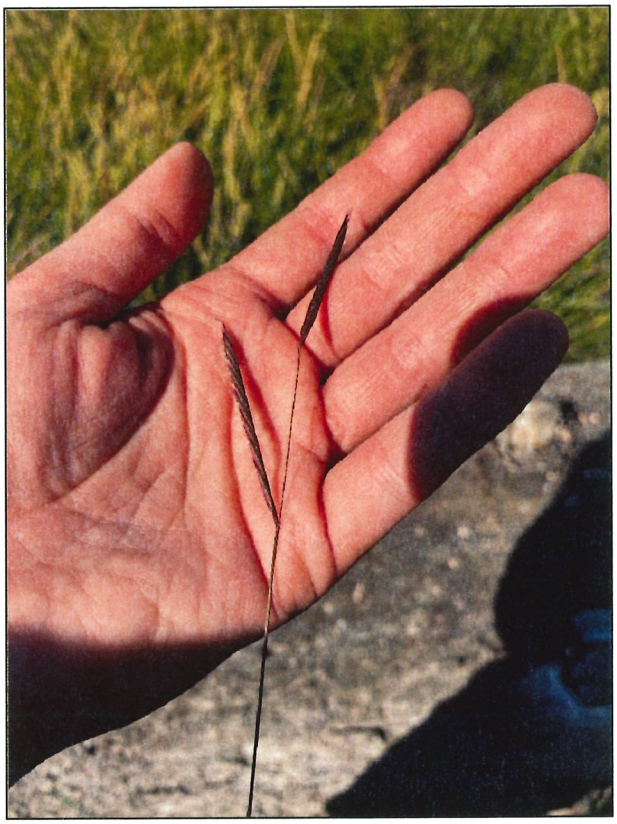

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City of Richmond

Report to Committee

To:	Public Works and Transportation Committee	**Date:**	March 19, 2025
From:	Milton Chan, P.Eng. Director, Engineering	**File:**	10-6000-01/2025-Vol 01
Re:	**2025 Liquid Waste Management Plan Biennial Report**		

Staff Recommendation

That the City's 2025 Liquid Waste Management Plan Biennial Report as presented in Attachment 1 of the staff report titled "2025 Liquid Waste Management Plan Biennial Report", dated March 19, 2025, from the Director, Engineering, be submitted to Metro Vancouver.

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

Att. 1

REPORT CONCURRENCE		
ROUTED TO:	**CONCURRENCE**	**CONCURRENCE OF GENERAL MANAGER**
Public Works	☑	Roeland Zwaag
SENIOR STAFF REPORT REVIEW	**INITIALS:**	**APPROVED BY CAO**

Staff Report

Origin

The Greater Vancouver Sewerage and Drainage District (GVS&DD) Board adopted the Integrated Liquid Waste and Resource Management Plan (the "Liquid Waste Plan") in May 2010. Subsequently, at the September 27, 2010 City of Richmond Regular Council Meeting, Council adopted the following motion:

> *"That the municipal commitments in the Metro Vancouver 2010 Integrated Liquid Waste and Resource Management Plan be endorsed."*

The Minister of Environment approved the Liquid Waste Plan, subject to the conditions identified in his letter dated May 30, 2011.

The Liquid Waste Plan requires member municipalities to report progress on their commitments on the operations, monitoring, and management of sanitary systems on a biennial basis. Metro Vancouver has introduced a simplified report template for the 2025 Biennial Report with provincial approval that provides updates on GVS&DD members' status of their commitments in the current Liquid Waste Plan.

This staff report summarizes the City's progress on the Liquid Waste Plan municipal action items, and presents the 2025 Biennial Report (Attachment 1) for Council's endorsement for submission to Metro Vancouver. This submission will be included in the Liquid Waste Plan Biennial Report compiled by Metro Vancouver and submitted to the Ministry of Environment & Climate Change Strategy (formerly the Ministry of Environment) once it is approved by the GVS&DD Board.

Metro Vancouver is currently updating the current Liquid Waste Plan as outlined in a separate staff report titled "Metro Vancouver Liquid Waste Management Plan Update", dated March 19, 2025, from the Director, Engineering. Metro Vancouver has indicated that future Biennial Reports under the new Liquid Waste Plan will be submitted in a format similar to the 2025 Biennial Report, subject to provincial approval.

This report supports Council's Strategic Plan 2022-2026 Focus Area #1 Proactive in Stakeholder and Civic Engagement:

> *Proactive stakeholder and civic engagement to foster understanding and involvement and advance Richmond's interests.*
>
> *1.1 Continue fostering effective and strategic relationships with other levels of government and Indigenous communities.*

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.*

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

This report supports Council's Strategic Plan 2022-2026 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.

Analysis

The Liquid Waste Plan includes a municipal commitment to report progress on a biennial basis. Richmond has previously submitted 10 biennial reports over the last 22 years based on reporting requirements in the current and previous Liquid Waste Management Plans.

The 2025 Biennial Report template, provided in a spreadsheet format by Metro Vancouver, is simplified compared to previous years. The new template consists of 10 Ministerial Conditions and 91 actions stipulated in the current Liquid Waste Plan. It provides a summary of member municipalities' status of all ministerial conditions and actions in the current Liquid Waste Plan as of the end of 2024.

Of the 101 conditions and actions in the 2025 Biennial Report, 66 fall under Metro Vancouver's jurisdiction, while the remaining 35 are Richmond's responsibility. The following sections highlight Richmond's key initiatives and progress in managing these 35 municipal actions as part of the City's commitment to sustainable liquid waste management.

Stormwater Management Plan

The Liquid Waste Plan includes actions that require municipalities to develop bylaws and design standards/guidelines, and to implement stormwater management plans that promote on-site rainwater management and integration with land use planning.

In alignment with these objectives, Richmond has adopted the Flood Protection Bylaw (No. 10426) to regulate surface water and groundwater discharges from properties, and has developed the Engineering Design Specifications that outline the requirements for infrastructure design to protect the City from flooding risks.

The City has also developed an Integrated Rainwater Resource Management Strategy that outlines a strategic approach to stormwater detention, water quality improvement, sediment control, as well as rainwater harvest and re-use. This strategy also promotes the protection and enhancement of green infrastructure to support long-term environmental resilience. In addition, Richmond's Ecological Network Management Strategy contains actions and initiatives on the integration of rainwater Best Management Practices tailored to various land uses within the City.

Liquid Waste Source Control

Grease Management and Green Cart Programs

The Liquid Waste Plan requires municipalities to continue outreach plans to support liquid waste source control programs. The City maintains a Grease Management Program that includes grease source control, sanitary sewer system monitoring and inspection, and on-going maintenance work. The City has a full-time bylaw enforcement officer dedicated towards liquid waste source control and grease management for the food services sector.

In addition, Richmond has had a Green Cart Program since 2013. This program reduces the amount of waste and pollutants, such as grease, that would otherwise be discharged into sanitary sewers. The City has also had a grease monitoring program since 2018. This program includes tracking the location and severity of grease accumulation, and conducting targeted maintenance at identified "hot spots" with a history of heavy grease accumulation.

Water Metering and Conservation

The Liquid Waste Plan strongly encourages municipalities to implement residential water metering programs, and to consider municipal rebate programs for water efficient fixtures and appliances to reduce potable water use.

Richmond is a regional leader in water metering, with a comprehensive water meter program for residential and commercial properties. All single-family, industrial, commercial, institutional, and farm properties, as well as about 60% of the multi-family units in Richmond have been metered. Since the inception of the program in 2003, the City's total water use has decreased by 14% despite an increase in population by 34%. This highlights the success of water metering in conserving water and effectively managing demand, reducing the need for costly infrastructure upgrades.

To further promote reduced water use, the City provides metered customers with water conservation kits, which include low-flow showerheads, faucet aerators, toilet fill cycle diverters, toilet leak detection tablets, and educational water conservation tools. In addition, the City has ongoing programs for toilet rebates and rain barrels.

Asset Management Plan

The Liquid Waste Plan requires municipalities to develop and implement asset management plans assessing the need for replacement or rehabilitation for their sewerage infrastructure. Richmond completes an ageing infrastructure analysis every two to three years to assess the current and long-term financial requirements for maintaining and replacing City's ageing infrastructure. The latest ageing infrastructure analysis was completed in 2022, with an update planned for 2025.

In addition, the City is updating its sanitary model to assess the potential impacts of the population densification resulting from the Provincial housing legislation passed in December 2023 on the City's sanitary infrastructure. This model update will help guide the City's planning and development efforts for future sewer upgrades, replacement, and rehabilitation projects.

Inflow and Infiltration

The Liquid Waste Plan requires municipalities to develop and implement inflow and infiltration (I&I) management plans that ensure I&I levels are within Metro Vancouver allowances. Inflow and infiltration of stormwater into the sanitary sewer system are typically caused by cross-connections or defects in the infrastructure, placing additional demands on the sanitary system.

Richmond does not have combined sewers, and does not permit unregulated groundwater discharge into the sanitary sewer system. Additionally, to manage I&I, the City conducts regular sewer assessments, maintenance, and rehabilitation programs to address defects proactively. This includes Closed-Circuit Television (CCTV) inspections of the City's gravity sewers to identify defects early, allowing for timely repair of the infrastructure to prevent further infiltration into the sanitary system. Any damaged infrastructure identified through inspections is prioritized in the City's annual capital program, positioning the City to continue meeting or exceeding Metro Vancouver targets.

Financial Impact

None.

Conclusion

The Liquid Waste Plan includes a municipal commitment to report progress on Liquid Waste Plan actions on a biennial basis. The 2025 Biennial Report adopts a simplified spreadsheet format provided by Metro Vancouver, and summarizes Richmond's progress on the municipal actions in the current Liquid Waste Plan as of the end of 2024. In summary, the City's sanitary and drainage infrastructure has been in good condition and performing well, thus providing effective protection to our environment, and enabling the City to meet the requirements in the Liquid Waste Plan. Staff will continue to work on the municipal actions that will be identified in the new Liquid Waste Plan to ensure that the City of Richmond continues to meet all of the requirements.

Jason Ho, P.Eng.
Manager, Engineering Planning
(604-244-1281)

Ridhi Dalla, P.Eng.
Senior Project Manager, Engineering
(604-204-8521)

JH:kl

Att. 1: City of Richmond 2025 Liquid Waste Management Plan Biennial Report

2025 Liquid Waste Management Plan Biennial Report

LWMP Action #	Action Description	Timeline Provided by Metro Vancouver	Colour coding indicating progress on actions (pink – not started, orange – in-progress, green - complete, blue – continuous action, grey - not applicable																				
			Metro Vancouver	City of Burnaby	City of Coquitlam	City of Delta	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	City of Vancouver	District of West Vancouver	City of White Rock	University Endowment Land
Ministerial Conditions																							
MC1	The ministry supports upgrading to secondary level treatment the Lions Gate Wastewater Treatment Plant by 2020 and Iona Island Wastewater Treatment Plant as soon as possible, but no later than 2030 and not contingent on the availability of senior government funding. The Ministry of Environment is not a funding agency. While I understand the cost of the upgrades is significant, they are necessary to meet current environmental standards. The Ministry will support Metro Vancouver pursuing senior government and alternative funding options, but cannot guarantee any provincial commitment in that regard, nor compromise the Ministry's mandate to protect the environment	Not provided																				
MC2	Member municipalities are strongly encouraged to business case and/or implement residential water metering programs and to consider municipal rebate programs for water efficient fixtures and appliances to reduce potable water use	Not provided																					
MC3	Metro Vancouver, in partnership with member municipalities is encouraged to pursue a region-wide water conservation program targeting the industrial, commercial, institutional and agricultural sectors as part of its new Drinking Water Management Plan. Remaining municipalities in the region that have not implemented metering for these sections are encouraged to do so	Not provided																					
MC4	Metro Vancouver must use receiving environmental and effluent monitoring data from combined sewer overflow (CSO) and sanitary sewer overflow (SSO) in the regional system to interpret the overall status of CSOs and SSOs. Metro Vancouver will continue the fate and effects studies on CSOs with the Clark Drive location and other significant sites as determined by the Environmental Management Committee. Metro Vancouver will establish similar studies representative of significant SSO locations, in particular the Cloverdale, Katzie and Lynn locations. The interpretation and assessment should demonstrate whether there has been any improvement or degradation along with any measures taken to address such discharges. Metro Vancouver will report out in the Quality Control Annual Report	Not provided																					
MC5	Metro Vancouver is encouraged to continue to build upon previous studies associated with studying endocrine-disrupting chemicals, persistent organic pollutants and other micro-contaminants found in the wastewater by developing source control initiatives through education (for example, target outreach), regulation and inspection programs	Not provided																					
MC6	Metro Vancouver will continue the receiving and ambient monitoring programs specified in the approved 2002 LWMP, including, but not limited to, recreational water quality (beach monitoring); monitoring near the outfalls for all five wastewater treatment plants, including the extensive deep sea monitoring near the Iona Island plant; and CSO effluent quality and monitoring of small urban streams relating to impacts from urbanization and stormwater	Not provided																					

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MC7	Member municipalities will, with MV planning and coordination, and to the satisfaction of the Regional Manager, develop a coordinated program to monitor stormwater and assess and report the implementation and effectiveness of Integrated Stormwater Management Plans (ISMPs). The program will use a weight-of-evidence performance measurement approach and will report out in the Biennial Report. The Regional Manager may extend the deadline for completion of ISMP by municipalities from 2014 to 2016 if satisfied that the assessment program could result in improvement of ISMP and protect stream health.	Not provided																				
MC8	Bypass conditions that occur at wastewater treatment plants will be reported out in the annual quality control report. The report on each activity will include a description of the event, cause, environmental effect and monitoring that occurred, and any mitigation measures undertaken to prevent recurrence and remediate detrimental environmental effect.	Not provided																				
MC9	The ILWRM has a goal of protecting public health and the environment. In keeping with this goal and to ensure alignment with other national, provincial and regional initiatives, Metro Vancouver and member municipalities are encouraged to: (a) Have local land use planning consider the direction provided by the ISMPs, (b) Consider how the degree, type and location of land development within a drainage can affect the long-term health of the watershed, (c) Consider how to protect the stream, including the riparian areas that exert an influence on the steam, from long-term cumulative impacts; and (d) Use scenarios and forecasting to systematically consider environmental consequences/benefits of different land use approaches prior to build-out (for example, Alternative Future type approaches).	Not provided																				
MC10	Metro Vancouver will continue to consult with First Nations during the implementation of the Plan – in particular, engaging, as appropriate, with First Nations likely to be impacted by the secondary upgrades.	Not provided																				
Goal 1 – Protect public health and the environment																						
1.1.1	Review and enhance sewer use bylaws to reduce liquid waste at source, including contaminants identified by the Canadian Environmental Protection Act.	2012																				
1.1.2	Develop new regulatory instruments, such as Pollution Prevention Plans to complement existing regulations.	2014																				
1.1.3	Increase resources for permitting and inspection to support and enforce sewer use bylaws.	2010																				
1.1.4	Investigate the implications of the use of domestic food grinders.	2012																				
1.1.5	Develop and implement targeted outreach plans to support liquid waste source control programs.	On-going																				
1.1.6	Develop a template to guide the preparation and implementation of inflow and infiltration management plans as part of broader asset management plans and to support sanitary sewer overflow reduction strategies.	2011																				
1.1.7	Work with the real estate industry and their regulators, and the municipalities to develop and implement a process for the inspection and certification of private sewer laterals being in good condition as a required component of real estate transactions within Metro Vancouver.	2011																				

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1.1.8	Develop and implement inflow and infiltration management plans that identify reduction strategies and timelines to ensure wet weather inflow and infiltration are within targeted levels.	2012																					
1.1.9	Work with municipalities to review historical data and adjust, as necessary, the average inflow and infiltration allowance for regional trunk sewers and wastewater treatment plants, and develop associated target allowances for municipal sewer catchments associated with a 1:5 year return frequency storm event for sanitary sewers to a level that ensures environmental economic sustainability.	2013																					
1.1.10	Review progress in reducing inflow and infiltration every four years.	Every 4 years																					
1.1.11	Enhance enforcement of sewer use bylaw prohibition against the unauthorized discharge of rainwater and groundwater to sanitary sewers.	2010																					
1.1.12a	Work with municipalities to facilitate research on watershed-based stormwater management approaches.	2012																					
1.1.12b	Work with municipalities to identify improvements to stormwater bylaws to include on-site rainwater management requirements.	2012																					
1.1.12c	Work with municipalities to develop model utility design standards and options for neighbourhood design guidelines.	2012																					
1.1.12d	Work with municipalities to establish region wide baseline criteria for on-site rainfall management including variations for localized geology, rainfall and watershed conditions.	2012																					
1.1.12e	Work with municipalities to establish mechanisms to ensure continued performance of on-site rainwater management systems.	2012																					
1.1.12f	Work with senior government and industry to develop codes of practice, certification, guidelines and standards which support this plan.	2012																					
1.1.13	Decrease liquid waste volumes through complementary initiatives in the Metro Vancouver Drinking Water Management Plan to reduce potable water consumption.	On-going																					
1.1.14	Review and enhance sewer use bylaws to reduce liquid waste at source, including contaminants identified by the Canadian Environmental Protection Act.	2012																					
1.1.15	Continue existing programs of permitting and inspection to support and enforce sewer use bylaws. * *City of Vancouver only*	On-going																					
1.1.16	Identify and regulate pesticides and lawn care products which negatively affect rainwater runoff quality and urban stream health	2014																					
1.1.17	Continue outreach plans to support liquid waste source control programs.	On-going																					
1.1.18	Develop and implement inflow and infiltration management plans, using the Metro Vancouver template as a guide, to ensure wet weather inflow and infiltration volumes are within Metro Vancouver's allowances as measured at Metro Vancouver's flow metering stations.	2012																					
1.1.19	Enhance enforcement of sewer use bylaw prohibition against the unauthorized discharge of rainwater and groundwater to sanitary sewers.	2010																					

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1.1.20	Update municipal bylaws to require on-site rainwater management sufficient to meet criteria established in municipal integrated stormwater plans or baseline region-wide criteria.	2014																			
1.1.21	Update municipal utility design standards and neighbourhood design guidelines to enable and encourage on-site rainwater management.	2014																			
1.2.1	Prohibit the construction of new combined sewer systems other than those functioning as part of a strategy to reduce combined sewer overflows or to manage stormwater quality.	On-going																			
1.2.2	Address the Canada-wide Strategy for the Management of Municipal Wastewater Effluent (CWS-MMWE) by working with Burnaby, New Westminster and Vancouver to develop and implement priorities for sewer separation of catchments tributary to combined sewer outfalls; regional and municipal sequence for trunk and collector sewer separation; strategic use of existing combined sewers to manage rainwater quality runoff; and a strategy to separate combined sewer connections from private properties.	2014																			
1.2.3	Replace combined regional trunk sewers with separated sanitary and storm sewers as determined by the plans developed in 1.2.2	On-going																			
1.2.4	Work with municipalities to develop and implement municipal-regional sanitary overflow management plans which will: prevent sanitary overflows resulting from heavy rain and snowmelt occurring less than once every five years (for a 24 hour duration event); reduce emergency overflows due to power outages; and identify locations and schedules for appropriate system capacity improvements, wet weather containment, and point treatment and discharge to receiving waters of chronic overflows, including Cloverdale Pump Station, Katzie Pump Station, Lynn Pump Station.	2013																			
1.2.5	Work with Metro Vancouver to develop and implement municipal-regional sanitary overflow management plans as set out in 1.2.4	2013																			
1.2.6	Burnaby, New Westminster and Vancouver will work with Metro Vancouver to give effect to 1.2.2 and, specifically, implement plans to prevent combined sewer overflows by 2050 for the Vancouver Sewerage Area and 2075 for the Fraser Sewerage Area and separate combined sewers at an average rate of 1% and 1.5% of the system per year in the Vancouver Sewerage Area and Fraser Sewerage Area respectively.	On-going																			
1.3.1	Develop and implement operational plans for sewerage and wastewater treatment facilities to ensure infrastructure reliability and optimal performance.	On-going																			
1.3.2	Maintain trunk sanitary sewer capacity for dry weather sewage conveyance levels plus the Metro Vancouver target inflow and infiltration allowance; as necessary upgrade trunk sewer systems to maintain hydraulic gradelines and safe operating levels which have been established based on measured flow.	On-going																			
1.3.3	Work with municipalities to develop and implement emergency sanitary sewer overflow plans including contingency plans to minimize impacts of unavoidable sanitary sewer overflows resulting from extreme weather, system failures or unusual events.	On-going																			

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1.3.4	Operate wastewater treatment plants which have secondary level treatment (Annacis Island, Lulu Island, North West Langley wastewater treatment plants) to meet requirements specified in each facility's Operating Certificate and the Canada-wide Strategy for the Management of Municipal Wastwater Effluent National Performance Standards for wastewater effluent, including: monthly average maximum Carbonaceous Biochemical Oxygen Demand (CBOD5): 25 mg/L; and monthly average maximum Total Suspended Solids (TSS): 25 mg/L.	On-going																				
1.3.5	Upgrade or replace Lions Gate (North Shore Sewerage Area) and Iona Island (Vancouver Sewerage Area) wastewater treatment plants to secondary level treatment to meet Canada-wide Strategy for the Management of Municipal Wastewater Effluent (CWSMMWE) requirements and timelines.	Not Available																				
1.3.6	Maintain interim maximum daily concentration limits for wastewater effluent of 130mg/L BOD5 at both Lions Gate and Iona Island plants and 130mg/L TSS at Lions Gate and 100mg/L TSS at Iona Island until such a time as secondary treatment is operational, and operate the plants to meet requirements specified in each facility's Operational Certificate (Ongoing).	On-going																				
1.3.7	Assess environmental monitoring results (see Strategy 3.3) to determine whether any actions are required to meet Ministry of Environment/Canada-wide Strategy for the Management of Municipal Wastewater Effluent (CWS-MMWE) requirements.	On-going																				
1.3.8	Continue odour control programs at wastewater treatment plants and implement odour control programs for targeted facilities in the regional sewer system and for relevant energy and material recovery processes (see Action 3.3.4).	On-going																				
1.3.9	Develop and implement air emissions management programs for standby power generators and biogas production, including assessment of desirability of retrofit and accelerated asset replacement where appropriate.	2014																				
1.3.10	Develop and implement programs to reduce greenhouse gas emissions from the regional liquid waste management systems to help achieve federal, provincial and Metro Vancouver greenhouse gas targets (see Action 3.3.4).	2015																				
1.3.11	Develop and implement operational plans for municipal sewerage facilities to ensure infrastructure reliability and optimal performance.	On-going																				
1.3.12	Work with Metro Vancouver to develop and implement emergency sanitary sewer overflow plans including contingency plans to minimize impacts of unavoidable sanitary sewer overflows resulting from extreme weather, system failures or unusual events.	On-going																				
1.3.13	Work with private marina operators, Ministry of Environment and Environment Canada to develop and implement regulations to ensure all new marinas and marinas where planned renovations exceed 50% of the assessed existing improvements value have pleasure craft pump-out facilities.	On-going																				
1.3.14	Require all pleasure craft pump-out facilities to connect to a municipal sanitary sewerage system or a provincially permitted on-site treatment and disposal system or have established enforceable protocols for transporting liquid waste for disposal at a permitted liquid waste management facility.	On-going																				

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Goal 2 – Use Liquid Waste as a Resource																						
1.3.15	Continue existing municipal odour control programs and implement new programs for targeted municipal sewer facilities (see Action 3.3.4).	On-going																				
1.3.16	Develop and implement air emissions management programs for standby power generators at municipal sewer pump stations.	2016																				
1.3.17	Develop and implement programs to reduce greenhouse gas emissions from municipal liquid waste management systems to help achieve federal, provincial and municipal greenhouse gas targets (see Action 3.1.5).	On-going																				
1.3.18	Include Metro Vancouver and municipalities in the Ministry's processes to review and establish official water uses and official water quality objectives for specific water bodies within Metro Vancouver.	On-going																				
2.1.1	Assess each sewerage area using an integrated resource recovery business case model that: (a) evaluates opportunities to expand the recovery of energy, nutrients and water from the liquid waste system, specifically: Energy from biogas at wastewater treatment plants including investigating new sludge and wastewater treatment technologies and the co-digestion of other organic wastes such as organics in municipal solid waste, oils and greases, Heat energy from new pump stations, sewer replacement and rehabilitation and major wastewater treatment plant projects, Biodiesel from trucked liquid waste, waste grease and sewer grease, Energy from biosolids and sludge, Nutrients, such as phosphorous from liquid waste and biosolids, Alternatives to potable water for nondrinking purposes, such as rainwater harvesting, greywater reuse and reclaimed treated wastewater, (b) identifies linkages between liquid waste resource recovery opportunities and other systems (solid waste, drinking water, land use/buildings, parks, air quality, energy), (c) develops and evaluates business cases for integrated resource recovery/use opportunities.	2012																				
2.1.2	Implement appropriate business cases based on the results of 2.1.1	On-going																				
2.1.3	Work with municipalities to adapt plans and infrastructure for long-term needs based on the results of 2.1.1	On-going																				
2.1.4	Work with Metro Vancouver to give effect to 2.1.1, 2.1.2 and 2.1.3	On-going																				
Goal 3 – Effective affordable and collaborative management																						
3.1.1	Assess the performance and condition of regional sewerage systems by: (a) inspecting regional sanitary sewers on a twenty-year cycle and, (b) maintaining current maps of sewerage inspection, condition, and repairs.	On-going																				
3.1.2	Create incentives to reduce inflow and infiltration by adjusting Tier 1 sewerage cost allocation formulae within each sewerage area from an average dry weather flow basis (25th percentile) to average wet weather flow (75th percentile) with appropriate adjustments for combined sewerage areas. Tier 2 cost allocation would remain unchanged.	2010																				
3.1.3	In consultation with municipalities, review Metro Vancouver's safe-operating head for regional sewers	2011																				
3.1.4	Develop and implement asset management plans targeting a 100 year replacement or rehabilitation cycle for regional sewerage infrastructure.	2013																				
3.1.5	Update and implement asset management plans for wastewater treatment plants which address risks, including climate change and seismic events, and maintain performance in wet weather.	2013																				

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3.1.6	Assess the performance and condition of municipal sewerage systems by (a) inspecting municipal sanitary sewers on a twenty year cycle; (b) maintaining current maps of sewerage inspection, condition and repairs; and (c) using the Metro Vancouver "Sewer Condition Reporting Template Standard Report, November 2002" as a guide to ensure a consistent approach to sewer system evaluation and reporting.	On-going																				
3.1.7	Work with Metro Vancouver to give effect to 3.1.2, 3.1.3 and 3.1.4	On-going																				
3.1.8	Develop and implement asset management plans targeting a 100 year replacement or rehabilitation cycle for municipal sewerage infrastructure and provide copies of such plans to Metro Vancouver.	2014																				
3.2.1	With financial support from provincial and federal governments and the University of British Columbia, develop the Annacis Island Sustainability Academy to support innovative research and demonstration projects in liquid waste management.	2011																				
3.2.2	Collaborate with local and senior governments, academic institutions and industry in research on wastewater treatment technology and stormwater management and associated demonstration projects, training and development of educational toolkits.	On-going																				
3.2.3	Undertake an annual internal audit of best practices of one regional liquid waste management sub program and environmental management system to identify opportunities for innovation and improvements.	Annually																				
3.2.4	Undertake a tri-annual internal audit of best practices of one municipal liquid waste management sub-program in each municipality to identify opportunities for innovation and improvements.	Triennially																				
3.3.1	Continue to monitor the ambient environment conditions of relevant water bodies in the region in conformance with the Canada-wide Strategy for the Management of Municipal Wastewater Effluent (CWSMMWE) requirements, and work with the Ministry of Environment in developing Environmental Quality Objectives.	On-going																				
3.3.2	Continue to monitor the quantity and characteristics of Metro Vancouver's liquid waste point discharges to the environment in conformance with the Canada-wide Strategy for the Management of Municipal Wastewater Effluent (CWS-MMWE) requirements to meet Environmental Discharge Objectives.	On-going																				
3.3.3	Continue to operate its regional data collection network for sewers, rainfall and streams and use that data to assess the effectiveness of actions taken under this plan.	On-going																				
3.3.4	In collaboration with municipalities, estimate and document the greenhouse gas emissions and odours associated with the operation of the municipal and regional liquid waste management systems (see Actions 1.3.8, 1.3.10, 1.3.15, and 1.3.17).	2012																				
3.3.5	Estimate and report on the frequency, location and volume of sewage overflows from regional combined and sanitary sewers, and where feasible identify and address the probable causes.	On-going																				
3.3.6	In collaboration with Metro Vancouver, estimate and document the greenhouse gas emissions and odours associated with the operation of the municipal and regional liquid waste management systems.	2014																				
3.3.7	Estimate and report on the frequency, location and volume of sewage overflows from municipal combined and sanitary sewers, and where feasible identify and address the probable causes.	On-going																				
3.3.8	Maintain and, if necessary, expand the existing municipal sewer flow and sewer level monitoring network.	On-going																				

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3.4.1	Design and adapt infrastructure and operations to address identified risks and long-term needs, including risks associated with climate change.	On-going																			
3.4.2	In collaboration with municipalities and the Integrated Partnership for Regional Emergency Management (IPREM), develop emergency management strategies and response plans for municipal and regional wastewater collection and treatment systems, including identifying and maintaining a system of emergency wastewater overflow locations.	2015																			
3.4.3	Ensure liquid waste infrastructure and services are provided in accordance with the Regional Growth Strategy and coordinated with municipal Official Community Plans.	On-going																			
3.4.4	In collaboration with Metro Vancouver and the Integrated Partnership for Regional Emergency Management (IPREM), develop emergency management strategies and response plans for municipal and regional wastewater collection and treatment systems.	2015																			
3.4.5	Adapt infrastructure and operations to address risks and long-term needs	On-going																			
3.4.6	Ensure liquid waste infrastructure and services are provided in accordance with the Regional Growth Strategy and coordinated with municipal Official Community Plans.	On-going																			
3.4.7	Develop and implement integrated stormwater management plans at the watershed scale that integrate with land use to manage rainwater runoff.	2014																			
3.5.1	Establish a new overarching committee, the Integrated Utility Management Advisory Committee (IUMAC), to advise Metro Vancouver on plan implementation, particularly from the perspectives of integrated planning and resource recovery across utility systems.	2010																			
3.5.2	Continue to receive advice from the Environmental Monitoring Committee (EMC) and Stormwater Interagency Liaison Group (SILG) as subcommittees under IUMAC.	On-going																			
3.5.3	Use the Burrard Inlet Environmental Action Program and the Fraser River Estuary Management Program Management Committee (BIEAP-FREMP) as the senior level forum for discussion of policy and assessment of the scientific work related to the plan, and for resolving toxicity concerns and any disputes among its members related to implementing the plan.	On-going																			
3.5.4	Biennially produce a progress report on plan implementation for the distribution to the Ministry of Environment that: (a) summarizes progress from the previous two years on plan implementation, for all Metro Vancouver actions, including the status of performance measures, (b) includes summaries and budget estimates for proposed LWMP implementation programs for the subsequent two calendar years (By July 1st biennially).	By July 1st Biennially																			
3.5.5	Hold a public accountability session based on the biennial reports (Actions 3.5.4 and 3.5.8) by making the report available through Metro Vancouver's website and by holding a special meeting of the Metro Vancouver Waste Management Committee to receive public comments and input on the report.	Biennially																			
3.5.6	The latest annual report under the IWLRMP was submitted to the Ministry of Environment on March 1, 2022 as the Interim Report: 2021. It included figures showing locations and volumes of all wet weather sanitary sewer overflows and municipal ISMP progress for 2021. This information is also included in this biennial report.	March 1st annually																			

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3.5.7	In collaboration with members and the Ministry of Environment, undertake a comprehensive review and update of the Plan on an eight-year cycle.	Every eight years																				
3.5.8	Biennially produce a progress report on plan implementation for distribution to the Ministry of the Environment that (a) summarizes progress from the previous two years on plan implementation for all municipal actions, including the status of performance measures. (b) includes summaries and budget estimates for proposed LWMP implementation programs for the subsequent two calendar years.	By July 1st Biennially																				
3.5.9	Report through Metro Vancouver to the Ministry of Environment annual progress on integrated stormwater management plan implementation and all occurrences of sanitary sewer overflows.	March 1st annually																				
3.5.10	Work with Metro Vancouver to give effect to 3.5.2, 3.5.5, and 3.5.7.	On-going																				

City of Richmond

Report to Committee

To:	Public Works and Transportation Committee	**Date:**	March 19, 2025
From:	Milton Chan, P.Eng. Director, Engineering	**File:**	10-6060-01/2025-Vol 01
Re:	**Metro Vancouver Liquid Waste Management Plan Update**		

Staff Recommendation

That the staff report titled "Metro Vancouver Liquid Waste Management Plan Update", dated March 19, 2025, from the Director, Engineering, be received for information.

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

REPORT CONCURRENCE		
ROUTED TO:	**CONCURRENCE**	**CONCURRENCE OF GENERAL MANAGER**
Public Works	☑	
SENIOR STAFF REPORT REVIEW	**INITIALS:**	**APPROVED BY CAO**

Staff Report

Origin

Metro Vancouver is required to develop and update its Liquid Waste Management Plan (LWMP) to be in compliance with provincial regulations under the Environmental Management Act. The two primary objectives for the LWMP is to protect public health and the environment and properly engage the public and First Nations.

The Interim Draft LWMP (Attachment 1) was endorsed by the Greater Vancouver Sewerage and Drainage District (GVS&DD) Board on November 29, 2024, with further consultation planned with municipalities, First Nations, regulatory agencies, and other stakeholders before final submission to the Ministry of Environment and Parks in late 2025.

This report provides information on the updated LWMP and its implications for Richmond.

This report supports Council's Strategic Plan 2022-2026 Focus Area #1 Proactive in Stakeholder and Civic Engagement:

> *Proactive stakeholder and civic engagement to foster understanding and involvement and advance Richmond's interests.*
>
> *1.1 Continue fostering effective and strategic relationships with other levels of government and Indigenous communities.*

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.*

Analysis

Metro Vancouver's updated LWMP introduces a shift in liquid waste management, prioritizing demand reduction and source control measures over traditional infrastructure expansion. The plan outlines new regional commitments, regulatory requirements, and implementation timelines that will affect member municipalities. Staff have reviewed the updated plan and identified key changes, Richmond's contributions, and considerations for implementation.

Key Changes in the Updated LWMP

The updated LWMP shifts from traditional infrastructure expansion toward reducing system demand at the source by emphasizing inflow and infiltration management, demand reduction, and storm water control. Several notable actions relevant to member municipalities include:

- Creating master sewer servicing plans to accommodate urban growth

- Providing incentives to homeowners to replace private sewer laterals
- Reviewing and adjusting wet weather sewer pricing
- Involving First Nations in watershed planning
- Establishing a municipal budget for rainwater management

Richmond already has an established master sewer servicing plan and allocates dedicated funding for rainwater management. Incentives for private lateral replacement are being considered at the regional level; however, due to Richmond's consistently low inflow and infiltration (I&I) rates, a municipal program is not currently necessary. Wet weather pricing review and First Nations engagement are being led by Metro Vancouver as part of their regional responsibilities.

The plan also updates policies for wastewater treatment upgrades, indicating commitments to achieve secondary treatment at the North Shore and Iona Island wastewater treatment plants by 2030 and 2040, respectively. Additionally, it proposes a regional target to eliminate combined sewer overflows by 2050 in the Vancouver Sewerage Area and by 2075 in the Fraser Sewerage Area. Member municipalities would also be expected to integrate rainwater and storm water management strategies into long-term planning, potentially requiring additional municipal resources. A streamlined plan update and annual reporting process could facilitate easier monitoring of progress, improved accountability, and reduced administrative efforts for member jurisdictions.

Richmond participated in the LWMP update process by reviewing proposed actions and providing feedback to ensure alignment with municipal priorities. The City's comments focused on:

- Developing clear collaboration strategies and engaging municipalities early to allow sufficient time for review and resource allocation.
- Ensuring accountability and clarity for actions requiring regional leadership.
- Clarifying funding responsibilities and implementation timelines.

Considerations for Richmond

Richmond's current initiatives align closely with the objectives outlined in the proposed LWMP, and staff generally support its overall direction. The City's system is advanced compared to many other municipalities in the region, placing Richmond in a strong position to meet proposed requirements. Key areas demonstrating Richmond's alignment and leadership include:

- *Demand reduction*: Richmond has proactively managed liquid waste through a comprehensive water metering program, in place for over 20 years, currently metering approximately 83% of total water consumption city-wide. All industrial, commercial, institutional, and single-family properties are metered, and universal multi-family metering will be achieved by 2039. This program is supplemented by additional water conservation initiatives, such as toilet rebates, significantly reducing liquid waste generation.

- *Source control*: Richmond operates a comprehensive Grease Management Program that includes regular inspections by dedicated City staff, proactive public education, and targeted communication with local businesses and residents. The program also includes ongoing system monitoring using pressure sensors and video inspections, supported by routine maintenance activities. Collaboration with Metro Vancouver and industry stakeholders further enhances the effectiveness of these efforts.

- *Infrastructure*: Richmond's sanitary sewer infrastructure is fully separated, with no combined sewer systems. This positions the City ahead of several other municipalities that must address significant combined sewer overflow challenges as outlined in the LWMP.

- *Overflow management*: Richmond does not experience chronic sanitary sewer overflow issues. Occasional localized overflow events during extreme weather conditions (e.g., atmospheric rivers) are effectively managed through proactive maintenance, continuous system monitoring, and timely infrastructure upgrades.

- *Inflow and infiltration (I&I)*: Richmond consistently maintains one of the lowest inflow and infiltration (I&I) levels in the region, reflecting the effectiveness of its proactive asset management practices and ongoing infrastructure renewal. The City's sustained low I&I rates result from regular monitoring, structured maintenance programs, and targeted capital improvements. These activities help reduce the amount of unnecessary rainwater and groundwater entering the sanitary sewer system, ensuring efficient operations and minimizing wastewater treatment demands.

The success of the City's sanitary system is attributed to Council-supported capital and operating programs that have been instrumental in maintaining a high-performing system. Richmond remains well-prepared to meet the proposed LWMP requirements.

Next Steps

Following the endorsement of the Interim LWMP by the GVS&DD, Metro Vancouver is entering the final stages of plan development. In 2025, Metro Vancouver will conduct a third and final phase of engagement with member jurisdictions, First Nations, regulatory agencies, stakeholders, and the public. Feedback from this engagement will inform the final version of the LWMP, which Metro Vancouver anticipates submitting to the Ministry of Environment and Parks in the fall of 2025. Once approved, the LWMP will become enforceable under the Environmental Management Act, guiding implementation of actions across the region.

Metro Vancouver will also establish a new streamlined annual reporting and plan update process, allowing for ongoing monitoring of progress and more transparent communication of results. This will include tracking implementation milestones and outcomes for both regional and municipal actions.

Staff will continue to support Metro Vancouver throughout this final phase of engagement and will monitor the approval process. Any substantive changes to the plan or implications for Richmond will be brought forward for Council's consideration as needed.

Financial Impact

None.

Conclusion

The Interim Draft Liquid Waste Management Plan suggests changes in how liquid waste may be managed across the region, emphasizing demand reduction and increased collaboration among member jurisdictions. Richmond has been actively involved in the update process and remains supportive of the plan's general objectives. Staff are continuing discussions with Metro Vancouver to better refine proposed implementation timelines, clarify funding responsibilities, and strengthen municipal coordination.

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Att. 1: Interim Draft Liquid Waste Management Plan

Interim Draft Liquid Waste Management Plan

November 2024

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.

Territorial Acknowledgment

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: q̓iċəy̓ (Katzie), q̓ʷɑ:ṅƛ̓əṅ (Kwantlen), kʷikʷəƛ̓əm (Kwikwetlem), máthxwi (Matsqui), xʷməθkʷəy̓əm (Musqueam), qiqéyt (Qayqayt), Semiahmoo, Sḵwx̱wú7mesh Úxwumixw (Squamish), scəẇaθən 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.

Table of Contents

Co-development of the Liquid Waste Management Plan

Metro Vancouver, as the Greater Vancouver Sewerage and Drainage District (GVS&DD), and its member jurisdictions work together closely to plan and manage wastewater collection and treatment across the region.

The Liquid Waste Management Plan reflects this collaborative relationship. It was co-developed by Metro Vancouver and GVS&DD member jurisdictions between 2021 and 2025, and reflects the priorities and significant contributions of the local governments that will be responsible for implementing the plan.

Metro Vancouver Members

GVS&DD Members

Village of Anmore	District of North Vancouver
City of Burnaby	City of Pitt Meadows
City of Coquitlam	City of Port Coquitlam
City of Delta	City of Port Moody
Electoral Area A	City of Richmond
City of Langley	City of Surrey
Township of Langley	City of Vancouver
City of Maple Ridge	District of West Vancouver
City of New Westminster	City of White Rock
City of North Vancouver	

Village of Belcarra
Bowen Island Municipality
Village of Lions Bay
scəwaθən məsteyəxʷ (Tsawwassen First Nation)

Introduction

Executive Summary

The purpose of all liquid waste management plans (LWMPs) is to protect public health and the environment. This LWMP includes community-specific solutions for Metro Vancouver and its member jurisdictions to manage wastewater and address growing pressures in the region.

This plan reflects the priorities of communities across the region who shared their perspectives during extensive engagement. It outlines Metro Vancouver's commitment to involve First Nations in wastewater management, and includes new actions developed in collaboration with First Nations governments.

This LWMP lays out a path toward meeting these *Municipal Wastewater Regulation* standards set by the Province:

- **Wastewater treatment.** The Province requires all Metro Vancouver wastewater treatment plants to provide secondary treatment at a minimum. Metro Vancouver plans to upgrade the North Shore and Iona Island wastewater treatment plants to secondary treatment by 2030 and 2040, respectively.
- **Combined sewer overflows.** Provincial policy requires the elimination of all combined sewer overflow systems. The *Municipal Wastewater Regulation* requires reducing the volume of combined sewer overflows from storm or snowmelt events with a less than five-year return period, by an average of 1 per cent per year. Combined sewer overflows will be eliminated by 2050 in the Vancouver Sewerage Area and by 2075 in the Fraser Sewerage Area.
- **Sanitary sewer overflows.** Provincial policy requires reducing the volume of sanitary sewer overflows from storm or snowmelt events with a less than five-year return period, by an average of 10 per cent per year. Metro Vancouver and member jurisdictions are reducing sanitary sewer overflows through actions that keep rainwater and groundwater from entering the sanitary system (inflow and infiltration).

This plan responds to the challenges facing our region – climate change, population growth, affordability, and the impacts of urban development. Many actions focus on reducing the amount of excess rainwater entering the system to avoid costly and unnecessary upsizing of major infrastructure in the future. These actions shift expenditures from Metro Vancouver to member jurisdictions, residents, and businesses, while resulting in a much lower total cost for the region to protect human health and the environment.

New and notable actions in the plan include:

- 1.3 Create master sewer servicing plans to accommodate growth and urban development
- 5.4 Provide incentives to homeowners for replacing private sewer laterals
- 6.4 Review and adjust wet weather sewer pricing
- 8.8 Implement system operational changes to minimize sanitary sewage in combined sewer overflows
- 9.6 Remove flows from creeks, lakes, and underground streams from combined sewers
- 10.2 Involve First Nations in watershed planning
- 11.1 Dedicate municipal budget to rainwater management
- 15.2 Build a regional biosolids dryer

We all have a role to play in protecting our region's waterways. This plan outlines how Metro Vancouver and its member jurisdictions will do their part to achieve our vision of **Healthy Waters. For all. Forever.**

Vision

Healthy Waters

Protect the waters that sustain life and make this region a great place to be

For All

Protect these waters for all life

Forever

Protect these waters for generations to come

Goals

The overarching aim of the plan is to protect public health and the environment by effectively managing liquid waste. The plan also seeks to honour Metro Vancouver's commitment to reconciliation with Indigenous Peoples by actively involving First Nations in regional liquid waste management. This is achieved through five goals:

Prevent pollution

Preventing pollution from entering the environment involves collecting and treating wastewater. Wastewater treatment plants are designed to remove certain substances from sewage. For other substances that would pass through treatment systems, preventing their introduction at the source – i.e., drains and toilets – is the only practical solution. Reliable pollution prevention allows liquid waste infrastructure to be more resilient and prepared for climate change and evolving regulatory requirements.

Reduce demands

Reducing the inputs into the wastewater system – both volume of flow and loading of organic material – enables smaller infrastructure to serve a growing population. Lowering the demands on the system can defer expansions and increase infrastructure resilience, which saves money in the long run and keeps the system affordable.

Recover resources

Recovering valuable resources from wastewater such as biogas, heat, biosolids, nutrients, and reclaimed water supports the return to a cyclical approach to natural resource management. Turning waste into valuable products as part of a circular water economy can reduce dependence on fossil fuels and extraction of raw materials, and improve economic resilience.

Restore ecological systems

Restoring ecological systems involves revitalizing and rehabilitating natural environments that have been degraded or damaged, to return these areas to their natural functioning and improve the ability of habitat to support wildlife.

Reflect First Nations' priorities

This plan aspires to reflect First Nations' priorities and respect Indigenous Knowledge and the rights of Indigenous Peoples while collaborating on areas of shared significance to improve environmental and public health outcomes for all.

These goals are linked to the circular water economy (Figure 1), which is a system where water and wastewater are treated as valuable resources that are sustainably managed to reduce waste and protect water for future needs. There is much to be learned from Indigenous societies and Indigenous ways that predate the colonial imposition of the linear economy in the region.

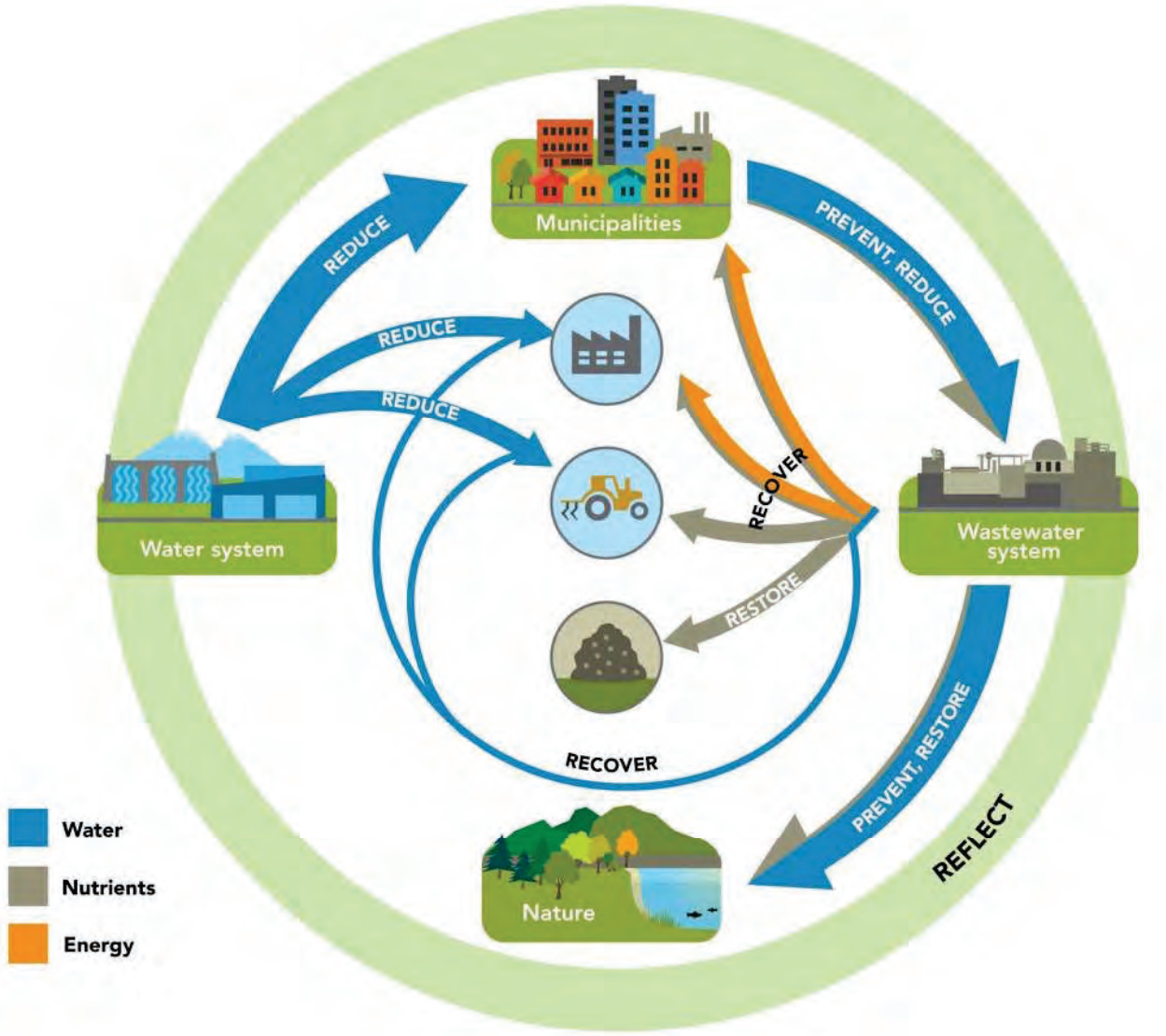


Figure 1 – Circular Water Economy

Plan Context

History

This LWMP has evolved over two decades to address the region's changing priorities and challenges in managing liquid waste.

The 2002 LWMP laid a comprehensive foundation by focusing on key areas such as water quality, combined sewer overflows, wastewater treatment plant upgrades, biosolids management, and source control. Key strategies included water conservation, asset maintenance, and maximizing environmental benefits per dollar spent. The plan emphasized interagency collaboration, continuous monitoring, and biennial reporting to measure progress and ensure environmental compliance. It also set deadlines for secondary treatment at major wastewater treatment plants and required member jurisdictions to develop stormwater management plans.

The 2011 LWMP built on the initial plan with a stronger emphasis on sustainability and resilience. It reset deadlines for secondary treatment and reinforced commitments to eliminating CSOs and sanitary sewer overflows. The plan introduced the Sustainable Region Initiative, focusing on the interconnectedness of local and global impacts, protecting natural and economic capital, and building community capacity. The new vision aimed for the long-term recovery of energy, nutrients, water, and other materials from liquid waste. The plan set three main goals: protecting public health and the environment, using liquid waste as a resource, and ensuring effective, affordable, and collaborative management. Additional performance measures were introduced to track progress toward these goals.

The new LWMP focuses on implementation and tangible results to meet current and future challenges. This plan streamlines initiatives to ensure timely and effective execution of key strategies, reducing complexity and focusing resources on the most impactful actions. It prioritizes adaptive infrastructure and programs to address climate change while continuing to use liquid waste as a valuable resource. The plan strengthens relationships with member jurisdictions, First Nations, the public, and interested parties to deliver reliable and equitable sewer infrastructure. Rigorous performance monitoring and reporting are maintained to track progress and make data-driven adjustments.

The new LWMP supersedes all previous LWMPs. Many of the actions in this LWMP are adapted from the 2002 and 2011 plans. A list of all previous actions and their status can be found in Appendices D and E respectively. Many actions also continue to be aligned with 2002 LWMP Policies while some have been superseded by updated federal or provincial regulations since that time. The 2002 LWMP Policies are listed in Appendix F.


Evolution of Liquid Waste Management in Metro Vancouver
1913
R.S. Lea Report: first "Master Plan" to direct raw sewage discharges away from beach areas
1969
Updated A.M. Rawn report recommends treatment plants on Lulu Island and Annacis Island
1998-1999
Secondary treatment implemented at Annacis Island WWTP and Lulu Island WWTP as mandated by the Province
1999
Stage 2 LWMP: Sewer separation strategy endorsed to eliminate combined sewer overflows
1890s-1910s
Outbreaks of cholera, typhoid fever, and other diseases
1910s-1950s
Combined sewers are built despite R.S. Lea Report recommendation to build separated sewers
1956
Greater Vancouver Sewerage & Drainage District Act establishes four sewerage areas
1961
Lions Gate WWTP opens
1973
Lulu Island WWTP opens
1989
Stage 1 LWMP: Desire to further improve receiving water quality and end overflows of untreated sewage
2002
Region's first LWMP approved by the Province, with ministerial conditions for future secondary treatment at Iona Island WWTP by 2020 and Lions Gate WWTP by 2030
2013
Requirement for annual reporting of combined sewer overflows to federal government
2023
Wet weather cost allocation implemented
2025
Submission of new LWMP to Province for approval
1910
1920
1930
1940
1950
1960
1970
1980
1990
2000
2010
2020
2030
2040
2050
2060
2070
2080
1911
Beaches were closed in summer due to sewage pollution
Four municipalities form the Burrard Peninsula Joint Sewerage Commission to build regional sewer system
1914
Vancouver & Districts Joint Sewerage & Drainage Board formed
1953
A.M. Rawn Report: new "Master Plan" developed due to increasing water quality issues
Decision to build interceptors and wastewater treatment plants
1963
Iona Island WWTP opens
1975
Annacis Island WWTP opens
1991
Inception of Metro Vancouver's biosolids beneficial use program
2001
LWMP establishes deadlines for separating combined sewers and eliminating combined sewer overflows, and sets requirement to eliminate sanitary sewer overflows at chronic sites
2010s to present
Efforts to mitigate wet weather flows unable to keep pace with climate change impacts, leading to planned expansions for increasing demand on conveyance and treatment systems
2050
Planned combined sewer elimination in Vancouver Sewerage Area
2075
Planned combined sewer elimination in Fraser Sewerage Area
1974
Interceptors are completed, ending the discharge of untreated sewage
2011
Increasing sanitary sewer overflows lead to additional actions in updated LWMP to eliminate overflows by addressing inflow and infiltration
Updated LWMP approved by the Province with ministerial conditions for secondary treatment at Lions Gate WWTP by 2020 and Iona Island WWTP by 2030
2030
Planned secondary treatment implementation at North Shore WWTP
2035-2040
Planned secondary treatment implementation at Iona WWTP

Working Collaboratively with First Nations

Metro Vancouver recognizes and respects that it operates on territory where First Nations have inherent rights, as recognized and affirmed in section 35 of the *Constitution Act, 1982*. In addition, both the governments of Canada and British Columbia have enacted legislation to affirm the application of the *United Nations Declaration on the Rights of Indigenous Peoples* (UNDRIP) to laws within their jurisdiction.

In its preamble, UNDRIP states that "respect for indigenous knowledge, cultures and traditional practices contributes to sustainable and equitable development and proper management of the environment."[1]

As part of our continued reconciliation efforts, Metro Vancouver is committed to meaningful engagement, dialogue, and collaboration with First Nations on our plans, programs, and projects, as outlined in Metro Vancouver's *Board Strategic Plan*, 2022-2026. We also continue to build and strengthen respectful and reciprocal relationships with First Nations, guided by the principles of UNDRIP "as a standard of achievement to be pursued in a spirit of partnership and mutual respect."[2]

Metro Vancouver would like to extend sincere thanks to the First Nations who were able to generously share their time, knowledge, and expertise in the engagement process for updating the LWMP. The opportunity to share and talk together has created learnings that go beyond the development of this plan and will continue to inform Metro Vancouver's work moving forward.

The LWMP seeks to honour the Board's commitment to reconciliation with Indigenous Peoples. The strategies and solutions in the plan reflect key themes heard during engagement with First Nations. The plan:

- Acknowledges that liquid waste management has impacts on First Nations communities and lands
- Outlines a commitment to work with First Nations to increase their influence on the projects and plans that affect their rights and interests
- Recognizes First Nations have an important role in stewardship of the region's land, water, and air
- Seeks to incorporate Indigenous Knowledge and actively involve First Nations in regional liquid waste management

These and other themes discussed with First Nations have been embedded throughout the strategies and actions of the LWMP. Metro Vancouver recognizes that each First Nation is unique, and we seek to work with First Nations individually to determine how best to move forward together. Metro Vancouver looks forward to working in collaboration with First Nations to achieve the goals of the LWMP.

[1] UNDRIP Preamble paragraph 11
[2] UNDRIP Preamble paragraph 24

Governance

The Province allows all local governments to develop and periodically update an LWMP. LWMPs, authorized and regulated through the *Environmental Management Act*, allow local governments to develop community-specific solutions for wastewater management providing a pathway towards meeting or surpassing existing regulations. There is also an opportunity to make mid-plan amendments during the approximately 10-year cycle of the LWMP, should any changes be required.

The Province's primary objectives for LWMPs are to protect public health and the environment and to properly consult the public and First Nations. Local governments are also encouraged to use LWMPs to show innovation and leadership on additional provincial objectives: water conservation, drinking water source protection, resources from waste, energy conservation, climate change adaptation and mitigation, and sustainable financing and asset management.

An LWMP for Metro Vancouver authorizes discharges to the environment — water, air, and land — associated with the management of liquid waste according to the criteria set out in the LWMP and in facility-specific Operational Certificates. Once each LWMP update is approved, it becomes part of local liquid waste regulation through the *Environmental Management Act*. In the absence of an approved LWMP, the provincial *Municipal Wastewater Regulation* governs. Where *Municipal Wastewater Regulation* standards are currently not met, an LWMP will establish a schedule for upgrading substandard facilities.

In addition, the Province has endorsed the Canadian Council of Ministers of the Environment (CCME) *Canada-wide Strategy for the Management of Municipal Wastewater Effluent* (CWS-MMWE). LWMPs should be consistent with the CWS-MMWE, which is designed to provide a harmonized framework to manage municipal wastewater discharges to surface waters with federal discharge criteria.

Roles and Responsibilities

The extent and complexity of the liquid waste systems, with roles and responsibilities being spread between broad levels of governance, require close coordination between all orders of government, businesses, institutions, and residents. This includes and is demonstrated by senior government cost sharing for major capital projects that benefit and support their mandates and regulations. The following entities have key roles and responsibilities in implementing this plan:

Federal government

- Environment and Climate Change Canada: regulates pollutants and protects species at risk
- Fisheries and Oceans Canada: mandated to protect fish populations and habitat in receiving waters and urban streams
- Housing, Infrastructure and Communities Canada: provides and administers infrastructure co-funding for local government projects

Provincial government

- Ministry of Environment and Climate Change Strategy: regulates discharges to the environment, regulates liquid waste, and approves LWMPs
- Ministry of Municipal Affairs: enables infrastructure financing and provides co-funding to local governments for civic projects
- Ministry of Health: regulates on-site wastewater treatment systems (such as septic tanks) and protects public health if sewage spills or if water quality becomes unsafe for recreation

Member jurisdictions

- Member jurisdictions of the Greater Vancouver Sewerage and Drainage District (GVS&DD): own and maintain collector sewers, implement member actions set out in the regional plan, manage rainwater in urban and rural watersheds, report on their progress on actions required in the plan, and establish local land use plans and community development standards

Metro Vancouver

- Metro Vancouver, as the GVS&DD: owns, maintains and operates regional trunk sewers and major wastewater treatment plants, regulates significant industrial discharges to sanitary sewers, implements required regional actions in its plans, reports on plan progress, and collaborates with others as appropriate

First Nations

- As stewards of water and land, First Nations have the right to work with all orders of government to advance improvements to regional water quality, to achieve environmental, cultural, spiritual, and economic goals for their communities, and to protect the health of all marine life

The Public

- Residents, businesses, institutions, and Crown corporations: own and maintain private property sewer connections and private stormwater management systems

Scope of the Plan

While the plan covers the geographic area of Metro Vancouver (Figure 2), the majority of its actions are specific to Metro Vancouver's wastewater collection and treatment systems, and the users connected to these systems, including municipalities, businesses, and residents. In addition, the plan sets specific actions for GVS&DD members in managing stormwater runoff. All actions outlined in the plan apply to the GVS&DD and its members.

Liquid waste management from sources such as on-site treatment and septic systems, agricultural runoff, and marine pump-out facilities for pleasure craft involves multiple jurisdictions. While the LWMP addresses these areas through collaboration with other government agencies and other parties, it excludes aspects regulated outside the Ministry of Environment and Climate Change Strategy, such as private septic systems governed by the Ministry of Health and marine pollution overseen by federal authorities.

Figure 2 – The Four Sewerage Areas of the Metro Vancouver Regional Liquid Waste System

Alignment and Linkages

Aligning with National Initiatives

Metro Vancouver and its members actively participated with the Canadian Council of Ministers of the Environment (CCME) to develop the *Canada-wide Strategy for the Management of Municipal Wastewater Effluent* (CWS-MMWE) endorsed by the CCME in February 2009 and implemented in British Columbia by the Ministry of Environment in 2012.

Through the strategy, governments have sought to develop a consistent approach to managing wastewater across Canada that is protective of human health and the environment. The CWS-MMWE sets baseline wastewater management criteria, timelines and prioritization methodologies, and formalizes processes to assess environmental risk.

Arising from recommendations that were part of CWS-MMWE, *Wastewater Systems Effluent Regulations* to manage wastewater releases came into force in June 2012 under the *Fisheries Act*. *Wastewater Systems Effluent Regulations* set national baseline effluent quality standards that are achievable through secondary wastewater treatment and prohibit the discharge of effluent that is acutely lethal to rainbow trout. The regulations also specify requirements for carrying out effluent monitoring, reporting, and record keeping, and require owners or operators of wastewater systems with combined sewers to submit an annual report on the total volume and the number of days that wastewater is discharged per month via combined sewer overflow (CSO) points as a result of precipitation.

In addition to the *Fisheries Act*, the *Canadian Environmental Protection Act* is also used to prevent and manage risks posed by toxic and harmful substance. This legal framework may contribute to improved wastewater effluents by controlling substances that are otherwise difficult to treat. Under the *Canadian Environmental Protection Act*, owners or operators of wastewater treatment facilities that meet reporting requirements are required to report discharges to the National Pollutant Release Inventory.

Aligning with Provincial Initiatives

The goals, strategies, and actions have been aligned with provincial policies and positions to ensure that Metro Vancouver's and the Province's environmental and fiscal objectives and actions are mutually supportive and successful. Key plans and initiatives supported by this plan include:

- ***Environmental Management Act*** — ***Municipal Wastewater Regulation (2022)***. As noted previously, where Municipal Wastewater Regulation standards are currently not met, the LWMP establishes a roadmap towards compliance.
- ***Resources from Waste: A Guide to Integrated Resource Recovery (2009)*** — Guidebook on integrated resource recovery approach for local governments to maximize the environmental, social, and economic benefits of recovering waste resources generated by infrastructure through planning and management.
- ***CleanBC Roadmap to 2030 (2021)*** — The Province's plan to reach climate targets and continue on a path to net-zero emissions by 2050.

- ***Preparing for Climate Change: An Implementation Guide for Local Governments in British Columbia (2012)*** — Guide to assist local government elected officials and staff, including planners, engineers, chief administrative officers, financial officers, and others, to plan and act in ways that will make their communities more resilient to the impacts of climate change.
- ***BC Climate Action Charter (2007)*** — Under the Charter, local government signatories commit to becoming carbon neutral in their corporate operations, measuring and reporting their community's greenhouse gas emissions, and creating complete, compact, more energy efficient communities.
- ***BC Clean Energy Strategy (2024)*** — Outlines actions in 10 focus areas to accelerate the shift to made-in-British Columbia clean energy and achieve net zero emissions by 2050.
- ***BC Coastal Marine Strategy (2024)*** – Establishes the Province's first shared vision for the British Columbia coast that was co-developed with many First Nations from the coast, with goals for healthy coastal marine ecosystems, resilience to climate change, thriving coastal economies and communities, and informed governance.

Linkages with other Metro Vancouver plans

There is interdependence between the goals, strategies and actions in this plan and those in other regional plans.

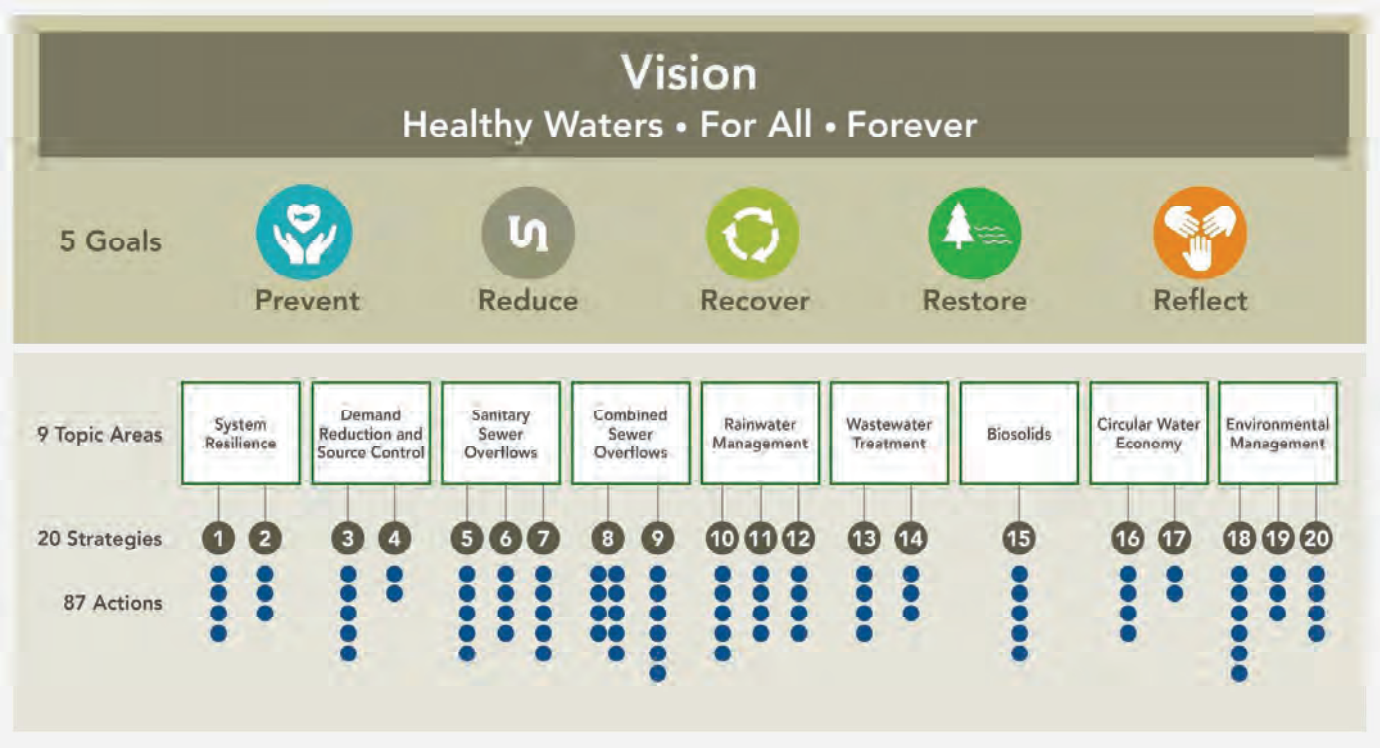
- ***Board Strategic Plan (2022-2026)*** — Annual work plans are prepared for Metro Vancouver's service areas that respond to the directions of the *Board Strategic Plan*. These work plans include high-level performance indicators that have been developed across the organization to evaluate trends, determine key actions for the coming year, and assist in long-term planning.
- ***Drinking Water Management Plan (2011)*** — An overarching plan for Metro Vancouver and its member jurisdictions, which sets the direction and priority for regional drinking water initiatives. This plan has three goals: provide high-quality drinking water; ensure the sustainable use of water resources; and ensure the efficient supply of water.
- ***Integrated Solid Waste and Resource Management Plan (2010)*** — Metro Vancouver's sustainability principles provide guidance for the regional solid waste plan. For Metro Vancouver, sustainability means tying together environmental, social, and economic interests. For managing solid waste this translates into protecting the receiving environment (air, land, and water).
- ***Metro 2050: Regional Growth Strategy (2022)*** — The region's collective vision for how growth will be managed to support the creation of complete, connected, and resilient communities, while protecting important lands and supporting the efficient provision of urban infrastructure like transit and utilities.
- ***Climate 2050 (2018-2019)*** — Metro Vancouver's *Climate 2050* strategy will guide climate change policy and action for Metro Vancouver for the next 30 years. *Climate 2050* prioritizes climate action in the region.
- ***Clean Air Plan (2021)*** — A plan for managing air quality and greenhouse gases over the next 10 years. The *Clean Air Plan* includes key actions to effectively reduce greenhouse gas emissions in this region, in pursuit of 2030 emissions targets. The regional *Clean Air Plan* aligns with the Province's *CleanBC Roadmap to 2030*, and represents a coordinated approach from local governments across the Metro Vancouver region. The *Clean Air Plan* includes significant next steps in moving towards regional carbon neutrality by 2050.

- ***Regional Greenways 2050 (2020)*** — The expansion of the greenway network provides opportunities to promote ecosystem connectivity by protecting some of the region's remaining natural areas, integrating green infrastructure, and increasing regional tree canopy cover.

Strategies and Actions

Snapshot

The five goals provide direction for the strategies in the plan. The strategies are grouped under nine topic areas that encompass liquid waste management from source to system to sea.



The following table shows how each of the plan's strategies contribute to the five goals.

	Prevent	Reduce	Recover	Restore	Reflect
System Resilience					
Strategy 1: Ensure system can serve a growing population in a changing climate					
Strategy 2: Improve resilience of wastewater system to climate change and natural hazards					
Demand Reduction and Source Control					
Strategy 3: Reduce flows and loadings into the system					
Strategy 4: Prevent pollution at the source					
Sanitary Sewer Overflows					
Strategy 5: Reduce excess rainwater entering into private lateral sewers					
Strategy 6: Enhance transparency and accountability for reducing inflow and infiltration					
Strategy 7: Minimize impacts of sanitary sewer overflows on human health and environment					
Combined Sewer Overflows					
Strategy 8: Assess impact of combined sewer overflows on receiving environment					
Strategy 9: Separate combined sewers to eliminate overflows					
Rainwater Management					
Strategy 10: Manage rainwater and urban development for watershed health					
Strategy 11: Update and harmonize municipal tools for rainwater management					
Strategy 12: Enhance interagency collaboration to improve watershed health across the region					

	Prevent	Reduce	Recover	Restore	Reflect
Wastewater Treatment					
Strategy 13: Treat wastewater so effluent meets or surpasses regulatory requirements					
Strategy 14: Operate and maintain wastewater treatment plants to meet or surpass regulatory requirements					
Biosolids					
Strategy 15: Diversify options to beneficially use Nutrifor biosolids					
Circular Water Economy					
Strategy 16: Implement proven resource recovery technologies					
Strategy 17: Research and pilot innovative technologies to advance the circular water economy					
Environmental Management					
Strategy 18: Minimize impacts of liquid waste management on the atmosphere and air quality					
Strategy 19: Environmental monitoring to protect public health and the environment					
Strategy 20: Collaborate on regional environmental management initiatives					

System Resilience

Metro Vancouver and its members collect and treat wastewater in the region as a fundamental local government function to protect human health and the environment. Population growth, changes to land use, and a changing climate all increase the volume of liquid waste and can strain existing infrastructure. Proactive planning is needed to ensure that the collection, conveyance and treatment systems can accommodate growth, extreme weather events, and rising water levels, since replacement and expansion of infrastructure takes decades.

Metro Vancouver and members update regional and municipal population projections on a regular basis to guide land use and infrastructure planning. The figure below shows three growth scenarios that capture varying assumptions about an uncertain future. The medium-growth scenario is considered to have the highest probability. The region is expected to grow by nearly 50,000 net new residents annually. As a result, the region's population is projected to reach 4 million by the mid-2040s.

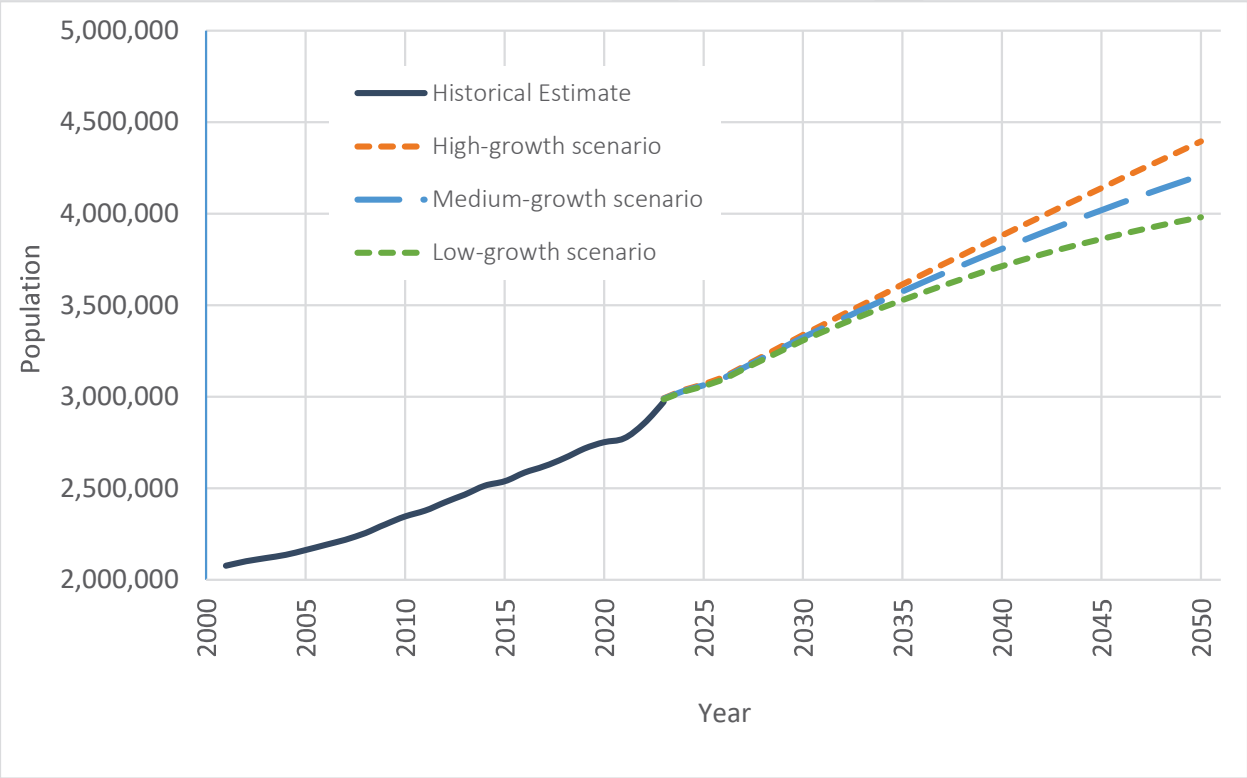


Figure 3 – Metro Vancouver population growth and projections from 2000 to 2050

Strategy 1 Ensure system can serve a growing population in a changing climate

In a region with a growing population, strong economy, constrained land base, and a changing climate, proactive planning for the provision of sanitary collection and treatment services is necessary. Asset management plans will be critical to ensure our infrastructure assets are properly maintained, repaired, replaced, and upgraded to minimize lifecycle costs while delivering the required level of service. Master Sewer Servicing Plans establish and assess existing sewer service levels, incorporate future growth and development forecasts, evaluate alternative solutions to maintain or enhance current service levels, include opportunities for feedback from those involved and affected, and provide an implementation roadmap. These plans serve as a vital tool to guide land use decisions, infrastructure planning, and budget allocation for municipal decision-makers to ensure wastewater infrastructure is adequate to support current and future growth and are aligned with regional goals and objectives.

Supports Goals: Prevent pollution, Reflect First Nations' priorities

Actions

1.1 Metro Vancouver and members will maintain the condition and performance of the sewerage system to serve a growing population in a changing climate by:

a) inspecting sanitary sewers on a 20-year cycle;

b) maintaining current maps of sewerage inspection, condition, and repairs; and

c) continuing to develop and implement asset management plans that address risks, including climate change and seismic events, and target a 100-year replacement or rehabilitation cycle for sewerage infrastructure.

Metro Vancouver will use the National Association of Sewer Service Companies' Pipeline Assessment Certification Program and Manhole Assessment Certification Program for (a) and (b). Members are encouraged to use these programs for (a) and (b) to ensure a consistent approach.

Timeline: ongoing
Adapted from: C19, 1.3.1, 1.3.11, 3.1.1, 3.1.4, 3.1.5, 3.1.6, 3.1.7, 3.1.8
Aligned with: P8

1.2 Members and Metro Vancouver will seek to accommodate population growth and land use changes:

- Members will provide local collector sanitary sewer capacity for peak dry weather flow plus an inflow and infiltration allowance of 11,200 L/ha/d on average at point of connection to Metro Vancouver infrastructure, to ensure hydraulic grade lines stay within safe operating levels.
- Metro Vancouver will provide regional trunk sanitary sewer capacity and wastewater treatment plant hydraulic capacity for peak dry weather flow plus an inflow and infiltration allowance of 11,200 L/ha/d, to ensure hydraulic grade lines stay within safe operating levels.

Note, the inflow and infiltration allowance of 11,200 L/ha/d corresponds to storms with return period of less than five years.

Timeline: ongoing
Adapted from: C19, 1.3.2, 3.1.3, 3.1.7
Aligned with: P8, P9

1.3 Metro Vancouver and members will create and update Master Sewer Servicing Plans to accommodate growth and urban development:

a) Metro Vancouver in collaboration with members will develop a framework for creating and updating Master Sewer Servicing Plans. At a minimum, the framework will identify required content and deliverables, deadlines, and the frequency of updates.

b) Metro Vancouver and members will create or update Master Sewer Servicing Plans in accordance with the framework. Metro Vancouver and members will continue to ensure that First Nations are engaged appropriately.

Timeline: (a) within three years; (b) as determined in (a)
New action; engagement with First Nations continuing per 2011 MC10.

1.4 Metro Vancouver and members' provision of liquid waste infrastructure and services will be consistent with the Regional Growth Strategy and coordinated with municipal Official Community Plans.

Timeline: ongoing
Adapted from: 3.4.3, 3.4.6

Performance Indicators

1A Percentage of sanitary sewer pipe inspected annually

Responsibility: Metro Vancouver and members
Replaces 2011 performance measure: metres of sewer pipe inspected and renewed annually

Strategy 2 Improve resilience of wastewater system to climate change and natural hazards

Most wastewater and rainwater infrastructure was not originally designed with climate change in mind. Wastewater infrastructure in the region is expected to face a range of hazards from climate change, including rising water levels, more extreme rainfall events, longer dry spells in summer, and increased precipitation in other seasons, among others. Climate change impacts and other natural hazards like earthquakes must be considered during design and upgrades of infrastructure to avoid creating vulnerabilities that make climate change adaptation more difficult and expensive for future generations. Metro Vancouver and members have been taking action to prepare for climate change impacts for well over a decade, and will continue to design, build, and operate more resilient and adaptable systems.

Supports Goals: Prevent pollution, Reflect First Nations' priorities

Actions

2.1 Metro Vancouver and members will collaborate with other jurisdictions and organizations to share climate data and to regularly update regional climate projections, to improve understanding of the future climate for infrastructure planning.
Timeline: ongoing
New action

2.2 Metro Vancouver will conduct climate change and natural hazard vulnerability assessments and will prepare adaptation plans for Metro Vancouver infrastructure, assets, and operations in each sewerage area to enhance resilience to future climate conditions.
Timeline: begin within one year
New action

2.3 Metro Vancouver and members will continue to plan, locate, design, and adapt infrastructure, assets, and operations to address identified hazards, risks, and vulnerabilities, including climate change impacts.
Timeline: ongoing
Adapted from: 1.3.1, 1.3.11, 3.4.1, 3.4.5

Performance Indicators

None proposed for this strategy.

Demand Reduction and Source Control

Wastewater treatment and conveyance infrastructure are critical assets for the region that require billions of dollars in investments to construct, operate, maintain, and upgrade. Reducing demands on the system involves encouraging households, businesses, and industries to reduce flows and loads to the sewer system, which reduces operational costs and can defer the need for costly infrastructure expansions. Shifting behaviours towards more sustainable practices requires effective education and incentives. Source control, which reduces loadings and prevents the introduction of contaminants into the sewage system, is often more effective and less costly than treatment. Source control is critical to address harmful substances that are difficult to treat, to prevent them from impacting the water quality of receiving environments.

Strategy 3 Reduce flows and loadings into the system

Wastewater flow and organics loading are the main drivers for designing and sizing wastewater treatment plant upgrades and expansions, as well as dictating day-to-day operational needs and affecting system performance. Larger flows and loadings mean the need to build larger and costlier infrastructure. The amount of wastewater produced by users also affects the capacity of the collection system to accommodate growth, wet weather, and the consequences of climate change.

Residential, commercial, and industrial users all have a role to play in improving the quantity and quality of the wastewater they produce. Metro Vancouver and members will assess and implement demand side management actions that help extend the useful life of existing facilities, defer expansion, and prevent system overflows, while reducing costs for the region. Identifying the best opportunities for reduction and implementing multi-pronged approaches tailored to each sector will help the regional wastewater system run as efficiently as possible.

The actions in this strategy reduce dry weather flow (i.e., flows from inside buildings) and organics loading. Strategies and actions to reduce wet weather flow (i.e., inflow and infiltration) are described in Strategies 5 and 6 in the Sanitary Sewer Overflows section.

Supports Goals: Prevent pollution, Reduce demands

Actions

3.1 Metro Vancouver will pursue reductions in residential wastewater flow and loading through improving education and awareness, starting with discouraging disposal of food waste down drains, by encouraging reduction of food waste in general and encouraging use of green bins for kitchen scraps. Members will provide input and assist with implementation.
Timeline: within two years
Adapted from: C28, C29, 1.1.4, 1.1.5, 1.1.17

3.2 Metro Vancouver will pursue reductions in commercial wastewater flow and loading through collaboration with businesses, starting with working with restaurants to improve grease interceptor maintenance practices, to prevent introduction of grease into the sewer system. Members will provide input and assist with implementation.
Timeline: within three years
Adapted from: C28
Aligned with: P15

3.3 Metro Vancouver will pursue reductions in industrial wastewater flow and loading, starting with updating fees in bylaws to create financial incentives that motivate industries to minimize their wastewater discharges.
Timeline: within five years
Adapted from: C25, C28, 1.1.1
Aligned with: P17, P20

3.4 Metro Vancouver will work with members to prevent the introduction of fats, oils, and grease into the system.

a) Metro Vancouver will improve monitoring and coordination with members to address fats, oils, and grease hot spots in the region.
b) Metro Vancouver will improve grease interceptor requirements for high grease producing restaurants within Metro Vancouver's *Food Sector Grease Interceptor Bylaw*.
c) Metro Vancouver will provide guidance to enable members to manage fats, oils, and grease through their own bylaws.

Timeline: within two years
Adapted from: C28, 1.1.14

3.5 a) Member jurisdictions are strongly encouraged to business case and/or implement residential water metering programs and to consider municipal rebate programs for water efficient fixtures and appliances to reduce potable water use.
b) Metro Vancouver, in partnership with member jurisdictions, is encouraged to pursue a region-wide water conservation program targeting the industrial, commercial, institutional and agricultural sectors as part of its updated *Drinking Water Management Plan*. Remaining municipalities in the region that have not implemented metering for these sectors are encouraged to do so.

Timeline: a) ongoing; b) Drinking Water Management Plan anticipated to be ready for Board endorsement by 2026.
Adapted from: C28, C32, 2011 MC2, 2011 MC3, 1.1.13
Aligned with: P19

Performance Indicator

3A Per capita average dry weather flow [L/person/day], total influent Biochemical Oxygen Demand (BOD) [g/person/day], and total influent Total Suspended Solids (TSS) [g/person/day], at each wastewater treatment plant.

Responsibility: Metro Vancouver
New indicator

Low-flow water fixtures reduce wastewater flows

Plumbing code updates in the 1990s and 2000s have successively decreased the maximum flow rates of faucets, showerheads, toilets and urinals. The introduction of low-flow water fixtures has reduced per capita drinking water consumption in the region. Since wastewater comes from drinking water that people put down drains and toilets, this has resulted in decreasing per capita wastewater flows, as shown in Figure 4 below.

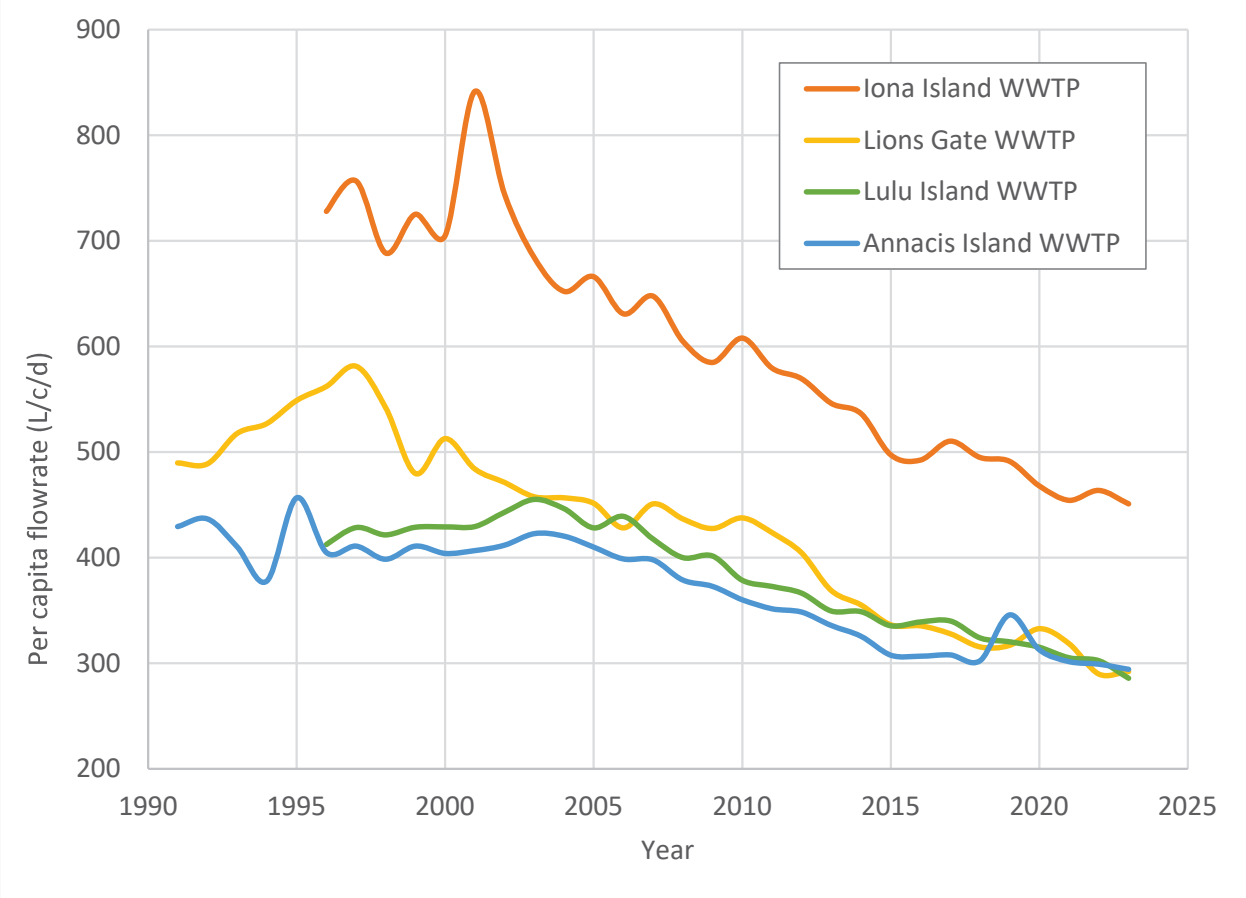


Figure 4 – Wastewater flows into Metro Vancouver wastewater treatment plants 1990 to 2023

The downward trend of wastewater flow means higher populations can be served by existing infrastructure and helps preserve system capacity for additional growth, deferring the requirement for costly expansions.

Strategy 4 Prevent pollution at the source

Metro Vancouver's source control program uses a suite of tools that include regulations and bylaws, education, community outreach, and advocacy for increased regulations. Examples of past and ongoing source control efforts include updating the sewer use bylaw to reflect the most recent scientific and technical information and best practices, the "Unflushables" campaign educating residents about items that should not be flushed, guides that communicate best wastewater management practices for various commercial and industrial sectors, and "Our Ocean Thanks You" campaign targeting reduction of microfibers in laundry. Through this strategy, the source control program will continue to prevent pollution from different sectors — residential, commercial, and industrial — in the region.

Supports Goals: Prevent pollution, Reflect First Nations' priorities

Actions

4.1 Metro Vancouver will prioritize contaminants for source control using the Canadian Council of Ministers of Environment (CCME) *Canada-wide Strategy for Management of Municipal Wastewater Effluent* (CWS-MMWE) Environmental Risk Management Framework. Metro Vancouver will take further source control actions such as educating target sectors to reduce their discharges to sewers, advocating for increased provincial and federal regulations on the manufacturing and use of products with contaminants, and updating Metro Vancouver's bylaws for industrial and commercial dischargers. Metro Vancouver will work with First Nations that choose to participate on advocating for increased provincial and federal regulations on the manufacturing and use of products with contaminants.

Timeline: ongoing

Adapted from: C25, C33, 2011 MC5, 2011 MC10, 1.1.1

Aligned with: P15

4.2 Metro Vancouver and members will continue to motivate residents and businesses to prevent pollution at the source by properly managing what they send down drains and toilets.

a) Metro Vancouver will continue outreach programs that include youth education programs.

b) Members will continue to promote and support Metro Vancouver's regional outreach and education efforts.

c) Metro Vancouver will work with First Nations as desired on such outreach and education.

Timeline: ongoing

Adapted from: C29, 2011 MC10, 1.1.5, 1.1.17

Aligned with: P15

Performance Indicators

None proposed for this strategy.

Sanitary Sewer Overflows

Sanitary sewers collect wastewater from toilets and drains in homes and businesses, and carry it to wastewater treatment plants for processing before being released into the environment. A sewer overflow occurs when wastewater is discharged directly into the environment — usually the nearest water body, or sometimes onto land — instead of being processed at a wastewater treatment plant. Overflows from sanitary sewers can happen when heavy rainfall overloads the sewer system, in both municipal and regional sewer systems. Metro Vancouver reports sanitary sewer overflows immediately to the federal and provincial governments, regional health authorities, the First Nations Health Authority, and associated municipalities.

Metro Vancouver and members are working to identify neighbourhoods where damaged pipes and improperly connected roof and foundation drains let in rainwater and groundwater that does not belong in sanitary sewers. This inflow and infiltration occurring on individual properties can add up to create serious challenges downstream: it contributes to sanitary sewer overflows, sewer backups and basement flooding in private property, and greatly increases the volume that must be processed at wastewater treatment plants.

Private lateral sewers connect homes, business, and institutions to the municipal and regional systems, and account for about half of the estimated 15,000 km of sewers in the region. While public sewers have ongoing maintenance programs, private lateral sewers have not been part of any comprehensive strategy. Previous construction of storage facilities and capacity upgrades have partially mitigated risks to the environment with additional facilities currently scheduled in Metro Vancouver's long range plan. However, continually building larger infrastructure to accommodate leaky pipes is financially unsustainable and has not achieved the elimination of sanitary sewer overflows. Reducing inflow and infiltration through inspection, maintenance, and repair of all sewers with particular focus on private lateral sewers as part of regular maintenance cycles and redevelopment over the coming decades will eliminate overflows.

Sanitary Sewer Overflow Storage Tanks

The conveyance capacity of sewers and pump stations can be exceeded during substantial rain storms due to leaky sewers allowing rainwater into the system. Storage tanks can be used to temporarily hold excess flow that cannot be completely conveyed during significant wet weather events, which is then pumped back into the conveyance system after the storm. This can prevent the occurrence of sanitary sewer overflows in areas with high inflow and infiltration. To date, storage tanks have been constructed in Surrey and Maple Ridge, and another is planned for North Surrey at a cost approaching $100 million.

Continuing with the current approach would require 15 to 20 more storage tanks over the next three decades. While storage tanks offer temporary relief from overflows, they only address the symptom of the problem. A better solution is to address the root cause of overflows – leaky sewers and improperly connected roof or foundation drains. Reducing the entry of excess rainwater into sewers at the source will prevent overflows and result in a system that is more resilient against large storm events.

Cloverdale Sanitary Sewer Overflow Storage Tank under construction in Surrey

Strategy 5 Reduce excess rainwater entering into private lateral sewers

Studies show that over half of all inflow and infiltration originates on private property. Improving the water-tightness of lateral sewers and ensuring that roof and foundation drains are not improperly connected to sanitary sewers reduces the amount of excess rainwater and groundwater entering the sanitary sewer system. Keeping additional water out of sanitary sewers helps retain the capacity of existing infrastructure to convey and treat sewage from a growing population, leading to lower costs for infrastructure expansions.

Building on previous plans, Metro Vancouver will strengthen actions to reduce rainfall-derived inflow and infiltration from lateral sewers on private properties by addressing potential problems throughout their lifecycle. Actions at the time of construction, through the useful lifespan, and at times of replacement will help ensure that laterals are watertight.

Supports Goals: Reduce demands

Actions

5.1 Metro Vancouver and members will conduct public education and outreach on the relationship between inflow and infiltration and efficient liquid waste management, showing that investing in water-tight private laterals is an effective demand side management strategy that can reduce regional infrastructure costs.
Timeline: within two years
New action

5.2 Members will require inspection, testing, repair and/or replacement of private laterals when new construction or redevelopment occurs:

a) Metro Vancouver will draft sample bylaw wording for members to use to require repair or replacement of private laterals at the time of new construction or redevelopment.

b) Members will develop and implement processes for inspections during construction of new homes and buildings to inspect the section of the lateral between the building and the sewer that can be exposed during construction.

c) Members and Metro Vancouver will advocate to other levels of government for support and changes to building codes that will facilitate these processes.

Timeline: within three years
Adapted from: C28, 1.1.7

5.3 Members will conduct inspections of private laterals in existing properties:

a) Members in coordination with Metro Vancouver will determine which areas have the highest inflow and infiltration and will prioritize those areas for inspection.

b) Members will develop a standardized method for gaining access to properties and for inspecting connections to laterals and condition of laterals on properties with existing buildings.

c) Members will conduct inspections of existing buildings' connections to laterals and condition of laterals in those priority areas identified under (a).

Timeline: begin conducting inspections within five years
Adapted from: C28, 1.1.7

5.4 Members in coordination with Metro Vancouver will develop programs to provide incentives or funding assistance to qualified property owners for rehabilitation of leaky private laterals.

a) Metro Vancouver will explore and analyze various approaches for incentives or funding assistance for members to consider.

b) Members may then develop programs tailored to their specific needs and capacities to provide incentives or funding assistance to qualified property owners.

Timeline: develop programs within two years; provide funding within four years
New action

5.5 Members will direct staff and officers to enforce bylaws on private property, using existing legal authority and/or via proposing any necessary amendments to bylaws, to prevent the unauthorized discharge of rainwater and groundwater to sanitary sewers, through the issuance of notices of bylaw violation, municipal ticket information, prosecution, and/or requirements for remedial action, for properties where either of the following conditions are not met:

- roof and foundation drain connections are properly configured to not direct rainwater to sanitary laterals, or
- sanitary laterals are in good condition and watertight.

Timeline: within five years
Adapted from: C28, 1.1.7, 1.1.19

Performance Indicators

5A Peak wet weather flow, average dry weather flow, and ratio of peak wet weather flow to average dry weather flow at key regional monitoring points and at wastewater treatment plants

Responsibility: Metro Vancouver
Replaces 2011 performance measures: wet weather peaking factors at key regional monitoring points; average [24 hour] flows at regional flow monitoring stations and at wastewater treatment plants

Strategy 6 Enhance transparency and accountability for reducing inflow and infiltration

Reducing inflow and infiltration is a gradual process that involves action by all concerned. Interim targets for progressive reductions can help motivate and track action while gradually moving towards long-term targets. Meaningfulness of reporting will be improved by using metrics that capture both actions taken and how the system performs in wet weather. Increased frequency of reporting will spur Metro Vancouver and members to update and accelerate actions if observed progress is slow.

A measure to gauge demands on the system from excess rainwater is by tracking municipal sewer levies that are tied to wet weather flows. In 2024 Metro Vancouver introduced wet weather sewer pricing that is being phased in over 10 years. Member jurisdictions pay fees that reflect the sewer capacity they use during wet weather. This user-pay approach means that communities with higher inflow and infiltration contribute more toward the regional sewer system. The goal of wet weather sewer pricing is for every community to pay for the amount of water they send through the sewer system. It also aims to ensure that the region is investing in expanding sewer and treatment capacity only when needed to accommodate population growth, and not to address lack of infrastructure maintenance.

Supports Goals: Reduce demands

Actions

6.1 Members will complete inflow and infiltration management plans:

a) Members in coordination with Metro Vancouver will set new interim targets for progressive inflow and infiltration reduction.

b) Metro Vancouver and members will collaboratively develop a consistent inflow and infiltration dashboard with standardized metrics and will incorporate it into the inflow and infiltration management plan template.

c) Members will complete inflow and infiltration management plans, based on the updated template, that include the new interim inflow and infiltration reduction targets.

Timeline: (a), (b) within three years; (c) within five years
Adapted from: C23, 1.1.6, 1.1.8, 1.1.18

6.2 Members will use the inflow and infiltration dashboard to track progress in reducing inflow and infiltration:

a) Members will publicly report their inflow and infiltration dashboard data annually.

b) The public reporting will also include a summary of the results of inspections of sewer laterals in Actions 5.3 and 5.4, and of the enforcement actions and outcomes in Action 5.5.

c) Members and Metro Vancouver will review progress in reducing inflow and infiltration by evaluating trends in their dashboard metrics every four years.

Timeline: (a), (b) within three years; (c) every four years thereafter
Adapted from: C23, 1.1.10

6.3 Members will monitor municipal sewer flows and levels in their existing network to inform their inflow and infiltration dashboards. Members will expand the monitoring network if needed to better understand where inflow and infiltration is happening.
Timeline: ongoing
Adapted from: 3.3.3, 3.3.8

6.4 Metro Vancouver will review the wet weather sewer pricing formula every four years, and will adjust it if needed to further incentivize inflow and infiltration reductions by members.
Timeline: every four years, starting in 2028
Adapted from: 3.1.2, 3.1.7

Performance Indicators

Performance indicators will be reported by members through the new inflow and infiltration dashboards developed in 6.1 and 6.2.

Wet Weather Pricing

The Greater Vancouver Sewerage and Drainage District (GVS&DD) has four distinct sewerage areas as follows: i) North Shore Sewerage Area, ii) Vancouver Sewerage Area, iii) Fraser Sewerage Area, iv) Lulu Island Sewerage Area (see Figure 2). The apportionment of expenditures within each sewerage area are determined in accordance to the *Cost Apportionment Bylaw* that defines a number of cost categories.

For costs to be apportioned within a given sewerage area, the formulation has historically been based on dry weather flows (or a proxy thereof) generated by each member. However, this does not adequately reflect the actual system use during wet weather events as those with low wet weather flows are effectively subsidizing those with excessive wet weather flows that take up more than their share of system capacity.

Apportioning costs based on wet weather flows better reflects the full regional costs of serving each member. This strengthens the "user-pay" principle for allocating costs and motivates members to stay on top of their inflow and infiltration programs to help prevent sanitary sewer overflows.

The GVS&DD Board approved amendments to the *Cost Apportionment Bylaw* that incorporate wet weather pricing, to be phased in over 10 years starting in 2024.

Strategy 7 Minimize impacts of sanitary sewer overflows on human health and the environment

As actions on reducing inflow and infiltration in private laterals are long-term initiatives, sanitary sewer overflows will continue to occur. Metro Vancouver will continue to assess the effects of sanitary sewer overflows on the receiving environment and reduce the impacts of overflows on human health and the environment.

Metro Vancouver reports sanitary sewer overflows immediately to the federal and provincial governments, regional health authorities, and associated municipalities. Metro Vancouver also provides real-time information about sanitary sewer overflows so that local First Nations and residents can make informed decisions about fishing, cultural and ceremonial use, harvesting, and recreational activities near areas where overflows occur.

Supports Goals: Prevent pollution

Actions

7.1 Metro Vancouver will continue to post real-time sanitary sewer overflow information on the Metro Vancouver website.
Timeline: ongoing
New action

7.2 Metro Vancouver will continue to, and members will, inform the Province, regional health authorities, and the First Nations Health Authority of any sanitary sewer overflows as soon as they occur.
Timeline: ongoing
Adapted from: 3.5.6, 3.5.9

7.3 Metro Vancouver and members will report annually on the number and location of sanitary sewer overflows, and, where feasible, the estimated volumes and probable causes.
Timeline: ongoing
Adapted from: C23, 3.3.5, 3.3.7, 3.5.6, 3.5.9
Aligned with: P10

7.4 Metro Vancouver will conduct risk assessments at any new significant regional sanitary sewer overflow locations and will holistically compare the risk assessments of all sanitary sewer overflow locations to determine their relative risk, considering risks to public health and the environment. Metro Vancouver will use the results of the sanitary sewer overflow risk assessments to prioritize mitigation efforts, to optimize the operation of the regional liquid waste collection system, and to provide input into decisions regarding capital improvements and upgrades.

Timeline: ongoing
Adapted from: C4, 2011 MC4
Aligned with: P12

7.5 Metro Vancouver and members will continue to develop and implement municipal-regional sanitary overflow management plans to eliminate overflows at chronic locations. Metro Vancouver will report on progress toward the implementation of these management plans including an updated list of infrastructure constructed to manage wet weather.
Timeline: ongoing; report on progress within two years
Adapted from: 2002 MC4, 1.2.4, 1.2.5

Performance Indicators

7A Number, duration, and estimated volume of sanitary sewer overflow discharge events at chronic overflow sites, where feasible; and, total number of sanitary sewer overflow discharge events and total volume of sanitary sewer overflow discharges for entire system.

Responsibility: Metro Vancouver and members
Adapted from 2011 performance measure: number of sanitary sewer overflows – frequency, location, volume

Combined Sewer Overflows

Combined sewers carry both sanitary wastewater and rainwater in a single pipe and exist only in older parts of Vancouver, Burnaby, and New Westminster. During dry weather, combined sewers convey all sanitary wastewater to wastewater treatment plants, where treated effluent is released to local water bodies. During heavy rainfall, excess rainwater in the system can cause combined sewage to overflow into local water bodies. This is because combined sewers were designed to provide system relief and avoid sewage backups into homes and businesses.

Metro Vancouver monitors its combined sewers continuously and reports overflows annually to Environment Canada. To address the *Canada-wide Strategy for the Management of Municipal Wastewater Effluent* (CWS-MMWE) and the *Municipal Wastewater Regulation*, Metro Vancouver and members with combined systems (Vancouver, Burnaby, and New Westminster) are working on separating all combined sewers to improve the water quality of our local water bodies while increasing system resilience.

History of Combined Sewers

In the 1913 *Vancouver and Districts Joint Sewerage and Drainage Board Report*, R.S. Lea recommended that municipalities build separated sewer systems:

> Whilst nearly every modern Sanitarian admits that the separate is the better system, it is looked on as somewhat of a luxury. It must not be forgotten, however, that the luxury of to-day becomes the necessity of to-morrow, and in considering a scheme of this magnitude, the trend of modern practice must be taken into account rather than the actual methods in use at the present time.

However, combined sewers were built because municipalities at the time deemed that separated sewers would be too costly. Combined sewers continued to be constructed in Vancouver, Burnaby and New Westminster until the 1950s when the decision was made to build regional interceptors and wastewater treatment plants.

The City of Vancouver began separating existing combined sewers in the early 1970s when its oldest sewers, in the West End, first came due for replacement. The City of Burnaby and the City of New Westminster began separating their sewer systems in 2002, when the first LWMP required separation. The sewers in those municipalities are about a generation younger than in Vancouver, owing to their more recent development.

The LWMP sets sewer separation deadlines of 2050 in the Vancouver Sewerage Area and 2075 in the Fraser Sewerage Area. A combined sewer overflow storage tank built by the City New Westminster and Metro Vancouver enabled the 2075 deadline.

Strategy 8 Assess impact of combined sewer overflows on receiving environment

Members with combined systems (Vancouver, Burnaby, and New Westminster) and Metro Vancouver can reduce the impact of combined sewer overflows on the receiving environment by better prioritizing action. The current metric of using combined sewer overflow volumes simply tracks the severity of the rainfall event, with higher rainfalls causing more volume but also more dilute overflows. The result is a weak correlation to the impact on the environment by combined sewer overflows. Prioritizing action based on characterizing the quality (including sanitary loading) of the overflows, in addition to combined sewer overflow volumes and frequencies, should result in better correlation to receiving environment monitoring data. This will allow better assessment of the effects of combined sewer overflows on receiving waters and of the progress of corrective measures.

As separation of combined sewers continues, Metro Vancouver and members with combined systems will develop and implement system optimization projects in the near term that decrease sewage discharges to receiving waters. This will involve the use of models to evaluate various system management measures, giving preference to higher concentrations of sewage for treatment, and assessing their potential environmental benefits.

Supports Goals: Prevent pollution, Reflect First Nations' priorities

Actions

8.1 Metro Vancouver will continue to post real-time information on regional combined sewer overflow location, flow volume, and duration on the Metro Vancouver website.
Timeline: ongoing
New action

8.2 Metro Vancouver will continue to estimate and report annually on the frequency, location, and volume of sewage overflows from regional combined sewers, and where feasible identify and address the probable causes.
Timeline: ongoing
Adapted from: C14, 3.3.5
Aligned with: P7

8.3 Metro Vancouver will continue to monitor combined sewer overflow flows and characterize samples from combined sewer overflow discharges. Members with combined systems will begin to monitor combined sewer overflow flows and characterize samples from combined sewer overflow discharges.
Timeline: within five years
Adapted from: 2011 MC6
Aligned with: P7

8.4 Members with combined systems will report on combined sewer overflows.

a) Members with combined systems will continue to estimate and report annually on the frequency, location, and volume of combined sewer overflows from municipal sewers, and where feasible identify and address the probable causes.

b) Members with combined systems will begin reporting combined sewer overflow flow monitoring and characterization and assessment of environmental impacts, or pursue an alternate approach approved by the Ministry of Environment and Climate Change Strategy.

Timeline: within five years
Adapted from: C14, 3.3.7

8.5 Metro Vancouver will continue to assess change in receiving environment water quality resulting from any measures taken to address combined sewer overflow discharges. Metro Vancouver will report out, as applicable, in the *Environmental Management and Quality Control Annual Report*.
Timeline: ongoing
Adapted from: C4, 2011 MC4
Aligned with: P7

8.6 Metro Vancouver and members with combined systems will use available information and environmental management tools to inform the prioritization of sewer separation and near term combined sewer overflow mitigation measures.
Timeline: ongoing
Adapted from: 2011 MC4

8.7 Metro Vancouver will use sewer separation data supplied by members with combined systems in a sewer system model to estimate the relative proportion of sanitary and rainwater flows in combined sewer overflows at outfalls. Metro Vancouver will use the model results to evaluate system management measures for reducing combined sewer overflow sanitary loading to the receiving environment.
Timeline: within three years
New action

8.8 Metro Vancouver and members with combined systems will continue to develop and implement system optimization projects in the near term to minimize combined sewer overflow sanitary sewage loading and minimize total combined sewer overflow volume spilled, using information from 8.4, 8.5, 8.6, and 8.7.

a) Metro Vancouver will update its system operation control strategies so that regional interceptors preferentially convey flows with higher concentrations of sanitary sewage to wastewater treatment plants.

b) Metro Vancouver and members with combined systems will implement operational improvements that minimize total volume and sanitary sewage loading in overflows, while considering interactions of the regional and municipal sewer systems.

Timeline: within five years
Adapted from: C13, C16
Aligned with: P11

8.9 Metro Vancouver and members with combined systems will maintain monitors at combined sewer overflow sites.

a) Metro Vancouver will maintain installed monitors to estimate overflow volume and frequency. Metro Vancouver will ensure the number and location of monitors is sufficient for characterizing discharges [see 8.3] and modelling sanitary flows [see 8.7] to prioritize combined sewer overflow mitigation actions [see 8.8].

b) Members with combined systems will maintain installed monitors to estimate overflow volume and frequency.

Timeline: ongoing
Adapted from: C12, 3.3.3

Performance Indicators

8A Number, duration and volume of combined sewer overflow discharge events at each combined sewer overflow site; and, total number of combined sewer overflow discharge events and total volume of combined sewer overflow discharges for entire system.
Responsibility: Metro Vancouver and members
New indicator

8B Sanitary wastewater volume (m^3) and loading* in combined sewer overflow discharges.
Responsibility: Metro Vancouver
Frequency: every two to four years
Replaces 2011 indicator: sanitary sewage volumes in combined sewer overflows
*Note, loading will be determined using best available information from either monitoring [see 8.3] or modelling [see 8.7]. Parameters and units of reporting to be determined.

Strategy 9 Separate combined sewers to eliminate overflows

Metro Vancouver and members with combined sewers (Burnaby, New Westminster, and Vancouver) have committed to eliminate combined sewer overflows by 2050 in the Vancouver Sewerage Area and by 2075 in the Fraser Sewerage Area.

To demonstrate continuing progress towards eliminating combined sewer overflows, Metro Vancouver in consultation with members will develop and submit intermediate targets for separation of combined catchments to the Ministry of Environment and Climate Change Strategy every five years. To guide this work, Metro Vancouver will engage with Burnaby, New Westminster, Vancouver, and local First Nations to develop a framework to prioritize sewer separation projects. The intermediate targets will be used to track progress of project delivery.

Historically, some creeks and streams in the region were buried with their flow piped into combined (and sometimes sanitary) sewers. Similarly, some lakes and ponds were connected to combined sewers to maintain water levels. These incoming extraneous flows discharge continuously and occupy pipe capacity designed for conveyance of sanitary sewage, adding unnecessary operational and financial costs for conveyance and treatment. Due to climate change, increases in rainfall and consequently extraneous flows will increase the risk of combined sewer overflows, system surcharging, and potential flooding. Disconnecting these extraneous flows from the sewer system can also facilitate daylighting of streams, which restores habitat and cultural value for First Nations, and creates public amenities.

Supports Goals: Prevent pollution, Reflect First Nations' priorities

Actions

9.1 Members will ensure that no new combined sewer laterals will be constructed on private or public property. Burnaby, New Westminster, and Vancouver will replace existing combined sewers with separate systems during redevelopment or significant renovations.
Timeline: ongoing
Adapted from: 1.2.1
Aligned with: P6

9.2 Metro Vancouver will develop intermediate targets on a five-year interval for municipal and regional separation of prioritized combined catchments. The targets will be based on a framework to be developed with Burnaby, New Westminster, Vancouver, and First Nations, that considers key factors such as cultural value, population, redevelopment rates, and operational considerations. Metro Vancouver will submit the targets to the Ministry of Environment and Climate Change Strategy.
Timeline: within five years
Adapted from: C15, 2011 MC10, 1.2.1, 1.2.2, 1.2.3
Aligned with: P6

9.3 Burnaby, New Westminster, and Vancouver will continue to work with Metro Vancouver to develop and implement Sewer Separation and Combined Sewer Overflow Elimination Plans to prevent combined sewer overflows, and in the interim, support the intermediate targets developed in action 9.2 by:

a) prioritizing combined catchments for separation;
b) sequencing the separation of regional trunk sewers and municipal collector sewers in the prioritized catchments; and
c) developing a strategy to separate combined sewer connections from private properties.

Burnaby, New Westminster, and Vancouver will separate municipal collector sewers according to the Sewer Separation and Combined Sewer Overflow Elimination Plans, such that:

- Vancouver Sewerage Area members will prevent combined sewer overflows by 2050 by replacing combined sewers with separate sanitary and storm sewers at an average rate of 1 per cent of the system per year.
- Fraser Sewerage Area members will prevent combined sewer overflows by 2075 by replacing combined sewers with separate sanitary and storm sewers at an average rate of 1.5 per cent of the system per year.

Timeline: ongoing
Adapted from: C15, 1.2.2, 1.2.6

9.4 Metro Vancouver or the member will replace combined regional trunk sewers with separated sanitary and storm sewers as determined by the Sewer Separation Plans.
Timeline: ongoing
Adapted from: 1.2.3

9.5 Members with combined systems will show progress of sewer separation and reduction of the sanitary loadings in combined sewer overflows by reporting the percentage of population with 100 per cent sanitary sewage delivered to Metro Vancouver interceptors. To do so, those members will develop and maintain a database of properties where private side plumbing is separated and feeds into separated municipal and regional sewers.
Timeline: within five years
New action

9.6 Members with combined systems will remove extraneous flows from creeks, lakes, and underground streams that discharge continuously into combined or sanitary sewers, in alignment with Sewer Separation and Combined Sewer Overflow Elimination Plans outlined in Action 9.3:
a) Members with combined systems will develop plans to remove extraneous flows.
b) Members with combined systems will implement the plans to remove the extraneous flows and provide progress updates every five years.
Timeline: (a) within three years
New action

Performance Indicators

9A Percentage of public sewer system that is separated
Responsibility: Metro Vancouver and members
New indicator

Note: This performance indicator will be supplemented by the "Percentage of population with 100 per cent sanitary sewage delivered to Metro Vancouver interceptors" within five years, as per action 9.5.

Rainwater Management

In urban areas, most rainwater and melting snow go into storm sewers (via the grated drains in streets), which typically empty into rivers, creeks, and adjacent lowland agricultural areas, or directly into the ocean. As rainwater travels along paved and unpaved surfaces to storm sewers, it can pick up pollution along the way. Urban rainwater can carry motor oil, gasoline, animal excrement, garbage, fertilizer, and other contaminants directly into the nearest body of water, where these materials can be harmful to plants, wildlife, and humans. Heavy storms can also introduce a lot of rainwater into streams and creeks in a short period of time, causing erosion and stirring up sediment, which makes it hard for fish to breathe.

In nature, trees and earth help absorb rain slowly, breaking down pollutants, refilling groundwater and keeping waterways healthy. In urban areas, buildings, roads, and other impervious surfaces do not allow rainwater to soak into the ground. The figure below illustrates the differences in the water cycle.

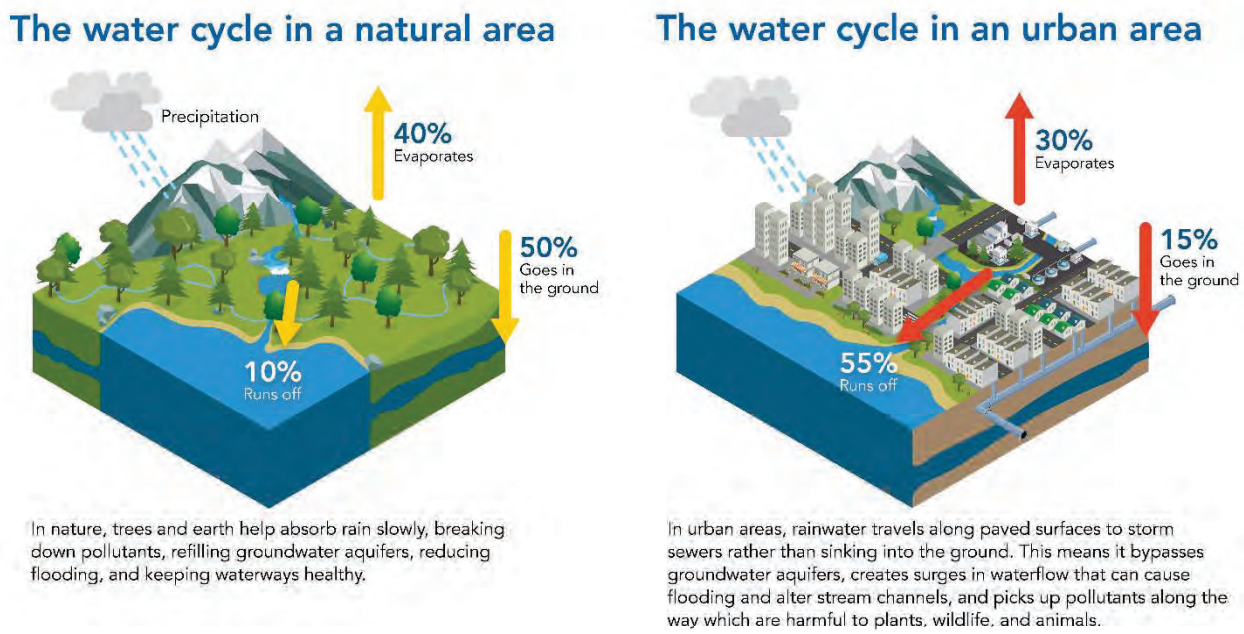


Figure 5 – The water cycle in a natural area vs. an urban area

Approaches that mimic natural processes using green infrastructure, blue infrastructure and thoughtful development patterns allow rainwater to soak into the ground or be released more slowly into local waterways. These approaches are combined with grey infrastructure (sewers and pumps) to help protect against flood risk, especially during higher intensity rain events and in lower elevation areas. Climate change will increase the frequency and intensity of rainfall events, adding stress to the system. From a hydrological perspective, the combined capacity of the green, blue and grey infrastructure needs to be able to absorb the increasing rainfall to avoid flooding.

Metro Vancouver members have been using Integrated Stormwater Management Plans (ISMPs) to manage rainwater with the aim of keeping waterways and lands healthy. Metro Vancouver supports

them by facilitating information sharing, helping develop tools and resources, and liaising with regulators. In collaboration with specific local governments, Metro Vancouver provides drainage services within the Still Creek–Brunette River Drainage Area and the Port Moody–Coquitlam Drainage Area.

Strategy 10 Manage rainwater and urban development for watershed health

The region contains over 100 watersheds with creeks and rivers of all sizes that provide habitat for fish and wildlife as well as recreation for communities. The health of these watersheds is also integral to First Nations food security and sovereignty. Integrated Watershed Management Plans (IWMPs), considered more holistic than the previously named Integrated Stormwater Management Plans (ISMPs), are tailored to each watershed to guide land use and development while prioritizing watershed and stream health. IWMPs must recognize the role that First Nations play in stewarding the land and water. Developing IWMPs presents an opportunity to build strong, collaborative, and respectful relationships with First Nations based on mutual understanding and shared objectives.

The Stormwater Monitoring and Adaptive Management Framework (AMF) was implemented in 2014 as guidance for monitoring and improving watershed health, and as a tool for evaluation of effectiveness of ISMPs. Integrating the AMF as a core component of IWMPs will establish it as an ongoing dynamic evaluation tool to improve IWMPs and best allocate resources. Using this integrated framework allows for dynamic adaptation: if positive watershed health indicators emerge, IWMP renewal periods can be extended; conversely, if degradation occurs, timely corrective actions can be taken.

A critical aspect of watershed health is groundwater, a vital drinking water source for parts of Metro Vancouver. Green infrastructure solutions mimic natural systems that slowly infiltrate rainwater into the ground, allow plants and soil to filter out pollutants, and replenish aquifers with clean groundwater. The development of standards for green infrastructure reflects our deepening understanding of interconnected environmental systems. By working together through IWMPs and the AMF, we can support healthy watersheds and sustainable groundwater resources.

Supports Goals: Restore ecological systems, Reflect First Nations' priorities

Actions

10.1 Members will use the Stormwater Monitoring and Adaptive Management Framework (AMF) to monitor watershed health:

a) Metro Vancouver will coordinate revising the existing Integrated Watershed Management Plan (IWMP) template, with input from First Nations that have chosen to participate, to incorporate the AMF.

b) Members will adopt the revised IWMP template and the associated AMF.

c) Members will implement AMF monitoring programs and will use AMF monitoring findings to continuously improve the IWMPs by (i) establishing criteria to define watershed health, (ii) comparing AMF findings against the watershed health criteria to determine the timing of IWMP review, and (iii) updating IWMP actions when review is triggered. The IWMP review period may be extended from 12 years to a maximum of 15 years when monitoring shows a healthy or improving watershed.

Timeline: (a) within two years; (b) within three years; (c) ongoing
Adapted from: C4, C39, 2011 MC6, 2011 MC7, 2011 MC9, 2011 MC10, 3.3.3, 3.5.6, 3.5.9
Aligned with: P25

10.2 Members will continue to develop, review and update Integrated Watershed Management Plans (IWMPs):

a) Members will prioritize watersheds for IWMP development with First Nations that have chosen to participate, using AMF criteria and additional criteria co-developed with First Nations that consider cultural significance and Aboriginal rights and interests.
b) First Nations will participate in IWMP development, monitoring, and review, as desired and mutually agreed upon, including sharing information about their respective land use plans as appropriate.
c) Members will continue to create, review, and update IWMPs for all watersheds with developed area currently above 20 per cent and will begin to create, review and update IWMPs for watersheds planned to have future developed area above 20 per cent, according to the prioritization sequence defined under (a).

Timeline: (a) within five years; (b), (c) ongoing
Adapted from: C17, 2011 MC10, 3.3.3
Aligned with: P25

10.3 Members will ensure IWMPs integrate rainwater and groundwater management, consider agricultural land rainwater runoff, and reflect the provisions of the Province's *Watershed Security Strategy* once it is launched.
Timeline: ongoing
Adapted from: C47, C48, 2011 MC9
Aligned with: P30

10.4 Members will align land-use planning and development with IWMPs to ensure development decisions support watershed health objectives, including protecting riparian areas and agricultural areas.
Timeline: TBD
Adapted from: 2011 MC6, 2011 MC9, 3.4.7

10.5 Members will expand the use of green infrastructure, blue infrastructure, and other practices to mimic natural watersheds, reduce runoff and discharge, improve water quality and increase climate resilience.
Timeline: TBD
Adapted from: C17

Performance Indicators

A complete set of performance metrics for this strategy will be presented in Rainwater Dashboards once they are created under Action 11.3.

10A Number of IWMPs completed, the area (hectares) they cover, and status or percentage complete of each IWMP action.

Responsibility: Members
Adapted from 2011 performance measure: number and area [hectares] of integrated stormwater management plans completed

Strategy 11 Update and harmonize municipal tools for rainwater management

Long-term success in managing urban watersheds and rainwater systems hinges on three pillars: consistent funding, clear policies, and effective programs.

Dedicated funding specifically tailored to each community's unique needs is crucial. This empowers local authorities to proactively plan for, respond to, and mitigate rainwater challenges. Funding sources can include general tax revenue, utility fees, parcel taxes, or other innovative options.

Watersheds do not respect jurisdictional boundaries. Harmonizing rainwater policies, programs, and bylaws across jurisdictions will create a unified regional direction for managing rainwater and watersheds.

Previously, the LWMP biennial report was the sole method for reporting on Integrated Watershed Management Plans (IWMPs) and the Adaptive Management Framework (AMF). A more dynamic approach is proposed: replacing the report with a rainwater dashboard. This shift towards data transparency and accessibility would enhance accountability by providing continuous access to IWMP progress and data collected through AMF monitoring programs.

Supports Goals: Restore ecological systems

Actions

11.1 Members will each establish dedicated funding to ensure consistent and reliable service delivery for rainwater management.
Timeline: within three years
New action

11.2 Members will update rainwater policies, programs, and bylaws in a harmonized manner:

a) Metro Vancouver will coordinate the development of a guidance document to aid members in harmonizing rainwater policies, programs, and bylaws.

b) Members will then review and update rainwater policies, programs and bylaws.

c) Metro Vancouver and members will coordinate and advocate with other levels of government to resolve rainwater policy conflicts and barriers.

Timeline: (a) within two years; (b) within five years after (a); (c) ongoing.
Adapted from: C38, 1.1.12.b, 1.1.12.e, 1.1.12.f, 1.1.14, 1.1.16, 1.1.20

11.3 Metro Vancouver will coordinate the development of a template for an online rainwater dashboard for members to report on IWMP progress, including contributions to watershed health (e.g., percentage impervious area, length of daylighted waterways, etc.). Members will then implement the online rainwater dashboards.
Timeline: implement dashboards within three years
New action

11.4 Metro Vancouver will coordinate, with members, an approach for seeking to update the Master Municipal Construction Documents such that green infrastructure guidelines become standards.
Timeline: within five years
Adapted from: C20, 1.1.12.f, 1.1.21

Performance Indicators

Performance indicators will be reported by members through the new rainwater dashboards developed in 11.3. Members will select key rainwater indicators to be reported annually in the LWMP dashboard as well (see Monitoring and Reporting section).

Strategy 12 Enhance interagency collaboration to improve watershed health across the region

Formed in 2002, the Stormwater Interagency Liaison Group has played a valuable role in implementing rainwater management actions outlined in the LWMP. However, to better address evolving environmental challenges, climate change, urban development realities, evolving regulatory roles, and First Nations rights and interests, the group requires a refresh.

Updating the interagency group's terms of reference and mandate will renew its vision and will position the group as a unified voice for the region to engage with provincial authorities on rainwater management. This includes ensuring alignment with diverse mandates and initiatives, particularly in the critical area of balancing plans to increase housing density with the need to protect watershed health. The interagency group will coordinate with participating First Nations to provide feedback on IWMPs to Metro Vancouver and members.

Supports Goals: Restore ecological systems, Reflect First Nations' priorities

Actions

12.1 Metro Vancouver will coordinate a revision of the interagency group's terms of reference, possibly to operate as a sub-committee under the Regional Engineer's Advisory Committee (REAC), to lead local research on rainwater management, to be the primary regional advocate with regulators, to promote education and outreach on rainwater management, and to coordinate region-wide accountability on IWMP actions. Metro Vancouver and members will actively participate in the revitalized interagency group.
Timeline: revise terms of reference within one year
Adapted from: C36, 1.1.12.a, 3.5.2, 3.5.10

12.2 Members and Metro Vancouver, as the interagency group, will conduct a regional study of the impacts of densification on watershed health. Members will use the study results to make informed decisions that balance urban growth and ecological resilience.
Timeline: within two years
Adapted from: 2011 MC6, 2011 MC9.b

12.3 Members and Metro Vancouver, as the interagency group, will conduct a cost-benefit analysis to quantify the benefits of green infrastructure and associated lifecycle costs in the region.
Timeline: within three years
New action

12.4 Members and Metro Vancouver, as the interagency group, will host a forum at regular intervals to report progress on IWMPs and LWMP rainwater actions, and to foster collaboration and knowledge sharing among members, First Nations, and interested parties.
Timeline: at least every three years
Adapted from: C37, 2011 MC10

Performance Indicators

None proposed for this strategy.

Wastewater Treatment

Metro Vancouver operates five wastewater treatment plants that currently process over one billion litres of wastewater every day. Wastewater contains different compounds and waste products including soap, food scraps, human waste, oils, and other chemicals. Treating wastewater removes substances that can harm human health and the environment. During and after treatment, wastewater is tested to ensure that treatment plant processes are working effectively and meeting regulations. Treated wastewater, or effluent, is released into the Fraser River, Burrard Inlet, or Strait of Georgia.

Wastewater Treatment Processes

- Primary treatment removes materials that float or readily settle out by gravity.
- Secondary treatment uses biological processes to remove 90 per cent of the organic materials.
- Tertiary treatment removes specific substances, such as ammonia or fine solids, after secondary treatment. Tertiary treatment can involve physical, chemical, or biological processes.
- Tertiary filtration is a physical process that improves treated wastewater quality beyond that achieved by primary or secondary treatment by removing additional suspended solids and associated organic matter.
- In British Columbia, advanced treatment means any form of treatment other than dilution that produces effluent with BOD_5 and TSS both less than 10 mg/L, which are measures of organic material and suspended solids, respectively.

Three of Metro Vancouver's wastewater treatment plants currently perform secondary treatment: Annacis Island, Lulu Island, and Northwest Langley. Metro Vancouver is upgrading both of its primary treatment plants, Iona Island and Lions Gate, to secondary treatment to conform with Ministerial Conditions from previous LWMPs and the Canadian Council of Ministers of the Environment (CCME) *Canada-wide Strategy for Management of Municipal Wastewater* (CWS-MMWE).

Metro Vancouver follows the CWS-MMWE Environmental Risk Management Framework to determine effluent discharge objectives and meet National Performance Standards. If this prescribed process identifies potential environmental risk, it may lead to actions such as source control initiatives, treatment process optimization, and wastewater treatment plant improvements and upgrades. When considering level of treatment for wastewater treatment plant improvements and upgrades, Metro Vancouver considers factors including funding availability, First Nations' concerns, societal values, and other input from engagement on projects.

The site-specific effluent discharge objectives are set for Metro Vancouver wastewater treatment plants based on relevant water quality guidelines, including site-specific water quality objectives where available. When the federal or provincial governments review these water quality objectives/guidelines, First Nations are invited by the presiding government to provide input, and can provide direct feedback on water quality objectives/guidelines.

Strategy 13 Treat wastewater so effluent meets or surpasses regulatory requirements

Metro Vancouver will continue to follow the CWS-MMWE Environmental Risk Management Framework to reduce risks to human health and the environment that may be identified through ongoing monitoring and assessment programs. Metro Vancouver will identify and pursue risk mitigation approaches as appropriate, including source control, treatment process optimization, and, when required, treatment upgrades.

Metro Vancouver has planned wastewater treatment projects to improve effluent quality and accommodate a growing population. These include upgrades such as upgrading a plant from primary to secondary treatment, or expansions such as increasing the plant's capacity to treat a higher maximum capacity. Future wastewater treatment projects and their estimated dates of initiation and operation are presented in the Wastewater Treatment Plant Upgrade and Expansion Schedule in Appendix A. Other wastewater treatment plant infrastructure projects not listed in these schedules may be driven by factors such as maintenance or resilience, and are captured in Metro Vancouver's Long Range Capital Plan that is updated annually as part of the budgeting process.

Table 1 shows the current and planned future level of treatment at each wastewater treatment plant. The level of treatment is selected to meet or surpass the regulatory requirements of Operational Certificates issued by the Province and to be consistent with the requirements of the CWS-MMWE. Table 1 also identifies additional treatment beyond secondary treatment planned for future upgrades, including ammonia removal and tertiary filtration.

Table 1 Levels of Treatment

Current level of treatment	**Wastewater treatment plant**	**Planned future level of treatment**
Primary	Iona Island	Secondary† (membrane filtration), or‡ Secondary† plus tertiary filtration (cloth media filters)
	Lions Gate (current) / North Shore (future)	Secondary† plus tertiary filtration (cloth media filters)
Secondary	Annacis Island	Secondary plus ammonia removal
	Lulu Island	Secondary
	Northwest Langley	Secondary (biological nutrient removal) plus tertiary filtration (cloth media filters)

† The designs for the Iona Island Wastewater Treatment Plant secondary upgrade and the North Shore Wastewater Treatment Plant include future-proofing to enable ammonia removal by adjusting operation of secondary treatment processes. Ammonia removal will begin when it is identified as required by the CWS-MMWE Environmental Risk Management Framework.

‡The specific technology for Iona Island Wastewater Treatment Plant will be selected during preliminary design.

Supports Goals: Prevent pollution, Reflect First Nations' priorities

Actions

13.1 Metro Vancouver will plan, design, operate, and maintain wastewater treatment infrastructure using the CWS-MMWE Environmental Risk Management Framework to address and adapt to identified risks and long term needs, and will additionally incorporate risks associated with climate change into the framework.
Timeline: ongoing
Adapted from: C9, 1.3.4, 1.3.5, 1.3.6, 1.3.7, 3.4.1

13.2 Metro Vancouver will continue to monitor the quantity and characteristics of Metro Vancouver's wastewater treatment plant effluent discharges and assess effluent quality in accordance with the CWS-MMWE.
Timeline: ongoing
Adapted from: C4, C11, 1.3.7, 3.3.2
Aligned with: P2

13.3 Metro Vancouver will continue to monitor influent and the receiving environment where wastewater treatment plants discharge and assess results to determine whether any actions, such as additional source control or treatment upgrades, are required.
Timeline: ongoing
Adapted from: C4, C9, C11, 2011 MC6, 1.3.7, 3.3.1
Aligned with: P2, P3

13.4 Metro Vancouver will upgrade wastewater treatment processes and plants according to the Wastewater Treatment Plant Upgrade and Expansion Schedule.

a) Metro Vancouver will update the Wastewater Treatment Plant Upgrade and Expansion Schedule and will report the updates to the Ministry of Environment and Climate Change Strategy.
b) Metro Vancouver will engage with First Nations on planned wastewater treatment upgrades when preparing and updating the Wastewater Treatment Plant Upgrade and Expansion Schedule, and will do so in a manner that is consistent with applicable federal and provincial law, and according to the level of First Nations interest.
c) Metro Vancouver will engage with the public and other interested parties on planned wastewater treatment upgrades when preparing and updating the Wastewater Treatment Plant Upgrade and Expansion Schedule.
d) Metro Vancouver will upgrade wastewater treatment plants in accordance with the timelines shown in the Wastewater Treatment Plant Upgrade and Expansion Schedule.

Timeline: (a) every two years; (b), (c), (d) ongoing.
Adapted from: 2011 MC10, 1.3.5

Performance Indicator
Results from monitoring of Metro Vancouver's wastewater treatment plant influent and effluent quantity and characteristics will continue to be reported in the Environmental Management and Quality Control Annual Report.

Strategy 14 Operate and maintain wastewater treatment plants to meet or surpass regulatory requirements

Effective operation and maintenance of Metro Vancouver's wastewater treatment plants is critical to meet regulatory requirements and to provide high quality effluent for discharge or reuse. Consistent compliance requires continuous monitoring, testing, and adjustment of treatment processes.

Supports Goals: Prevent pollution

Actions

14.1 Metro Vancouver will operate wastewater treatment plants to meet or surpass requirements specified in each facility's Operational Certificate and CWS-MMWE National Performance Standards for wastewater effluent.
Timeline: ongoing
Adapted from: 1.3.4, 1.3.6

14.2 Metro Vancouver will update and implement asset management plans to enhance the operational efficiency of wastewater treatment plants, maintain the reliability of the existing infrastructure and equipment for wastewater treatment plants that address risks including climate change and seismic events, and maintain performance in wet weather.
Timeline: ongoing
Adapted from: 3.1.5
Aligned with: P3

14.3 Metro Vancouver will report on bypass conditions that occur at wastewater treatment plants in the *Environmental Management and Quality Control Annual Report*. The report on each activity will include a description of the event, cause, and environmental effect.
Timeline: ongoing
Adapted from: 2011 MC8

Performance Indicator

14A Compliance with BOD and TSS limits specified in Operational Certificates for wastewater treatment plants (percentage of time)

Responsibility: Metro Vancouver
Adapted from 2011 performance measure: compliance with parameters specified in the Operational Certificates for wastewater treatment plants

Biosolids

Biosolids are the treated organic material that is recovered from wastewater treatment. The end result is an earth-like product that is rich in nutrients and organic matter. Biosolids can be used to improve soil health, or as source of energy. Nutrifor™ is the brand name for the biosolids that Metro Vancouver produces. Currently, Nutrifor biosolids are applied to land within the region and around the province as a fertilizer or as an ingredient to build healthy soil.

Metro Vancouver plans for the current and future management of biosolids by taking into account growth in the region, wastewater treatment infrastructure upgrades, and new technologies. The stability and resilience of biosolids management in the region depends on ensuring a diversity of best available technologies and customer markets, a solid scientific foundation, and a commitment to the environment, public health, and future generations.

Strategy 15 Diversify options to beneficially use Nutrifor biosolids

Population growth and wastewater treatment plant upgrades will significantly increase the amount of biosolids produced, and the greenhouse gas emissions to manage biosolids may also increase. Diversifying markets and best available technologies will ensure beneficial use of all Nutrifor biosolids to avoid landfill disposal of a valuable resource. New options can also recover energy and minimize greenhouse gas emissions.

Supports Goals: Recover resources, Restore ecological systems, Reflect First Nations' priorities

Actions

15.1 Metro Vancouver will grow the land application program and will increase public outreach and education, including to First Nations, on how Nutrifor biosolids are used safely and responsibly as fertilizer and as an ingredient to build healthy soil.
Timeline: ongoing
Adapted from: C34, C35, 2011 MC10, 2.1.1.a.5
Aligned with: P21

15.2 Metro Vancouver will beneficially use dried Nutrifor biosolids pellets:

a) Metro Vancouver will build a regional biosolids dryer to produce granular pellets that can be used as a low carbon fuel and as a fertilizer product.

b) Metro Vancouver will work with the Province to certify the pellets as a retail-grade organic matter product under OMRR or other regulation as appropriate.

Timeline: (a) by 2032-2037
Adapted from: 2.1.1.a.4, 2.1.1.a.5
Aligned with: P21

15.3 Metro Vancouver will explore technologies that displace the production of Nutrifor biosolids, such as thermal technologies that convert sludge to low carbon fuel with a net positive energy balance and net greenhouse gas emissions reduction.
Timeline: ongoing
Adapted from: 2.1.1.a.4

Aligned with: P21

15.4 Metro Vancouver will process Nutrifor biosolids at Metro Vancouver's Waste-to-Energy Facility to maintain contingency management options when other markets or uses cannot be accessed.
Timeline: ongoing
Adapted from: 2.1.1.a.4
Aligned with: P21

15.5 Members will continue to use Nutrifor landscaping soil in municipal projects when feasible.
Timeline: continuing
Adapted from: 2.1.1.a.5, 2.1.4

Performance Indicators

15A Beneficial use of Nutrifor biosolids (percentage of total biosolids generated)
Responsibility: Metro Vancouver
New indicator

15B In-region use of Nutrifor biosolids (percentage of total biosolids generated)
Responsibility: Metro Vancouver
New indicator

Circular Water Economy

Wastewater is rich in resources, including energy, nutrients, and water. A circular water economy recovers and recycles these resources to provide value for citizens, the environment, and businesses. Metro Vancouver already recovers energy from wastewater in the form of biogas and heat, nutrients in the form of Nutrifor biosolids, and water for use in wastewater treatment plants. Innovative technologies are being developed that can recover even more resources from wastewater and propel the transition to a circular water economy.

Strategy 16 Implement proven resource recovery technologies

Metro Vancouver will continue to implement proven technologies for resource recovery at its wastewater treatment plants and in its collection system when there is a good business case. Recovering resources from wastewater creates revenue while reducing environmental footprint. Successful resource recovery projects rely on a strong and diverse network of partners including member jurisdictions to address challenges such as regulatory issues, public perception, and market integration of recovered resources.

Supports Goals: Recover resources

Actions

16.1 Metro Vancouver will recover energy from the liquid waste system to reduce regional greenhouse gas emissions and support the region's transition to clean energy.

a) Metro Vancouver will continue to identify and implement best uses of biogas from wastewater treatment plant digesters. This includes use at Metro Vancouver wastewater treatment plants and upgrading biogas for sale to other parties as renewable natural gas, when appropriate.

b) Metro Vancouver will continue to recover thermal energy from sewage and treated effluent for use at Metro Vancouver facilities, when appropriate.

c) Metro Vancouver will continue to provide access to sewage and effluent for heat recovery to members, First Nations, and district energy providers, when appropriate.

d) Metro Vancouver will continue to invest in sewer heat recovery and effluent heat recovery projects, when appropriate.

Timeline: ongoing

Adapted from: 2011 MC10, 2.1.1.a, 2.1.2, 2.1.3

16.2 Metro Vancouver will recover water from the liquid waste system.

a) Metro Vancouver will continue to use treated wastewater in Metro Vancouver's wastewater treatment plants, which reduces use of potable water in plant processes.

b) Metro Vancouver will review and recommend revisions and extensions to Board policy on reclaimed water use, to provide guidance on enabling use of treated wastewater by other off-site parties throughout the region. Potential uses include sewer flushing, hydro-excavation, irrigation, vehicle washing, dust suppression, and other beneficial uses.

c) Metro Vancouver will construct and operate facilities to provide reclaimed water from wastewater treatment plants for on-site use or to other parties for use at off-site locations, when financially and environmentally appropriate.

Timeline: ongoing
Adapted from: 2.1.1.a, 2.1.2, 2.1.3

16.3 Metro Vancouver will recover nutrients and other materials from liquid waste.

a) Metro Vancouver will continue to periodically evaluate the business case for recovering nutrients and other materials from liquid waste.

b) Metro Vancouver will implement promising technologies when financially and environmentally appropriate.

Timeline: ongoing
Adapted from: 2.1.1.a, 2.1.2, 2.1.3

16.4 Members will use recovered energy and water when feasible.

a) Members will continue to explore recovery of thermal energy from sewage and treated effluent for use in district energy systems, and will implement heat recovery projects in collaboration with Metro Vancouver when financially and environmentally appropriate.

b) Members will identify potential uses of reclaimed treated wastewater and rainwater by institutions and businesses throughout the region such as sewer flushing, hydro-excavation, irrigation, vehicle washing, dust suppression, and other beneficial uses, and will support and establish facilities and programs to use reclaimed water when financially and environmentally appropriate.

Timeline: ongoing
Adapted from: 2.1.4

Performance Indicators

16A Amount of energy recovered from liquid waste system (GJ)§

Responsibility: Metro Vancouver and members
Adapted from 2011 performance measure: quantities and types of energy and materials recovered from the liquid waste system.

§ Sum of GJ from all energy types (e.g., biogas, sewer heat, biocrude), recovered by Metro Vancouver or members, for use by any end customer.

Strategy 17 Research and pilot innovative technologies to advance the circular water economy

Metro Vancouver can support exploration of new resource recovery technologies and approaches that reduce operational risks, improve performance, increase resilience, and decrease costs. Promising solutions need to be piloted in a real-world wastewater environment as a critical step in progressing from lab-scale testing to full-scale adoption. Investing in research and pilots of new technologies not only ensures sustainable wastewater management for Metro Vancouver, but can also cultivate the next generation of researchers and boost economic growth in the region.

Supports Goals: Recover resources

Liquid Waste as a Resource

The liquid waste system is rich in resources that can be recovered, including:

- Biogas from existing wastewater processes, which can be upgraded for use as renewable natural gas
- Low-carbon biofuel from new sludge conversion technology, which can replace diesel for transportation
- Heat from sewage or treated wastewater effluent, which can be used to heat buildings in areas with district energy systems
- Nutrients such as nitrogen or phosphorous, which can be used for fertilizer
- Reclaimed (treated) water, which can be used for non-potable purposes like sewer flushing, street sweeping, landscape watering, or agricultural purposes
- Alternative fuels, such as hydrogen or ammonia, that could be used for heavy-duty transportation
- Carbon dioxide that can be recovered from biogas, for industrial use

New resources and novel uses may emerge as research progresses.

Actions

17.1 Metro Vancouver will research, develop and pilot new methods to expand the recovery and use of energy, nutrients, water and other emerging resources from the liquid waste system, by:

a) Hosting pilots in wastewater treatment plants and the collection system
b) Collaborating with researchers at academic institutions
c) Collaborating with other utilities and water research organizations
d) Partnering with water technology developers
e) Collaborating with First Nations on pilot projects as desired
f) Conducting public outreach and education about resource recovery, including to First Nations

Timeline: ongoing
Adapted from: 2011 MC10, 2.1.1.a, 3.2.2

17.2 Metro Vancouver will foster circular water economy innovation within the liquid waste system by:

a) Leveraging the Lulu Island Wastewater Treatment Plant Pilot Digestion Optimization Facility as a platform for piloting and developing new technologies and enhancements
b) Embedding spaces for future treatment technology pilots into the upgraded Iona Island Wastewater Treatment Plant
c) Integrating circular water economy principles into Metro Vancouver wastewater facility plans
d) Promoting circular water economy innovation and research through sharing our story and actively participating in industry organizations and regional networks

Timeline: ongoing
New and Adapted from: 3.2.2

Performance Indicators

None proposed for this strategy.

Environmental Management

Many environmental management strategies and actions have been integrated into each of the preceding sections. This section contains environmental management strategies and actions that either apply across a number of preceding sections or do not specifically apply to any one section.

Strategy 18 Minimize impacts of liquid waste management on the atmosphere and air quality

Managing greenhouse gas emissions from wastewater systems aligns with regional, provincial, and federal climate goals. Metro Vancouver and members will continue to quantify and manage greenhouse gas emissions, other air emissions including potential air contaminants, and odours associated with operating and maintaining the liquid waste system. Reducing air pollution improves environmental quality and public health. Reducing air contaminants and odours is also a stated high priority for First Nations leadership and communities.

Supports Goals: Prevent pollution, Reflect First Nations' priorities

Actions

18.1 Metro Vancouver and members will continue to develop and implement programs and policies to track greenhouse gas emissions associated with the construction and operation of wastewater collection and treatment systems, including developing and implementing new monitoring plans where necessary.
Timeline: ongoing
Adapted from: 3.3.4, 3.3.6

18.2 Metro Vancouver and members will continue to develop and implement programs and procurement policies to reduce greenhouse gas emissions associated with the design, construction, operation, and management of wastewater collection and treatment systems, to help achieve federal, provincial, and Metro Vancouver greenhouse gas reduction targets, using business case analysis techniques to assess opportunities and options.
Timeline: ongoing
Adapted from: 1.3.10, 1.3.17

18.3 Metro Vancouver and members will manage air emissions from standby power generators:

a) Metro Vancouver will continue to develop and implement air emissions management programs for standby power generators, including assessment of desirability of retrofit and accelerated asset replacement where appropriate.

b) Members will continue to develop and implement air emissions management programs for standby power generators at municipal sewer pump stations.

Timeline: ongoing
Adapted from: 1.3.9, 1.3.16

18.4 Metro Vancouver will develop and undertake a program to characterize emissions from various processes at wastewater treatment plants (e.g., digesters, exhausts, stacks) during operation, preventative maintenance, and emergency maintenance. Metro Vancouver will identify potential concerns, and, where appropriate, undertake studies of best economically feasible control processes or technologies.
Timeline: ongoing
Adapted from: 1.3.9

18.5 Metro Vancouver will continue odour management programs at wastewater treatment plants and targeted facilities in the regional sewer system. These programs are driven by community acceptance and industry best practices, and are designed to: establish the current odour levels through monitoring; set targets for future odour levels through modelling; and, identify and implement the steps to achieve the targets through mitigation.
Timeline: ongoing
Adapted from: 1.3.8, 3.3.4, 3.3.6

18.6 Members will continue existing municipal odour control programs and implement new programs for targeted municipal sewer facilities.
Timeline: ongoing
Adapted from: 1.3.15, 3.3.4, 3.3.6

Performance Indicators

18A Greenhouse gas emissions from operation of Metro Vancouver's liquid waste management system (tonnes CO_2e per year).

Responsibility: Metro Vancouver
New indicator

Strategy 19 Environmental monitoring to protect public health and the environment

Metro Vancouver regularly tests and monitors areas where treated wastewater is released into the environment and the overall health of the aquatic environment. The Environmental Monitoring Committee was established under the 2002 LWMP to provide scientific advice and recommendations on the effect of liquid waste discharges on the receiving environment and monitoring of the environmental health of the receiving environment. The committee members are staff with scientific and technical expertise from federal and provincial government, academic institutions, Metro Vancouver, and member jurisdictions.

Metro Vancouver monitors the water quality of local recreational waters from May to September, testing beaches at least once a week. Water samples are taken from over 100 sites in 40 locations across the region. Metro Vancouver provides test results to regional health authorities, who then determine whether notices should be posted at beaches to inform of possible risk for swimming.

The environmental monitoring and reporting actions in this strategy continue to provide information for use in assessments to protect public health and the environment.

Supports Goals: Prevent pollution, Reflect First Nations' priorities

Actions

19.1 Metro Vancouver will continue to receive advice from the Environmental Monitoring Committee. The Committee will continue to be responsible for reviewing the scope and design of monitoring programs, review of monitoring results, predictive modelling, and risk assessments of waste discharges.
Timeline: ongoing
Adapted from: C2, 3.5.2, 3.5.10
Aligned with: P2

19.2 Metro Vancouver will continue to monitor recreational water quality (seasonal beach monitoring) throughout the region, will continue to share this information with municipal beach operators and local Health Authorities, and will share this information with the First Nations Health Authority.
Timeline: ongoing
Adapted from: C4, 2011 MC6, 2011 MC10

19.3 Metro Vancouver will continue to monitor substances of interest in effluent and environmental fate of priority contaminants and their potential for adverse effects.
Timeline: ongoing
Adapted from: 2002 MC7

Performance Indicators

19A Beach advisory days per year and locations (number of days)

Responsibility: Metro Vancouver
Copy of 2011 performance measure

Testing Wastewater for COVID-19 and Other Viruses

Metro Vancouver is working with the BC Centre for Disease Control and the University of British Columbia to track the presence of respiratory viruses in the region's wastewater. Respiratory virus particles are shed in the feces of people who have the virus and can be detected in wastewater.

Untreated wastewater entering each of Metro Vancouver's five wastewater treatment plants is sampled and tested three times a week for these respiratory viruses:

- SARS-CoV-2, commonly known as COVID-19
- Influenza A and Influenza B, commonly known as the flu
- Respiratory Syncytial Virus (RSV), a common respiratory virus that usually causes mild, cold-like symptoms

While wastewater testing cannot tell us the number of people who are infected or contagious, it can tell us which respiratory viruses are present and how viral levels might be changing over time. This information may help health authorities evaluate the effectiveness of measures to control the virus in the community.

Strategy 20 Collaborate on regional environmental management initiatives

These actions support collaboration with interested parties on environmental management initiatives for the protection of public health and the environment.

Supports Goals: Prevent pollution, Reflect First Nations' priorities

Actions

20.1 Metro Vancouver will participate in relevant collaborative environmental program(s) for regional water bodies (i.e., Fraser River, Burrard Inlet, Strait of Georgia) along with members, First Nations, senior governments, and interested parties.
Timeline: ongoing
Adapted from: 2011 MC10, 3.3.1, 3.5.3

20.2 Metro Vancouver will continue to participate, and members may participate, in provincial processes to review and establish water uses and water quality objectives for specific water bodies within Metro Vancouver.
Timeline: ongoing
Adapted from: C1, C49, 2011 MC10, 1.3.18, 3.3.1

20.3 Members will work with private marina operators, the Province, and the federal government to develop and implement regulations to ensure all new marinas and marinas where planned renovations exceed 50 per cent of the assessed existing improvement value have pleasure craft pump-out facilities.
Timeline: ongoing
Adapted from: C41, 1.3.13

20.4 Members will require all pleasure craft pump-out facilities to connect to a municipal sanitary sewerage system or a provincially permitted on-site treatment and disposal system or have established enforceable protocols for transporting liquid waste for disposal at a permitted liquid waste management facility.
Timeline: ongoing
Adapted from: C42, 1.3.14

Performance Indicators

None proposed for this strategy.

Water Quality Objectives for səlilwət / Burrard Inlet

Water Quality Objectives (WQOs) are developed for waterbodies of regional, provincial, inter-provincial, international, and Indigenous significance. WQOs establish levels for substances in waterbodies to protect water quality, guide resource management decisions, and support the responsible stewardship of water resources.

> *Tsleil-Waututh (səlilwətaɬ) means "People of the Inlet". Since time out of mind, səlilwətaɬ people have used, occupied, governed, and stewarded their territory. səlilwətaɬ hold a sacred, legal obligation and responsibility to protect, defend, and steward the lands and waters of their territory, in accordance with səlilwətaɬ law, for past, present, and future generations. This stewardship responsibility requires restoring conditions that provide the environmental, cultural, spiritual, and economic foundation for səlilwətaɬ people to thrive.*
>
> *— səlilwətaɬ (Tsleil-Waututh Nation)*

WQOs for Burrard Inlet were initially developed in 1990 by the Province. In 2017, səlilwətaɬ published the Burrard Inlet Action Plan to summarize scientific knowledge, identify priority issues and gaps related to environmental degradation, foster environmental stewardship, and identify near-term actions to improve the health and integrity of the inlet. The first of six strategic priorities was to update the WQOs for Burrard Inlet.

səlilwətaɬ led the update of the WQOs in collaboration with the Province. This update combines səlilwətaɬ Indigenous science and knowledge, improved western science, and more recent monitoring data, to lay the foundation for further efforts to protect the water quality and values in Burrard Inlet. Metro Vancouver and members participated in the Burrard Inlet Water Quality Technical Working Group and Roundtable for this update. Action 20.2 in this LWMP continues Metro Vancouver's and members' commitment to participating in the review and update of WQOs when they occur. Several strategies in this plan commit to monitoring the impacts of wastewater discharges to the environment, including whether WQOs are being met.

The updated Water Quality Objectives for Burrard Inlet are co-signed by the Province and səlilwətaɬ. The vision is to increase the benefits of Burrard Inlet for all in the region by reducing stressors and improving water quality, balancing ecological, social, economic, health, and First Nation cultural values. The water values to be protected in the Burrard Inlet include: human consumption of shellfish and finfish, aquatic life, wildlife, cultural practices, recreational uses, and institutional uses.

Monitoring and Reporting

Monitoring and reporting the progress on LWMP actions is important to ensure that Metro Vancouver and members are implementing actions as planned; continuing to be transparent and accountable to the Province, First Nations, the public, and interested parties; and meeting regulatory obligations. This process also helps Metro Vancouver and member jurisdictions to reflect on their progress, share successes and challenges, learn from each other, and collaborate to find solutions.

This updated LWMP introduces new reporting approaches to improve ease of understanding, accountability, transparency, and collaboration:

- a streamlined annual report to the Province with a snapshot view of progress;
- increased public access to LWMP performance indicators through online dashboards;
- regular collaborative meetings between Metro Vancouver and member jurisdictions; and,
- regular meetings between Metro Vancouver and the Province to share progress and discuss challenges.

The following sections explain how Metro Vancouver and member jurisdictions will use the new LWMP Annual Report, LWMP Dashboard, and Progress Meetings to ensure progress toward LWMP goals.

LWMP Annual Report

Metro Vancouver will submit an Annual Report to the Province outlining the progress of Metro Vancouver and member jurisdictions in implementing LWMP actions. Once approved by the Province, the report will be posted publicly on Metro Vancouver's website. The report will contain the following three elements, which are described in detail in Appendix C:

1. **Action Status Table**
   This is a snapshot showing the current status ('Complete,' 'In Progress,' or 'Not Started') of each action and sub-action in the LWMP, for Metro Vancouver and each member jurisdiction. Evidence supporting the reported status of actions will be provided by Metro Vancouver or member jurisdictions should the Province request it.

2. **Performance Indicators Table**
   This table will show the numerical values of the LWMP performance indicators (listed in Appendix B) for Metro Vancouver and member jurisdictions, compiled annually.

3. **LWMP Progress Context and Insights**
   Metro Vancouver and members will prepare contextual information and insights on implementation of select LWMP actions. Content will include:
   - Progress on key priority LWMP actions and highlights for ongoing actions (the 30 actions to be reported in this section are shown in Appendix C, Table C.1)
   - Explanations of missed deadlines for action completion
   - Changes in approach from the original approved LWMP actions

- 2002 LWMP reporting commitments C14, C18, C23 and 2011 LWMP reporting commitments 3.5.4 (b) and 3.5.8 (b) will continue to be reported unless different reporting requirements are agreed to with the Province.

Metro Vancouver will create templates for all three elements of the LWMP Annual Report that members will complete, and will coordinate the compilation of submissions from Metro Vancouver and each member jurisdiction on an annual basis. The timing for completion will be established through discussion with the Province and member jurisdictions and will be aligned with completion of the Environmental Management and Quality Control (EMQC) Annual Report.

The EMQC Annual Report will continue to be prepared and posted publicly to meet Metro Vancouver's regulatory reporting requirements. Some LWMP actions refer to the EMQC Annual Report directly and will be reported upon primarily in the EMQC Annual Report to reduce redundancies. Table C.1 in Appendix C indicates which LWMP actions will continue to be reported in the EMQC Annual Report.

LWMP Dashboard

LWMP performance indicators will be compiled into an easily accessible dashboard format on Metro Vancouver's website (see example in Appendix C). The format of the LWMP Dashboard will be improved, integrated, and updated over time in alignment with other Metro Vancouver dashboards.

The full list of LWMP performance indicators is shown in Appendix B. The LWMP Dashboard will contain performance indicators for both Metro Vancouver and member jurisdictions. The numerical values displayed in the LWMP Dashboard will be updated at least annually, in alignment with the LWMP Annual Report. Metro Vancouver will coordinate the compilation and publishing of information on Metro Vancouver's website. There will also be links to the inflow and infiltration dashboards, inflow and infiltration public reports and the rainwater dashboards once they are created (see Actions 6.1, 6.2 and 11.3). Key rainwater indicators from the rainwater dashboards will be included directly in the LWMP Dashboard (as described in Strategy 11 and Appendix B).

Progress Meetings

Regular meetings are planned as a key element in monitoring progress on LWMP actions, aimed at improving accountability and collaboration. See Appendix C for further details on the planned meetings:

1. **Metro Vancouver – Member Jurisdiction Meetings**
   Metro Vancouver and member jurisdictions will use staff-to-staff meetings to update each other on progress on actions, reach consensus on how to implement shared actions, learn from each other about successes and challenges, and collaborate on solutions. Metro Vancouver will coordinate meeting to discuss the LWMP at least once per year.

2. **Metro Vancouver – Ministry of Environment and Climate Change Strategy Meetings**
   Metro Vancouver and the Ministry of Environment and Climate Change Strategy currently meet quarterly to discuss Metro Vancouver's liquid waste function. Following adoption of this LWMP, at two of these meetings per year, Metro Vancouver will include LWMP progress reporting on

the agenda to highlight successes, discuss challenges, and receive input from the ministry on proposed solutions.

There may be LWMP topics that warrant the scheduling of additional meetings between the ministry, Metro Vancouver, and interested First Nations.

Monitoring and Reporting Roles and Responsibilities

Through the LWMP Annual Report, LWMP Dashboard, and Progress Meetings, Metro Vancouver and member jurisdictions will streamline regulatory reporting requirements, improve transparency and accountability, and formalize opportunities for collaboration on implementation of actions.

The following table provides an overview of roles and responsibilities for monitoring and reporting on LWMP Progress:

Item	Frequency	Roles and Responsibilities				
		Metro Vancouver	**Member Jurisdictions**	**Province (Ministry [§])**	**First Nations**	**Public**
LWMP Annual Report	Annual	Contribute and compile	Contribute	Receive and review	Access on website	Access on website
LWMP Dashboard	Annual (at least)	Contribute and compile	Contribute	N/A	Access on website	Access on website
LWMP Progress Meetings – Metro Vancouver and Member Jurisdictions	Annual (at least)	Coordinate and participate	Coordinate and participate	N/A	Invited periodically according to mutually agreed schedules	N/A
LWMP Progress Meetings – Metro Vancouver and Ministry[§]	Twice per year	Coordinate and participate	N/A	Participate	Invited periodically according to mutually agreed schedules	N/A

[§]Ministry of Environment and Climate Change Strategy

Financial Implications

Overview

The updated LWMP continues Metro Vancouver's longstanding commitment to achieving compliance with the *Municipal Wastewater Regulation* in a manner that is fiscally responsible and fair across generations. The plan acknowledges the broader financial pressures on taxpayers, who are also contributing to other essential services in the region such as hospitals and transportation infrastructure. The LWMP actions balance progress towards *Municipal Wastewater Regulation* compliance with the need to manage costs effectively.

Through the LWMP update process, new actions have been identified and efforts related to ongoing initiatives have been expanded to accelerate progress toward full compliance under the *Municipal Wastewater Regulation*. The financial impact of these new and expanded actions were assessed to understand the financial implications on the GVS&DD levy.

Several initiatives will primarily be carried out using current staff resources that are funded through existing sources in annual program budgets, resulting in no net increase in spending. Additional funding of approximately $5 million annually will be necessary for new actions and to expand existing programs. A significant portion of the additional funding will be allocated to enhancing environmental management programs. This funding will support LWMP commitments and address feedback received from First Nations and interested parties, including the public advisory committee. The increases will have a minimal impact on the overall GVS&DD operating budget, as they represent less than 1 per cent of the total budget for the liquid waste function.

Capital and Member Jurisdiction Cost Exclusions

No additional capital projects are anticipated to fulfill the LWMP commitments during the plan's 10-year implementation period. The financial projections in this LWMP exclude existing capital projects that are already included in Metro Vancouver's Five-Year Financial Plan and Ten-Year Projections. For example, the North Shore Wastewater Treatment Plant and the Iona Island Wastewater Treatment Plant secondary upgrade are already included. Furthermore, member costs have been excluded from these estimates due to significant variation in resources and funding approvals across different member jurisdictions. The focus of this section is to understand implications on the GVS&DD levy due to new and revised actions identified in this LWMP.

Reducing Demand and Shifting Responsibilities

The LWMP emphasizes strategies to reduce demand on the system, such as managing inflow and infiltration in private laterals, which will help reduce the need for costly expansion to regional infrastructure. These strategies will gradually shift some financial responsibilities from the regional level to private property owners or individual members, allowing for a more localized approach to addressing system capacity and compliance challenges. The end result is a net reduction in costs for the region due to a shift in costs from regional infrastructure expansions to management of inflow and infiltration at the municipal level.

Summary

While the LWMP outlines significant new actions and improvements, the overall financial impact on the GVS&DD budget is minimal. Most funding is integrated into existing programs, with a marginal increase

required for environmental management programs. This approach ensures continued environmental leadership and progress toward *Municipal Wastewater Regulation* compliance while keeping household costs manageable and avoiding major impacts on regional budgets.

Glossary

Adaptive Management Framework (AMF) provides an approach for monitoring watershed health, monitoring the progress and effectiveness of Integrated Watershed Management Plans (IWMPs), identifying impacts and threats to watershed health, and identifying mitigation approaches. It is a continuous improvement process that promotes flexible decision making that can be adjusted over time as the outcomes of IWMP actions are better understood.

Advanced treatment, in British Columbia, means any form of treatment other than dilution that produces effluent with BOD_5 and TSS both less than 10 mg/L, which are measures of organic material and suspended solids, respectively.

Air contaminants are any substances emitted into the air that do or could harm public health (including material physical discomfort) and property, damage the environment (including the climate), impede normal business operations, or impair visual air quality.

Ammonia is a compound of nitrogen and hydrogen (NH_3) commonly found in wastewater. It is an indicator of organic pollution and can be toxic to aquatic life at high concentrations.

Asset management plans are developed by utilities and municipalities to maintain and replace infrastructure assets, such wastewater systems, to ensure their reliability, sustainability, and cost-effectiveness over their life cycle.

Average dry weather flow is the average daily flow of wastewater in a sewer system or input to a treatment plant during dry weather conditions, which indicates the flow of sanitary sewage and excludes additional flow from rainfall or snowmelt infiltration.

Biochemical Oxygen Demand (**BOD)** is a measure of the amount of oxygen that microorganisms need to decompose the organic material present in wastewater. If it were not removed, BOD would use up the oxygen in the water that fish and other aquatic life need. BOD_5 is the BOD measured over a 5-day period, and is one of the parameters regulated in effluent from Metro Vancouver's wastewater treatment plants.

Biogas is a mixture of methane and carbon dioxide produced by the anaerobic digestion of sewage sludge at a wastewater treatment plant. Biogas can be cleaned up for use as renewable natural gas.

Biosolids are the treated solids recovered from wastewater. The solids have been treated by microorganisms and heat to eliminate pathogens and reduce odours. The final product is similar to soil and is rich in nutrients and organic matter.

Blue infrastructure refers to natural and engineered systems that manage water, including natural water bodies like rivers, lakes, and wetlands, as well as engineered solutions such as constructed wetlands and retention ponds.

Canadian Council of Ministers of Environment Canada-wide Strategy for Management of Municipal Wastewater (CCME CWS-MMWW) provides a harmonized framework to manage municipal wastewater discharges to surface waters with federal discharge criteria. It articulates the collective agreement reached by the 14 ministers of environment in Canada to ensure that wastewater facility owners have

regulatory clarity in managing municipal wastewater effluent discharges under a consistent framework that is protective of human health and the environment.

Catchment refers to an area of land where collected rainwater and groundwater feed to a single point in the sewer system.

Circular economy is a system that retains and recovers value from resources through reusing, repairing, repurposing, recycling and remanufacturing products and materials. The circular economy tackles climate change and other environmental challenges by decoupling economic activity from the consumption of finite resources, by eliminating waste and pollution, and helping to regenerate natural systems.

Circular water economy is an approach to wastewater management that emphasizes the recovery, reuse, and recycling of wastewater and the resources it contains, including energy, nutrients and water, to create a sustainable and resilient wastewater system that provides value for citizens, the environment, and businesses.

Climate change adaptation means anticipating, planning for and responding to the adverse effects of climate change and taking appropriate action to prevent or minimize the damage it can cause, or taking advantage of opportunities that may arise. It has been shown that well planned, early adaptation action saves money and lives later.

Climate change mitigation means working to limit the amount of climate change that occurs by reducing greenhouse gas emissions into the atmosphere.

Climate projections refers to the future temperature and precipitation patterns in the region due to the impacts of climate change.

Climate resilience describes the capacity of ecosystems, economies, infrastructure, and communities to absorb the impacts of climate change while maintaining essential services and functions needed to support health and well-being. In some cases, climate resilience involves changing services and functions so they are more sustainable.

Climate vulnerability assessments identify areas or populations most likely to be impacted by projected changes in climate and build an understanding of why these areas are vulnerable, including the interaction between climate change, non-climatic stressors, and cumulative impacts. Assessments evaluate the effectiveness of previous coping strategies and target potential adaptation measures.

Climate vulnerability is the degree to which ecosystems, economies, infrastructure, and communities are susceptible to, or unable to cope with, the adverse effects of climate change. Vulnerability varies based on exposure, sensitivity, and adaptive capacity. Geographic location, socio-economic conditions, and other factors can impact susceptibility to harm and adaptive capacity.

Collection system is the network of pipes, pumps, and other equipment used to collect and transport wastewater from homes, businesses, and industries to a treatment plant. The collection system can refer to sanitary sewers or combined sewers.

Combined sewers carry both sanitary wastewater and rainwater in a single pipe and exist only in older parts of Vancouver, Burnaby, and New Westminster. During dry weather, combined sewers convey all sanitary wastewater to wastewater treatment plants.

Combined sewer overflow is a discharge of sewage from a combined sewer into a water body, caused by excess water entering the combined sewer system during heavy rainfall. The combined sewer system was designed to overflow in this manner to avoid sewage backups into homes and businesses.

Conveyance is the process of transporting wastewater in sewers from its source to a treatment plant or discharge point.

Daylighting is the practice of uncovering and restoring buried urban streams to their natural state, which improves water quality, reduces peak flows, and improves ecosystem health.

Effluent is treated wastewater that is released from a wastewater treatment plant into the Fraser River, Burrard Inlet, or Strait of Georgia.

Gigajoule (GJ) is a unit of energy equal to one billion Joules, commonly used to measure the energy content of fuels.

Grease interceptor a device installed in a plumbing system to capture grease and solids before they enter the sewer system, preventing blockages and treatment issues.

Green infrastructure includes natural, enhanced and engineered systems and practices that manage rainwater and mitigate negative impacts of urban development. These natural assets (e.g., forests, wetlands, and soil), enhanced assets (e.g., urban trees and bioswales), and engineered systems (e.g., green roofs, rain gardens, and permeable pavement) help absorb and filter stormwater to reduce flooding, improve water quality, and enhance urban biodiversity.

Greenhouse gases are air contaminants that trap heat and cause climate change. Greenhouse gases include carbon dioxide and nitrous oxide, as well as short-lived climate forcers such as methane.

Grey infrastructure means engineered infrastructure, such as pipes, pumps, and treatment plants, used to manage rainwater and wastewater. For rainwater management, grey infrastructure includes storm sewers and retention basins.

Hydraulic gradeline is a line representing the level to which water would rise in a system of pipes, channels, and other conduits in the sewer collection system or treatment plant, reflecting the total energy of the water; hydraulic grade lines above basement or ground surface elevations can result in flooding.

Infiltration is rainwater or groundwater that enters a sanitary sewer due to leaky or damaged pipes.

Inflow is rainwater that enters a sanitary sewer due to improperly connected roof or foundation drains.

Integrated Watershed Management Plans (IWMPs) provide direction for future development to balance land use planning, stormwater engineering, flood and erosion protection, and environmental protection. IWMPs were formerly referred to as Integrated Stormwater Management Plans.

Interceptors are large pipes in combined sewer systems that are designated by Metro Vancouver to convey sanitary flow from areas that have separated sewers and the dry weather portion of combined flow from areas that still have combined sewers to the treatment plant.

Land application is the practice of applying biosolids to land to improve soil health and provide nutrients for vegetation or crops, governed by British Columbia's *Organic Matter Recycling Regulation.*

Master Municipal Construction Documents is a standardized set of general conditions, standard specifications and drawings, and design guidelines for the design, construction, and management of municipal infrastructure projects in British Columbia.

Master Sewer Servicing Plan is a comprehensive plan outlining the development, maintenance, and improvement of a municipality's sewer system to meet current and future needs.

Monitors are devices or meters used to measure and record environmental parameters, such as flow rates, water quality, and pollution levels in wastewater systems.

Natural hazards include rainstorms, extreme weather, storm surges, landslides, and floods – which are made worse by climate change – and seismic events.

Nature-based solutions are approaches to rainwater management that use natural processes and green infrastructure to enhance ecosystem health, improve water quality, and provide multiple benefits to communities.

Nutrients are substances such as nitrogen and phosphorus that are essential for the growth of plants and animals, but can cause water quality issues when present in excessive amounts.

Nutrifor is the brand name for the biosolids that Metro Vancouver produces.

Official Community Plan is a comprehensive policy document adopted by a municipal council or regional board that outlines the long-term vision, objectives, and policies for land use, development, and infrastructure within a community. An Official Community Plan addresses various aspects of community planning, including housing, transportation, parks, and utilities, and provides guidance on managing growth and development in a sustainable and orderly manner. The plan must align with provincial legislation and regional growth strategies.

Operational Certificate is issued by the Ministry of Environment and Climate Change Strategy for each treatment plant. The Operational Certificate requires effluent released from the treatment plant to meet certain standards.

Organics loading is the amount of organic matter, measured as BOD, entering a wastewater treatment plant, which influences the plant's design and operation.

Peak dry weather flow is the highest flow rate of wastewater observed during dry weather conditions, used for the design and capacity assessment of sewer collection and treatment systems.

Primary treatment removes materials that float or readily settle out by gravity, and up to 50 per cent of dissolved organic materials.

Private laterals are pipes that connect buildings on private property to municipally owned sewers. Private laterals are typically maintained by property owners.

Rainfall-derived inflow and infiltration comes from rainwater that enters pipes, as opposed to infiltration from groundwater sources (see Inflow and Infiltration).

Rainwater is water that originates from precipitation events, including rain and snowmelt, which flows over land surfaces. In urban areas, rainwater becomes stormwater when it runs off impervious surfaces such as rooftops, roads, and parking lots, and is typically directed into storm sewers.

Receiving environment means the natural water bodies, such as rivers or oceans, into which treated wastewater is discharged (or untreated wastewater in the case of overflows).

Reclaimed water refers to wastewater that has been treated and purified to a level suitable for reuse for various non-potable purposes, such as industrial processes, landscaping, or agricultural irrigation. British Columbia's *Municipal Wastewater Regulation* establishes prescriptive water quality requirements to ensure reclaimed water is safe for its intended uses.

Regional Growth Strategy for the Metro Vancouver region, Metro 2050, is the region's shared vision of how projected population, housing, and job growth will be managed over the next 30 years, to create complete, connected, and resilient communities, while protecting important lands and supporting the efficient provision of urban infrastructure like transit and utilities.

Renewable natural gas is created from biogas that has been cleaned up so that it is mostly methane and can be injected into the natural gas distribution network for use in homes and businesses.

Sanitary loading refers to the portion of sewage in combined sewers that originates from residential, commercial or industrial sources, excluding rainwater.

Sanitary sewage is generated from domestic activities, such as toilets, sinks, showers, and washing machines, as well as from commercial and industrial processes; it excludes rainwater and stormwater.

Sanitary sewers collect wastewater from residential, commercial, and industrial sources, and transport it to wastewater treatment plants for processing.

Sanitary sewer overflow occurs when untreated wastewater is improperly discharged directly into the environment – usually the nearest water body, or sometimes onto land – instead of being processed at a wastewater treatment plant. Sanitary sewer overflows can happen when inflow and infiltration from heavy rainfall overloads the sanitary sewer system.

Secondary treatment uses biological processes to remove 90 per cent or more of materials, including soluble organic materials and small suspended solids that do not readily settle.

Sewer separation replaces combined sewers with separate pipes for sanitary sewage and stormwater, reducing the risk of overflows.

Stormwater is water from rain or melting snow that is not absorbed into the ground. In urban areas, stormwater runs off impervious surfaces such as rooftops, roads, and parking lots, and is typically directed into storm sewers, which empty directly into creeks, rivers, or the ocean.

Stormwater Interagency Liaison Group is mandated in the LWMP since 2002 to advise and work through technical stormwater issues with Metro Vancouver member jurisdictions, and senior government agencies.

Surcharging is a condition in which the pressure in a sewer system causes the water level to rise above the top of the pipe, usually due to excessive flow, leading to potential overflows or backups.

Tertiary filtration is a physical treatment process that improves treated wastewater quality beyond that achieved by primary or secondary treatment by removing additional suspended solids and associated organic matter.

Tertiary treatment removes specific substances including solids, nutrients such as ammonia, and contaminants, after secondary treatment as needed to protect receiving waters where effluent is discharged. Tertiary treatment can involve physical, chemical or biological processes.

Total Suspended Solids (TSS) is a measure of the solids in water that are too small to settle out by gravity. The wastewater treatment process is designed to remove suspended solids, because otherwise the suspended solids would block light in the water and interfere with the growth of aquatic life. TSS is one of the parameters regulated in effluent from Metro Vancouver's wastewater treatment plants.

Trunk sewers are Metro Vancouver sewers designated to convey both sanitary and stormwater flows in areas of the region with combined sewers. Dry weather flow (i.e., sanitary flow) is discharged to interceptor sewers while excess wet weather flows are discharged to receiving waters as combined sewer overflows.

Wastewater is used water that is collected from toilets and drains in homes and businesses, and conveyed in sewers to wastewater treatment plants for processing. Wastewater can contain various pollutants and waste products, including soap, food scraps, human waste, oils and other chemicals.

Wastewater treatment removes substances that can harm human health and the environment before releasing treated wastewater, or effluent, to receiving water bodies. Wastewater treatment processes can be classified as primary, secondary, tertiary, or advanced.

Water metering is the practice of measuring the volume of potable water used by households, businesses, or industries, often for billing and conservation purposes.

Watershed is a land area where all rainwater and snowmelt drains into a common water body such as a creek, river, or ocean.

Appendix A – Wastewater Treatment Plant Upgrade and Expansion Schedule

Project name and scope	Increase in maximum discharge rate in OC	Authorization classification			Anticipated project initiation date [b]	Anticipated operational date [b]
		LWMP Amendment [a]	Operational Certificate Amendment	New Operational Certificate		
North Shore Wastewater Treatment Plant Phase 1 • New preliminary, primary and secondary treatment, tertiary filtration and solids treatment facilities	<0.01%		Y		2011	2030
Annacis Island Wastewater Treatment Plant Stage 5 • Additional preliminary, primary and secondary and solids treatment capacity	55%		Y		2012	2030 – 2035
Northwest Langley Wastewater Treatment Plant Phase 1 • Additional preliminary, primary and secondary treatment capacity • New solids treatment capacity and tertiary filtration	636% [c]	Y	Y		2014	2030 – 2035
Annacis Island Wastewater Treatment Plant Regional Biosolids Dryer • Dryer will process biosolids to produce granular pellets that can be used as low carbon fuel and as fertilizer product	N/A			Y [d]	2019	2032 – 2037
Iona Island Wastewater Treatment Plant Stage 7 • Preliminary, primary and secondary treatment and tertiary filtration facilities • Additional solids treatment capacity • Scope refinement – phasing and existing wastewater treatment plant re-use options assessment	0%		Y		2015	2035 – 2040
Annacis Island Wastewater Treatment Plant Partial Ammonia Removal • Scope to be determined	0%		Y		2024	2038 – 2043
Annacis Island Wastewater Treatment Plant Stage 7 [e] • Scope to be determined	17%	Y	Y		2025 – 2035	2040 – 2050
Northwest Langley Wastewater Treatment Plant Phase 2 [e] • Scope to be determined	88%	Y	Y		2030 – 2040	2045 – 2055
Lulu Island Wastewater Treatment Plant Stage 5 • Scope to be determined	18%	Y	Y		2035 – 2045	After 2050

(a) An Environmental Impact Study will be performed for projects listed as an LWMP amendment.
(b) Anticipated dates will be adjusted subject to engineering studies.
(c) This increase includes flow from new developments and diversion of some flow from Annacis Island Wastewater Treatment Plant to Northwest Langley Wastewater Treatment Plant.
(d) This is a new, additional, separate Operational Certificate for the dryer.
(e) Timing of upgrade is subject to Master Sewer Servicing Plan.

Appendix B – Performance Indicators

Performance indicators listed under each strategy are compiled here for ease of reference.

Issue Area	Strategy	No.	Description	Units	Frequency	Responsibility	Status
System Resilience	1. Provide services for a growing population in a changing climate	1A	Percentage of sanitary sewer pipe inspected annually	%	Annual	Metro Vancouver and members	Adapted from 2011 Performance Measure: Metres of sewer pipe inspected and renewed annually
Demand Side Management and Source Control	3. Use demand side management to reduce flows and loadings	3A	Average dry weather flow per capita, total influent TSS per capita per day, and total influent BOD per capita per day; at each wastewater treatment plant	L/person/day g/person/day g/person/day	Annual	Metro Vancouver	New
Sanitary Sewer Overflows	5. Reduce rainfall-derived inflow and infiltration into private lateral sewers	5A	Peak wet weather flow, average dry weather flow, and ratio of peak wet weather flow to average dry weather flow; at key regional monitoring points and at wastewater treatment plants	MLD MLD ratio peak wet weather flow to average dry weather flow	Annual	Metro Vancouver	Adapted from 2011 Performance Measures: Wet weather peaking factors at key regional monitoring points; Average (24 hour) flows at regional flow monitoring stations and at wastewater treatment plants
Sanitary Sewer Overflows	7. Minimize impacts of sanitary sewer overflows on human health and environment	7A	Number, duration, and estimated volume of sanitary sewer overflow discharge events at chronic overflow sites, where feasible; and, total number of sanitary sewer overflow discharge events and total volume of sanitary sewer overflow discharges for entire system.	#, hours, m^3 #, m^3	Annual	Metro Vancouver and members	Adapted from 2011 Performance Measure: Number of sanitary sewer overflows – frequency, location, volume
Combined Sewer Overflows	8. Assess combined sewer overflows' impact on receiving environment	8A	Number, duration and volume of combined sewer overflow discharge events at each combined sewer overflow site; and, total number of combined sewer overflow discharge events and total volume of combined sewer overflow discharges for entire system.	#, hours, m^3 #, m^3	Annual	Metro Vancouver, Burnaby, New Westminster, and Vancouver	New
Combined Sewer Overflows	8. Assess combined sewer overflows' impact on receiving environment	8B	Sanitary wastewater volume and loading* in combined sewer overflow discharges *Note, loading will be determined using best available information from either monitoring [action 8.3] or modelling [action 8.7]. Parameters and units of reporting to be determined.	m^3, loading units TBD	Every 2-4 years (TBD)	Metro Vancouver	Adapted from 2011 Performance Measure: Sanitary sewage volumes in combined sewer overflows.
Combined Sewer Overflows	9. Separate combined sewers to eliminate combined sewer overflows	9A	Percentage of public sewer system that is separated Note: this indicator will transition to "Percentage of population with 100 per cent sanitary sewage delivered to Metro Vancouver interceptors" within five years.	%	Annual	Metro Vancouver, Burnaby, New Westminster, and Vancouver	New

Issue Area	Strategy	No.	Description	Units	Frequency	Responsibility	Status
Rainwater	10. Manage rainwater and development for watershed health	10A	Number of IWMPs completed, the area that completed IWMPs cover, and percentage of IWMP activities implemented Note: additional performance indicators will be added upon development of the rainwater dashboards.	# hectares %	Annual	Members	Adapted from 2011 Performance Measure: Number and area [hectares] of integrated stormwater management plans completed.
Wastewater Treatment	14. Operate and maintain wastewater treatment plants to meet or surpass regulatory requirements	14A	Compliance with BOD and TSS limits specified in Operational Certificates for wastewater treatment plants	% of time	Annual	Metro Vancouver	Adapted from 2011 Performance Measure: Compliance with parameter specified in the Operational Certificate for wastewater treatment plants
Biosolids	15. Diversify options to beneficially use Nutrifor biosolids	15A	Beneficial use of Nutrifor biosolids (percentage of total biosolids generated)	%	Annual	Metro Vancouver	New
Biosolids	15. Diversify options to beneficially use Nutrifor biosolids	15B	In-region use of Nutrifor biosolids (percentage of total biosolids generated)	%	Annual	Metro Vancouver	New
Circular Water Economy	16. Implement proven technologies towards a circular economy	16A	Amount of energy recovered from liquid waste system [Sum of GJ from all energy types (e.g., biogas, sewer heat, biocrude), recovered by Metro Vancouver or members, for use by any end customer]	GJ	Annual	Metro Vancouver and members	Adapted from 2011 Performance Measure: Quantities and types of energy and materials recovered from the liquid waste system.
Environmental Management	18. Minimize impacts of liquid waste management on atmosphere and air quality	18A	Greenhouse gas emissions from operation of Metro Vancouver's liquid waste management systems	tonnes CO_2e	Annual	Metro Vancouver	New
Environmental Management	19. Environmental monitoring to protect public health and the environment	19A	Number of beach closure days per year and locations	#	Annual	Metro Vancouver	Adapted from 2011 Performance Measure: Beach closure days and locations

Appendix C – Reporting on LWMP Actions

This appendix provides further details on the reporting elements in the 'Monitoring and Reporting' section.

Annual Report

1. **Action Status Table**
   This table will have a row for each action and sub-action in the LWMP, and columns for Metro Vancouver and each member jurisdiction. Metro Vancouver and member jurisdictions will annually report on the status of all actions and sub-actions applicable to them as 'Complete,' 'In Progress,' or 'Not Started.' If the LWMP specified a due date for completing an action, this will be entered into the 'Timeline' column. If context is needed to supplement the action status, this can be provided under the '3. LWMP Progress Context and Insights' section, as described below.

   Excerpt from example Action Status Table:

Action	Sub-Action	Timeline	Metro Vancouver	Member Jurisdiction
5.1	n/a	Within two years		
5.2	a)	Within three years		
	b)	Within three years		

Legend:	**Complete**	In Progress	Not Started	Not applicable

   This approach to reporting on actions intentionally does not include explanatory comments, to provide an at-a-glance snapshot for readers to quickly understand general progress among Metro Vancouver and member jurisdictions.

   For actions noted as 'Complete,' Metro Vancouver and member jurisdictions will be prepared to provide the Province with evidence of completion. This may be a report, metrics, maps, or other data or information as appropriate for the particular action.

   In cases where a timeline is not met or an action has not changed for a long period of time from 'Not Started' or 'In Progress,' Metro Vancouver and member jurisdictions will be prepared to provide explanation, rationale, evidence of works in progress or reasons for delays to the Province as necessary.

2. **Performance Indicators Table**
   LWMP performance indicators for Metro Vancouver and member jurisdictions will be compiled annually into a single table that contains numerical values arranged in a format similar to the Action Status Table. The full list of performance indicators is available in Appendix B. Key

indicators from rainwater dashboards (as described in Strategy 11 and Appendix B) will also be included in this table.

3. LWMP Progress Context and Insights

Metro Vancouver and members will prepare contextual information and insights on implementation of select LWMP actions. Content in this section will include:

- *Progress on key priority LWMP actions and highlights for ongoing actions*
  An initial set of 30 out of 87 LWMP actions are proposed for reporting in this qualitative section. The initial list is available in Table C.1 but may change over time through discussion with the Province and member jurisdictions.

  Priority actions selected for reporting include some on inflow and infiltration, combined sewer overflows, integrated watershed management planning and wastewater treatment plant upgrade schedules.

  Some actions are ongoing and can never be considered 'Complete' – for example, some actions related to circular water economy and environmental management. In these cases, when action status is not expected to ever change from 'In Progress,' highlights from the past year's activities will be reported in this section.

  Metro Vancouver and member jurisdictions will use this section to describe work completed, work underway on actions in progress, challenges and successes, provide links to completed reports or documents, and explain quantitative data if needed.

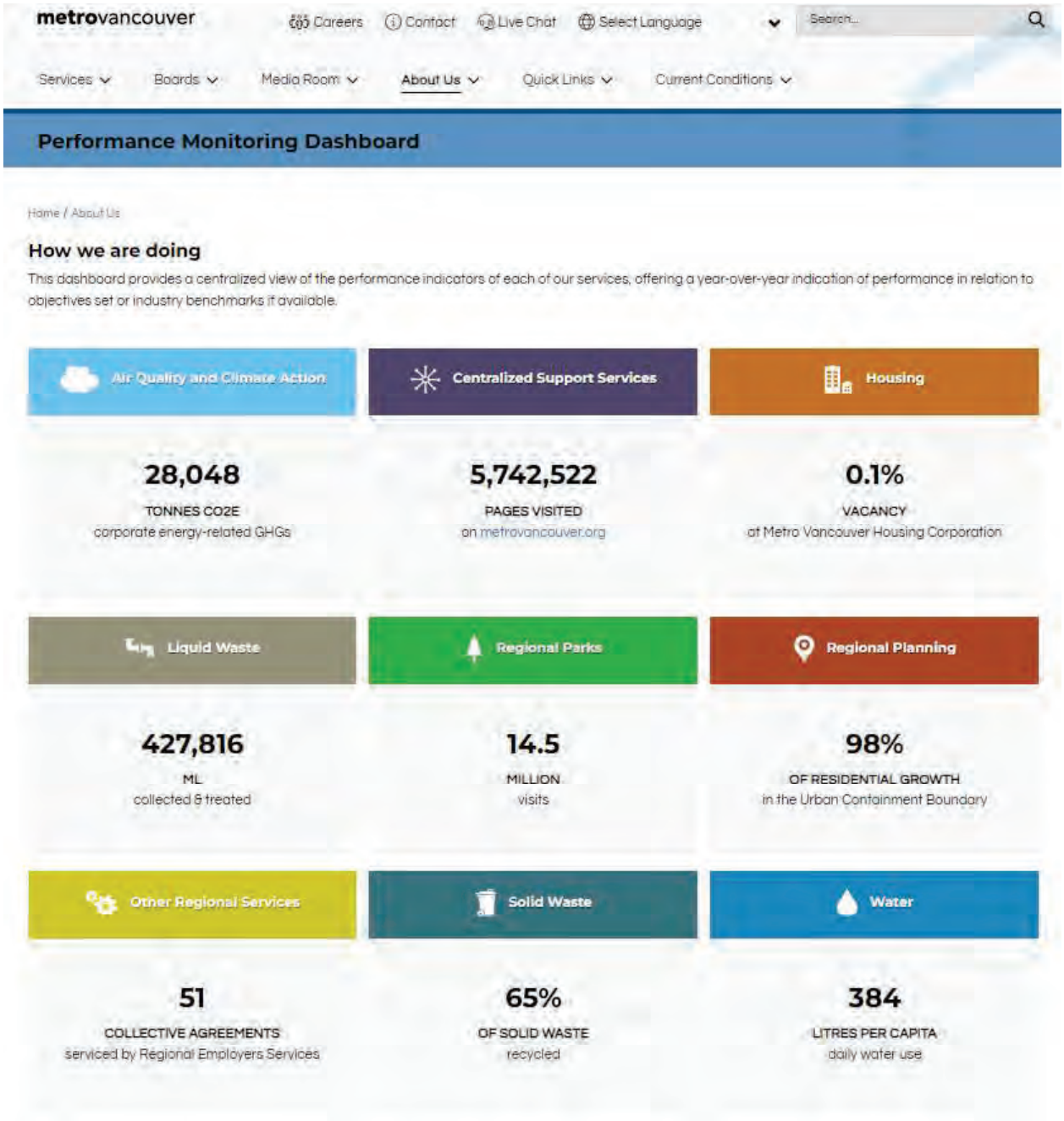
- *Explanations of missed deadlines for action completion.*
  Some actions have specific timeframes for completion. If implementation has been delayed, explanations will be provided in this section and new timelines established.

- *Changes in approach from the original approved LWMP actions.*
  Sometimes, actions that were drafted initially and approved in the LWMP may be later discovered to not be fully feasible or not be the best approach to achieving intended objectives. This section will describe cases where Metro Vancouver or members are proposing to modify individual actions, the impact of the proposed change, and, how First Nations, the public, and interested parties will be engaged regarding the change.

- 2002 LWMP reporting commitments C14, C18, C23 and 2011 LWMP reporting commitments 3.5.4 (b) and 3.5.8 (b) will continue to be reported unless different reporting requirements are agreed to with the Province (refer to 2002 and 2011 past actions in Appendix D for descriptions of these commitments).

LWMP Dashboard

Initially, the format will be similar to other Metro Vancouver Performance Monitoring Dashboards. The screenshot below shows an example of a Metro Vancouver performance monitoring dashboard.



Progress Meetings

1. **Metro Vancouver – Member Jurisdiction Meetings**
   The existing Regional Engineers Advisory Committee (REAC) Liquid Waste Sub-Committee comprises Metro Vancouver and member jurisdiction liquid waste staff and typically meets six times per year.
   - This will be the primary forum for member jurisdictions and Metro Vancouver to discuss progress on LWMP action implementation.
   - The content and timing of LWMP progress updates at these meetings will be established through discussion between Metro Vancouver and member jurisdictions.
   - Outcomes from REAC Liquid Waste Sub-Committee meetings are reported to REAC and, ultimately, to the GVS&DD Board if needed.

   Strategies and actions related to rainwater (i.e., stormwater and watershed) management have been drafted with additional emphasis towards improving how progress is measured, including actions specifically committing to oversight. The approach for meetings is described in Strategy 12: *Enhance interagency collaboration to improve watershed health across the region* through actions that commit member jurisdictions and Metro Vancouver to:
   - Coordinate revision of the terms of reference for the interagency group (currently called the Stormwater Interagency Liaison Group) to include coordination of region-wide accountability on Integrated Watershed Management Plan (IWMP) actions; and,
   - Host a forum at regular intervals (at least every three years) to report progress on IWMPs and LWMP rainwater actions, and to foster collaboration and knowledge sharing among members, First Nations, and interested parties.

2. **Metro Vancouver – Ministry of Environment and Climate Change Strategy Meetings**
   Discussing the LWMP at two meetings per year of the four regularly-scheduled quarterly meetings between the Province and Metro Vancouver will help ensure Metro Vancouver is meeting its regulatory obligations and allow for more frequent communication with the Province regarding:
   - how timelines for action implementation may be changing;
   - whether actions require revisions; and,
   - planned engagement activities if timelines or actions may be revised.

Table C.1

This table shows how each action, sub-action, and performance indicator will be reported over the duration of the LWMP.

Action and sub-action		LWMP Annual Report		Other Reporting Mechanism	Performance Indicators (LWMP Annual Report and Dashboard)
		Action Status Table	Context and Insights Section		
Strategy 1: Provide services for a growing population in a changing climate.					1A
1.1	a)	✓			
	b)	✓			
	c)	✓			
1.2	-	✓			
1.3	a)	✓			
	b)	✓			
1.4	-	✓			
Strategy 2: Improve resilience of wastewater system to climate change and natural hazards					
2.1	-	✓			
2.2	-	✓ Reported by sewerage area			
2.3	-	✓			
Strategy 3: Use demand side management to reduce flows and loadings					3A
3.1	-	✓			
3.2	-	✓			
3.3	-	✓			
3.4	a)	✓			
	b)	✓			
	c)	✓			
3.5	-	✓	✓ Describe progress and results		
Strategy 4: Prevent pollution at the source					
4.1	-	✓			
4.2	a)	✓			
	b)	✓			
	c)	✓			
Strategy 5: Reduce rainfall-derived inflow and infiltration into private lateral sewers					5A
5.1	-	✓	✓		
5.2	a)	✓	✓		
	b)	✓	✓		
	c)	✓	✓		
5.3	a)	✓	✓		
	b)	✓	✓		
	c)	✓	✓		
5.4	a)	✓	✓		
	b)	✓	✓		
5.5		✓	✓		
Strategy 6: Enhance transparency and accountability for reducing inflow and infiltration					Inflow and Infiltration Dashboards
6.1	a)	✓	✓ Describe progress and results		
	b)	✓	✓ Describe progress and results		
	c)	✓	✓ Describe progress and results		
6.2	a)	✓	✓ Describe progress and results	✓ Inflow and Infiltration Dashboard, Progress Meetings	
	b)	✓	✓ Describe progress and results	✓ Inflow and Infiltration Dashboard, Progress Meetings	
	c)	✓	✓ Describe progress and results	✓ Inflow and Infiltration Dashboard, Progress Meetings	
6.3	-	✓		✓ Inflow and Infiltration Dashboard, Progress Meetings	
6.4	-	✓	✓ Wet weather pricing findings and modifications		
Strategy 7: Minimize impacts of sanitary sewer overflows on human health and the environment					7A
7.1	-	✓		✓ Posted on website	
7.2	-	✓			
7.3	-	✓	✓ Report on sanitary sewer overflows (volumes, causes)		

Action and sub-action		LWMP Annual Report		Other Reporting Mechanism	Performance Indicators (LWMP Annual Report and Dashboard)
		Action Status Table	Context and Insights Section		
7.4	-	✓		✓ Assessments available to Ministry of Environment and Climate Change Strategy	
7.5	-	✓	✓ Describe progress and results		
Strategy 8: Assess impact of combined sewer overflows on receiving environment					8A, 8B
8.1	-	✓		✓ Posted on website	
8.2	-	✓	✓ Report on combined sewer overflows (volumes, causes)		
8.3	-	✓			
8.4	a)	✓	✓ Report on combined sewer overflows (volumes, causes)		
	b)	✓	✓ Report on combined sewer overflows (impacts)		
8.5	-	✓		✓ EMQC Annual Report	
8.6	-	✓			
8.7	-	✓			
8.8	a)	✓	✓ Describe progress and results		
	b)	✓	✓ Describe progress and results		
8.9	a)	✓	✓ Describe progress and results		
	b)	✓	✓ Describe progress and results		
Strategy 9: Separate combined sewers to eliminate overflows					9A
9.1	-	✓			
9.2	-	✓	✓ Targets will be reported		
9.3	a)	✓			
	b)	✓			
	c)	✓			
9.4	-	✓			
9.5	-	✓			
9.6	a)	✓			
	b)	✓			
Strategy 10: Manage rainwater and urban development for watershed health					10A, Rainwater Dashboards
10.1	a)	✓		✓ Progress Meetings	
	b)	✓			
	c)	✓		✓ Rainwater Dashboards	
10.2	a)	✓			
	b)	✓			
	c)	✓			
10.3	-	✓			
10.4	-	✓			
10.5	-	✓			
Strategy 11: Update and harmonize municipal tools for rainwater management					Rainwater Dashboards
11.1	-	✓	✓Progress toward dedicated funding		
11.2	a)	✓			
	b)	✓			
	c)	✓			
11.3	-	✓	✓Progress on rainwater dashboards	✓ Rainwater Dashboards	
11.4	-	✓			
Strategy 12: Enhance interagency collaboration to improve watershed health across the region					
12.1	-	✓			
12.2	-	✓			
12.3	-	✓			
12.4	-	✓			
Strategy 13: Treat wastewater so effluent meets or surpasses regulatory requirements					
13.1	-	✓			
13.2	-	✓		✓ EMQC Annual Report	
13.3	-	✓		✓ EMQC Annual Report	
13.4	a)	✓	✓ Progress or changes year over year		
	b)	✓	✓ Progress or changes year over year		
	c)	✓	✓ Progress or changes year over year		
	d)	✓	✓ Progress or changes year over year		
Strategy 14: Operate and maintain wastewater treatment plants to meet or surpass regulatory requirements					14A

Action and sub-action		LWMP Annual Report		Other Reporting Mechanism	Performance Indicators (LWMP Annual Report and Dashboard)
		Action Status Table	Context and Insights Section		
14.1	-	✓			
14.2	-	✓			
14.3	-	✓		✓ EMQC Annual Report	
Strategy 15: Diversify options to beneficially use Nutrifor biosolids					15A, 15B
15.1	-	✓			
15.2	a)	✓			
	b)	✓			
15.3	-	✓			
15.4	-	✓			
15.5	-	✓			
Strategy 16: Implement proven resource recovery technologies					16A
16.1	a)	✓	✓ Select highlights from Strategy 16		
	b)	✓	✓ Select highlights from Strategy 16		
	c)	✓	✓ Select highlights from Strategy 16		
	d)	✓	✓ Select highlights from Strategy 16		
16.2	a)	✓	✓ Select highlights from Strategy 16		
	b)	✓	✓ Select highlights from Strategy 16		
	c)	✓	✓ Select highlights from Strategy 16		
16.3	a)	✓	✓ Select highlights from Strategy 16		
	b)	✓	✓ Select highlights from Strategy 16		
16.4	a)	✓	✓ Select highlights from Strategy 16		
	b)	✓	✓ Select highlights from Strategy 16		
Strategy 17: Research and pilot innovative technologies to advance the circular water economy					
17.1	a)	✓	✓ Select highlights from Strategy 17		
	b)	✓	✓ Select highlights from Strategy 17		
	c)	✓	✓ Select highlights from Strategy 17		
	d)	✓	✓ Select highlights from Strategy 17		
	e)	✓	✓ Select highlights from Strategy 17		
	f)	✓	✓ Select highlights from Strategy 17		
17.2	a)	✓	✓ Select highlights from Strategy 17		
	b)	✓	✓ Select highlights from Strategy 17		
	c)	✓	✓ Select highlights from Strategy 17		
	d)	✓	✓ Select highlights from Strategy 17		
Strategy 18: Minimize impacts of liquid waste management on the atmosphere and air quality					18A
18.1	-	✓			
18.2	-	✓			
18.3	a)	✓			
	b)	✓			
18.4	-	✓			
18.5	-	✓	✓ Describe progress and results		
18.6	-	✓	✓ Describe progress and results		
Strategy 19: Environmental monitoring to protect public health and the environment					19A
19.1	-	✓			
19.2	-	✓		✓ EMQC Annual Report	
19.3	-	✓		✓ EMQC Annual Report	
Strategy 20: Collaborate on regional environmental management initiatives					
20.1	-	✓	✓ Describe progress of programs		
20.2	-	✓	✓ Describe progress and results		
20.3	-	✓			
20.4	-	✓			

Appendix D – Status of Past Actions from 2011 LWMP

Ministerial Conditions (MC)	Status	Rationale
MC 1 The Ministry supports upgrading to secondary level treatment the Lions Gate wastewater treatment plant by 2020 and Iona Island wastewater treatment plant as soon as possible, but no later than 2030 and not contingent on the availability of senior government funding. The Ministry of Environment is not a funding agency. While I understand the cost of the upgrades is significant, they are necessary to meet current environmental standards. The Ministry will support Metro Vancouver pursuing senior government and alternative funding options, but cannot guarantee any provincial commitment in that regard, nor compromise the Ministry's mandate to protect the environment.	Removed	Removed. Metro Vancouver is including a Wastewater Treatment Plant Upgrade and Expansion Schedule in this LWMP that shows the planned timing and treatment levels for wastewater treatment plants. Refer to Appendix A for this table. The method for the funding of wastewater treatment plant upgrades is not prescribed in this LWMP because capital programs are established and approved through GVS&DD bylaws, policies, and annual budgets as adopted by the GVS&DD Board.
MC 2 Member municipalities are strongly encouraged to business case and/or implement residential water metering programs and to consider municipal rebate programs for water efficient fixtures and appliances to reduce potable water use.	Continuing	Continuing in Action 3.5. (verbatim)
MC 3 Metro Vancouver, in partnership with member municipalities, is encouraged to pursue a region-wide water conservation program targeting the industrial, commercial, institutional and agricultural sectors as part of its new Drinking Water Management Plan. Remaining municipalities in the region that have not implemented metering for these sectors are encouraged to do so.	Continuing	Continuing in Action 3.5. (verbatim)
MC 4 Metro Vancouver must use receiving environment and effluent monitoring data from combined sewer overflow (CSO) and sanitary sewer overflow (SSO) in the regional system to interpret the overall status of CSOs and SSOs. Metro Vancouver will continue the fate and effects studies on CSOs with the Clarke Drive location and other significant sites as determined by the Environmental Management Committee. Metro Vancouver will establish similar studies representative of significant SSO locations, in particular the Cloverdale, Katzie and Lynn locations. The interpretation and assessment should demonstrate whether there has been any improvement or degradation along with any measures taken to address such discharges. Metro Vancouver will report out in the Quality Control Annual Report.	Continuing	Continuing in Action 7.4 (conduct risk assessments at any new significant regional sanitary sewer overflow locations and will holistically compare the risk assessments of all sanitary sewer overflow locations to determine their relative risk, considering risks to public health and the environment. Metro Vancouver will use the results of the sanitary sewer overflow risk assessments to prioritize mitigation efforts, to optimize the operation of the regional liquid waste collection system, and to provide input into decisions regarding capital improvements and upgrades); Action 8.5 (Metro Vancouver will continue to assess change in receiving environment water quality resulting from any measures taken to address combined sewer overflow discharges. Metro Vancouver will report out, as applicable, in the *Environmental Management and Quality Control Annual Report*); and Action 8.6 (Metro Vancouver and members with combined systems will use available information and environmental management tools to inform the prioritization of sewer separation and near term combined sewer overflow mitigation measures).
MC 5 Metro Vancouver is encouraged to continue to build upon previous studies associated with studying endocrine-disrupting chemicals, persistent organic pollutants and other micro-contaminants found in wastewater by developing source control initiatives through education (for example, target outreach), regulation and inspection programs.	Continuing	Continuing in Action 4.1 (Metro Vancouver will prioritize contaminants for source control using the Canadian Council of Ministers of Environment (CCME) *Canada-wide Strategy for Management of Municipal Wastewater Effluent* (CWS-MMWE) Environmental Risk Management Framework. Metro Vancouver will take further source control actions such as educating target sectors to reduce discharges, advocating for increased provincial and federal regulations on the manufacturing and use of products with contaminants, and updating Metro Vancouver's bylaws for industrial and commercial dischargers. Metro Vancouver will work with First Nations as desired on advocating for increased provincial and federal regulations on the manufacturing and use of products with contaminants.

MC 6 (Metro Vancouver will continue the receiving and ambient monitoring programs specified in the approved 2002 LWMP, including, but not limited to, recreational water quality (beach monitoring); monitoring near the outfalls for all five wastewater treatment plants, including the extensive deep sea monitoring near the Iona Island plant; and CSO effluent quality and monitoring of small urban streams relating to impacts from urbanization and stormwater.	Continuing	Continuing in Action 8.3 (monitor combined sewer overflow flows and characterize samples from combined sewer overflow discharges); Action 10.1 (Members will use the Stormwater Monitoring and Adaptive Management Framework (AMF) to monitor watershed health); Action 10.4 (align land-use planning and development with IWMPs to ensure development decisions support watershed health objectives, including protecting riparian areas and agricultural areas); Action 12.2 (conduct a regional study of the impacts of densification on watershed health. Members will use the study results to make informed decisions that balance urban growth and ecological resilience.); Action 13.3 (Metro Vancouver will continue to monitor influent and the receiving environment where wastewater treatment plants discharge and assess results to determine whether any actions, such as additional source control or treatment upgrades, are required); Action 19.2 (Metro Vancouver will continue to monitor recreational water quality (seasonal beach monitoring) throughout the region, will continue to share this information with municipal beach operators and local Health Authorities, and will share this information with the First Nations Health Authority)
MC 7 Member municipalities will, with MV planning and coordination, and to the satisfaction of the Regional Manager, develop a coordinated program to monitor stormwater and assess and report the implementation and effectiveness of Integrated Storm Water Management Plans (ISMP). The program will use a weight-of-evidence performance measurement approach and will report out in the Biennial Report. The Regional Manager may extend the deadline for completion of ISMP by municipalities from 2014 to 2016 if satisfied that the assessment program could result in improvement of ISMP and protect stream health.	Continuing	Continuing in Action 10.1 (Members will use the Stormwater Monitoring and Adaptive Management Framework (AMF) to monitor watershed health.); Action 11.3 (Members will implement online rainwater dashboards to report on IWMP progress, including contributions to watershed health). The Biennial Report is being replaced with a short LWMP Annual Report, dashboards, and progress meetings. Refer to reporting commitments described in 'Monitoring and Reporting' Section of this LWMP.
MC 8 Bypass conditions that occur at wastewater treatment plants will be reported out in the annual quality control report. The report on each activity will include a description of the event, cause, environmental effect and monitoring that occurred and any mitigation measures undertaken to prevent reoccurrence and remediate detrimental environment effect.	Continuing	Continuing in Action 14.3 (Metro Vancouver will report on bypass conditions that occur at wastewater treatment plants in the Environmental Management and Quality Control Annual Report. The report on each activity will include a description of the event, cause, and environmental effect.)
MC 9 The ILWRMP has a goal of protecting public health and the environment. In keeping with this goal and to ensure alignment with other national, provincial and regional initiatives, Metro Vancouver and member municipalities are encouraged to:		
MC 9(a) Have local land use planning consider the direction provided by the ISMPs;	Continuing	Continuing in Action 10.3 (Members will ensure IWMPs integrate rainwater and groundwater management, consider agricultural land rainwater runoff, and reflect the provisions of the Province's *Watershed Security Strategy* once it is launched); Action 10.4 (Members will align land-use planning and development with IWMPs to ensure development decisions support watershed health objectives, including protecting riparian areas and agricultural areas.)
MC 9(b) Consider how the degree, type and location of land development within a drainage can affect the long-term health of the watershed;	Continuing	Continuing in Action 12.2 (Members and Metro Vancouver, as the interagency group, will conduct a regional study of the impacts of densification on watershed health. Members will use the study results to make informed decisions that balance urban growth and ecological resilience.)
MC 9(c) Consider how to protect the stream, including the riparian areas that exert an influence on the stream, from long-term cumulative impacts; and	Continuing	Continuing in Action 10.1 (use the Stormwater Monitoring and Adaptive Management Framework to monitor watershed health); Action 10.3 (Members will ensure IWMPs integrate rainwater and groundwater management, consider agricultural land rainwater runoff, and reflect the provisions of the Province's *Watershed Security Strategy* once it is launched); Action 10.4 (Members will align land-use planning and development with IWMPs to ensure development decisions support watershed health objectives, including protecting riparian areas and agricultural areas).

MC 9(d) Use scenarios and forecasting to systematically consider environmental consequences/benefits of different land use approaches prior to build-out (for example, Alternative Future type approaches).	Continuing	Continuing in Action 10.3 (Members will ensure IWMPs integrate rainwater and groundwater management, consider agricultural land rainwater runoff, and reflect the provisions of the Province's *Watershed Security Strategy* once it is launched); Action 10.4 (Members will align land-use planning and development with IWMPs to ensure development decisions support watershed health objectives, including protecting riparian areas and agricultural areas).
MC 10 Metro Vancouver will continue to consult with First Nations during the implementation of the Plan – in particular, engaging, as appropriate, with First Nations likely to be impacted by the secondary upgrades.	Continuing	Continuing in many actions throughout the plan including Actions 1.3 (Metro Vancouver and members will create and update Master Sewer Servicing Plans to accommodate growth and urban development and will continue to ensure that First Nations are engaged appropriately); Action 4.1 (Metro Vancouver will work with First Nations as desired on advocating for increased provincial and federal regulations on the manufacturing and use of products with contaminants.); Action 4.2 (Metro Vancouver and members will continue to motivate residents and businesses to prevent pollution at the source by properly managing what they send down drains and toilets. Metro Vancouver will work with First Nations as desired on such outreach and education.); Action 9.2 (Metro Vancouver will develop intermediate targets on a five-year interval for municipal and regional separation of prioritized combined catchments. The targets will be based on a framework to be developed with Burnaby, New Westminster, Vancouver, and First Nations, that considers key factors such as cultural value, population, redevelopment rates, and operational considerations. Metro Vancouver will submit the targets to the Ministry.); Action 10.1 (Members will use the Stormwater Monitoring and Adaptive Management Framework (AMF) to monitor watershed health: Metro Vancouver will coordinate revising the existing Integrated Watershed Management Plan (IWMP) template, with input from First Nations that have chosen to participate, to incorporate the AMF); Action 10.2 (Members will continue to develop, review and update Integrated Watershed Management Plans (IWMPs): (b) First Nations will participate in IWMP development, monitoring, and review, as desired and mutually agreed upon, including sharing information about their respective land use plans as appropriate); Action 12.4 (Members and Metro Vancouver, as the interagency group, will host a forum at regular intervals to report progress on IWMPs and LWMP rainwater actions, and to foster collaboration and knowledge sharing among members, First Nations, and interested parties.); Action 13.4 (b) (Metro Vancouver will engage with First Nations on planned wastewater treatment upgrades when preparing and updating the Wastewater Treatment Plant Upgrade and Expansion Schedule, and will do so in a manner that is consistent with applicable federal and provincial law, and according to the level of First Nations interest.); Action 15.1 (Metro Vancouver will grow the land application program and will increase public outreach and education, including to First Nations, on how Nutrifor biosolids are used safely and responsibly as fertilizer and as an ingredient to build healthy soil.); Action 16.1 (c) (Metro Vancouver will continue to provide access to sewage and effluent for heat recovery to members, First Nations, and district energy providers, when appropriate.); Action 17.1 (Metro Vancouver will research, develop and pilot new methods to expand the recovery and use of energy, nutrients, water and other emerging resources from the liquid waste system, by: (e) Collaborating with First Nations on pilot projects as desired, and, (f) Conducting public outreach and education about resource recovery, including to First Nations); Action 19.2 (Metro Vancouver will continue to monitor recreational water quality (seasonal beach monitoring) throughout the region, will continue to share this information with municipal beach operators and local Health Authorities, and will share this information with the First Nations Health Authority.); Action 20.1 (Metro Vancouver will participate in relevant collaborative environmental program(s) for regional water bodies (i.e., Fraser River, Burrard Inlet, Strait of Georgia) along with members, First Nations, senior government, and interested parties); and, Action 20.2 (Metro Vancouver will continue to participate, and members may participate, in the Ministry of Environment and Climate Change Strategy processes to review and establish water uses and water quality objectives for specific water bodies within Metro Vancouver.)

Action	Status	Rationale
1.1.1 Review and enhance sewer use bylaws to reduce liquid waste at source, including contaminants identified by the *Canadian Environmental Protection Act*.	Continuing	Continuing in Action 3.3 (pursue reductions in industrial wastewater flow and loading, starting with updating fees in bylaws to create financial incentives that motivate industries to minimize their wastewater discharges) and Action 4.1 (use CWS MMWE risk framework to prioritize contaminants and develop source control actions).
1.1.2 Develop new regulatory instruments, such as Pollution Prevention Plans to complement existing regulations.	Completed	Completed as reported in 2018 Biennial Report Volume 1 (Pollution prevention plan bylaws for different sectors were assessed for feasibility and the *Hospital Pollution Prevention Bylaw* was adopted in 2018).
1.1.3 Increase resources for permitting, and inspection to support and enforce sewer use bylaws.	Completed	Completed as reported in 2015 Biennial Report Appendix A (Between 2010 and 2012, four new enforcement officer positions were created, a new regulatory database was created that improved enforcement efficiency, and paper permitting processes were automated.)
1.1.4 Investigate the implications of the use of domestic food grinders.	Completed Continuing	Completed as reported in 2015 Biennial Report Appendix A (Investigations were completed in 2012 and 2015 and found that grinders were already installed in almost half the residential properties in the region - efforts will continue to reduce the generation of food waste and reduce the disposal of food to sewer). Continuing in Action 3.1 (pursue reductions in residential wastewater flow and loading through improving education and awareness, starting with discouraging disposal of food waste down drains. Members will provide input and assist with implementation).
1.1.5 Develop and implement targeted outreach plans to support liquid waste source control programs.	Completed Continuing	Completed as reported in 2019 Biennial Report Volume 1 and 2023 Biennial Report Volume 1 (several wastewater management guides for commercial operations were published and distributed in 2017 and 2018; and several public communication campaigns — 'Unflushables,' 'Wipe It, Green Bin It,' 'Our Ocean Thanks You,' and others — were conducted from 2019 to 2022). Continuing in Action 3.1 (pursue reductions in residential wastewater flow and loading through improving education and awareness, starting with discouraging disposal of food waste down drains, by encouraging reduction of food waste in general and encouraging use of green bins for kitchen scraps. Members will provide input and assist with implementation) and Action 4.2 (continue to motivate residents and businesses to prevent pollution at the source by properly managing what they send down drains and toilets and continue outreach programs that include youth education programs).
1.1.6 Develop a template to guide the preparation and implementation of inflow and infiltration management plans as part of broader asset management plans and to support sanitary sewer overflow reduction strategies.	Completed Continuing	Completed as reported in 2015 Biennial Report Appendix A (template created in 2011) and as reported in 2023 Biennial Report Volume 1 (template updated in 2022). Continuing in Action 6.1 (develop a consistent inflow and infiltration dashboard with standardized metrics and will incorporate it into the inflow and infiltration management plan template)
1.1.7 Work with the real estate industry and their regulators, and the municipalities to develop and implement a process for the inspection and certification of private sewer laterals being in good condition as a required component of real estate transactions within Metro Vancouver.	Continuing	Continuing in Action 5.2 (require inspection, testing, repair and/or replacement of private laterals when new construction or redevelopment occurs); Action 5.3 (members will conduct inspections of private laterals in existing properties); and Action 5.5 (members to enforce bylaws that require sanitary laterals to be in good condition).

1.1.8 Develop and implement inflow and infiltration management plans that identify reduction strategies and timelines to ensure wet weather inflow and infiltration are within targeted levels.	Completed Continuing	Completed to varying extents by different member jurisdictions (see 2023 Biennial Report Volume 2 - Municipal Reports). Continuing in Action 6.1 (members will complete inflow and infiltration management plans).
1.1.9 Work with municipalities to review historical data and adjust as necessary the average inflow and infiltration allowance for regional trunk sewers and wastewater treatment plants and develop associated target allowances for municipal sewer catchments associated with a 1:5 year return frequency storm event for sanitary sewers to a level that ensures environmental and economic sustainability.	Completed	Completed as reported in 2015 Biennial Report Volume 1. The review of the inflow and infiltration allowance was completed in 2014 and approved by the Regional Engineers Advisory Committee. The regional inflow and infiltration allowance remains unchanged at 11,200 L/ha/d.
1.1.10 Review progress in reducing inflow and infiltration every four years	Continuing	Continuing in Action 6.2 c) (review progress in reducing inflow and infiltration every four years).
1.1.11 Enhance enforcement of sewer use bylaw prohibition against the unauthorized discharge of rainwater and groundwater to sanitary sewers.	Completed	Completed as reported in 2013 Biennial Report Appendix A (*GVS&DD Sewer Use Bylaw No. 299, 2007* contains the prohibition of discharges of stormwater and groundwater to sanitary sewers from industrial, commercial and institutional sources unless authorized in a waste discharge permit).
1.1.12 Work with municipalities to:		
1.1.12 (a) facilitate research on watershed-based stormwater management approaches;	Completed Continuing	Completed as reported in 2013, 2019, and 2023 Biennial Reports. Watershed-based stormwater management approaches were explored and implemented to varying degrees throughout the last plan - especially through the Stormwater Interagency Liaison Group. Continuing in Action 12.1 (interagency group will lead local research on rainwater management).
1.1.12 (b) identify improvements to stormwater bylaws to include on-site rainwater management requirements;	Continuing	Continuing in Action 11.2 (a guidance document will be developed to aid members in harmonizing rainwater policies, programs and bylaws; members will review and update rainwater policies, programs and bylaws).
1.1.12 (c) develop model utility design standards and options for neighbourhood design guidelines;	Completed	Completed in 2012 (reported in 2013 Biennial Report, Appendix A). Stormwater Source Control Design Guidelines were updated to include sizing and design methodologies for members to reference, incorporate, or adapt for their standards and guidelines. See https://metrovancouver.org/services/liquid-waste/Documents/stormwater-source-control-design-guidelines-2012.pdf
1.1.12 (d) establish region-wide baseline criteria for on-site rainfall management including variations for localized geology, rainfall and watershed conditions;	Completed	Completed in 2017 (reported in 2019 Biennial Report, Volume 1). See https://metrovancouver.org/services/liquid-waste/Documents/region-wide-baseline-onsite-stormwater-management-report-2017-02.pdf
1.1.12 (e) establish mechanisms to ensure continued performance of on-site rainwater management systems; and	Completed Continuing	Completed in 2012 and 2017 as part of Actions 1.1.12 (c) and (d). Generalized performance requirements for on-site stormwater management were identified in 2012 and following GVS&DD Board endorsement of the Region-wide Baseline for On-Site Stormwater Management in 2017, the Stormwater Interagency Liaison Committee continued to work to identify specific issues and mechanisms that support the long-term performance of on-site rainwater management systems. Continuing in Action 11.2 (review and update rainwater bylaws, programs and policies).

1.1.12 (f) work with senior governments and industry to develop codes of practice, certification, guidelines and standards which support this plan.	Continuing	Continuing in Action 11.2 c) (coordinate and advocate with other levels of government to resolve rainwater policy conflicts and barriers) and Action 11.4 (coordinate an approach for updating the Master Municipal Construction Documents).
1.1.13 Decrease liquid waste volumes through complementary initiatives in the Metro Vancouver Drinking Water Management Plan to reduce potable water consumption.	Continuing	Continuing in Action 3.5 (Metro Vancouver and members will advance water conservation and water metering).
1.1.14 Review and enhance sewer use bylaws to reduce liquid waste at source, including contaminants identified by the *Canadian Environmental Protection Act*.	Completed Continuing	This member action was completed to varying extents by different member jurisdictions through revisions and updates to municipal stormwater, sediment and sewer and drainage system bylaws (see 2023 Biennial Report Volume 2). Continuing in Action 3.4 (provide guidance to enable members to manage fats, oils, and grease through their own bylaws) and Action 11.2 (update rainwater policies, programs, and bylaws in a harmonized manner).
1.1.15 Continue existing programs of permitting and inspection to support and enforce sewer use bylaws.	Removed	This member action is removed from the LWMP because, being unique to the City of Vancouver as the only member jurisdiction with GVS&DD Board designated enforcement officers, the coordination of GVS&DD regulatory bylaw enforcement is completed between City of Vancouver and Metro Vancouver on an ongoing basis, separate from the LWMP.
1.1.16 Identify and regulate pesticides and lawn care products which negatively affect rainwater runoff quality and urban stream health	Completed Continuing	Completed to varying extents by different member jurisdictions through revisions and updates to municipal stormwater, sediment and sewer and drainage system bylaws (see 2023 Biennial Report Volume 2). Continuing in Action 11.2 (coordinate the development of a guidance document to aid members in harmonizing rainwater policies, programs and bylaws; members will review and update rainwater policies, programs and bylaws).
1.1.17 Continue outreach plans to support liquid waste source control programs.	Completed Continuing	Completed to varying extents by different member jurisdictions (see 2023 Biennial Report Volume 2 - Municipal Reports). Continuing in Action 3.1 (pursue reductions in residential wastewater flow and loading through improving education and awareness) and Action 4.2 (continue to motivate residents and businesses to prevent pollution at the source through outreach programs that include youth education programs).
1.1.18 Develop and implement inflow and infiltration management plans, using the Metro Vancouver template as a guide, to ensure wet weather inflow and infiltration volumes are within Metro Vancouver's allowances as measured at Metro Vancouver's flow metering stations.	Completed Continuing	Completed to varying extents by different member jurisdictions (see 2023 Biennial Report Volume 2). Continuing in Action 6.1 (members will complete inflow and infiltration management plans).
1.1.19 Enhance enforcement of sewer use bylaw prohibition against the unauthorized discharge of rainwater and groundwater to sanitary sewers.	Continuing	Continuing in Action 5.5 (members to enforce bylaws on private property to prevent the unauthorized discharge of rainwater and groundwater to sanitary sewers).

1.1.20 Update municipal bylaws to require on-site rainwater management sufficient to meet criteria established in municipal integrated stormwater plans or baseline region-wide criteria.	Completed Continuing	Completed to varying extents by different member jurisdictions (see 2023 Biennial Report Volume 2 - Municipal Reports). Continuing in Action 11.2 (coordinate the development of a guidance document to aid members in harmonizing rainwater policies, programs and bylaws; members will review and update rainwater policies, programs and bylaws).
1.1.21 Update municipal utility design standards and neighbourhood design guidelines to enable and encourage on-site rainwater management.	Completed Continuing	Completed to varying extents by different member jurisdictions (see 2023 Biennial Report Volume 2 - Municipal Reports). Continuing in Action 11.4 (coordinate an approach for seeking to update the Master Municipal Construction Documents such that green infrastructure guidelines become standards).
1.2.1 Prohibit the construction of new combined sewer systems other than those functioning as part of a strategy to reduce combined sewer overflows or to manage stormwater quality.	Continuing	Continuing in Action 9.1 (ensure that no new combined sewer laterals will be constructed on private or public property).
1.2.2 Address the Canada-wide Strategy for the Management of Municipal Wastewater Effluent (CWS-MMWE) by working with Burnaby, New Westminster and Vancouver to develop and implement: priorities for sewer separation of catchments tributary to combined sewer outfalls; regional and municipal sequence for trunk and collector sewer separation; strategic use of existing combined sewers to manage rainwater quality runoff; and a strategy to separate combined sewer connections from private properties.	Continuing	Continuing in Action 9.2 and Action 9.3 (develop targets for separation on five-year intervals; develop and implement Sewer Separation and Combined Sewer Overflow Elimination Plans to prevent combined sewer overflows, and in the interim, support the intermediate targets developed in action 9.2).
1.2.3 Replace combined regional trunk sewers with separated sanitary and storm sewers as determined by the plans developed in 1.2.2.	Continuing	Continuing in Action 9.2 and Action 9.4 (develop targets for separation on five-year intervals; replace combined regional trunk sewers with separated sanitary and storm sewers as determined by the Sewer Separation Plans).
1.2.4 Work with municipalities to develop and implement municipal-regional sanitary overflow management plans which will: prevent sanitary overflows resulting from heavy rain and snowmelt occurring less than once every five years (for a 24 hour duration event); reduce emergency overflows due to power outages; and identify locations and schedules for appropriate system capacity improvements, wet weather containment, and point treatment and discharge to receiving waters of chronic overflows, including Cloverdale Pump Station, Katzie Pump Station, Lynn Pump Station.	Completed Continuing	Completed to varying extents by members and Metro Vancouver as reported in 2023 Biennial Report (for example, in the work of the REAC Liquid Waste Sub-Committee SSO Working Group). Continuing in Action 7.5 (continue to develop and implement municipal-regional sanitary overflow management plans to eliminate overflows at chronic locations).
1.2.5 Work with Metro Vancouver to develop and implement municipal-regional sanitary overflow management plans as set out in 1.2.4.	Completed Continuing	Completed to varying extents by members and Metro Vancouver as reported in 2023 Biennial Report (for example, in the work of the REAC Liquid Waste Sub-Committee SSO Working Group). Continuing in Action 7.5 (continue to develop and implement municipal-regional sanitary overflow management plans to eliminate overflows at chronic locations).

1.2.6 Burnaby, New Westminster and Vancouver will work with Metro Vancouver to give effect to 1.2.2 and, specifically, implement plans to prevent combined sewer overflows by 2050 for the Vancouver Sewerage Area and 2075 for the Fraser Sewerage Area and separate combined sewers at an average rate of 1 per cent and 1.5 per cent of the system per year in the Vancouver Sewerage Area and Fraser Sewerage Area respectively.	Continuing	Continuing in Action 9.3 (Burnaby, New Westminster, and Vancouver continue to work with Metro Vancouver to develop and implement Sewer Separation and Combined Sewer Overflow Elimination Plans to prevent combined sewer overflows, and in the interim, support the intermediate targets developed in action 9.2).
1.3.1 Develop and implement operational plans for sewerage and wastewater treatment facilities to ensure infrastructure reliability and optimal performance.	Continuing	Continuing in Action 1.1 (maintain the condition and performance of the sewerage system to serve a growing population in a changing climate) and Action 2.3 (plan, locate, design, and adapt infrastructure, assets, and operations to address identified hazards, risks, and vulnerabilities, including climate change impacts).
1.3.2 Maintain trunk sanitary sewer capacity for dry weather sewage conveyance levels plus the Metro Vancouver target inflow and infiltration allowance; as necessary upgrade trunk sewer systems to maintain hydraulic gradelines and safe operating levels which have been established based on measured flow.	Continuing	Continuing in Action 1.2 (regional and municipal systems will seek to accommodate population growth and land use changes by providing sanitary sewer capacity and wastewater treatment plant hydraulic capacity for peak dry weather flow plus an inflow and infiltration allowance of 11,200 L/ha/d).
1.3.3 Work with municipalities to develop and implement emergency sanitary sewer overflow plans including contingency plans to minimize impacts of unavoidable sanitary sewer overflows resulting from extreme weather, system failures or unusual events.	Removed	Removed. Emergency management planning is regularly conducted as part of ongoing operations as required under British Columbia's *Emergency and Disaster Management Act* and no longer needs to be included in the LWMP.
1.3.4 Operate wastewater treatment plants which have secondary level treatment (Annacis Island, Lulu Island, North West Langley wastewater treatment plants) to meet requirements specified in each facility's Operating Certificate and the Canada-wide Strategy for the Management of Municipal Wastewater Effluent (CWS-MMWE) National Performance Standards for wastewater effluent, including:	Continuing	Continuing in Action 13.1 (wastewater treatment infrastructure will be operated using the CWS-MMWE Environmental Risk Management Framework) and 14.1 (wastewater treatment plants will meet or surpass requirements specified in each facility's Operational Certificate and the CWS-MMWE National Performance Standards for wastewater effluent).
1.3.4 (a) monthly average maximum Carbonaceous Biochemical Oxygen Demand (CBOD5): 25 mg/L; and	Removed	Specific wastewater treatment plant effluent quality criteria are established in Operational Certificates issued by the Province for each wastewater treatment plant and may be revised from time to time. These specific concentrations should be removed from the LWMP to prevent them from becoming outdated if/when Operational Certificates are revised or updated.
1.3.4 (b) monthly average maximum Total Suspended Solids (TSS): 25 mg/L.	Removed	Specific wastewater treatment plant effluent quality criteria are established in Operational Certificates issued by the Province for each wastewater treatment plant and may be revised from time to time. These specific concentrations should be removed from the LWMP to prevent them from becoming outdated if/when Operational Certificates are revised or updated.
1.3.5 Upgrade or replace Lions Gate (North Shore Sewerage Area) and Iona Island (Vancouver Sewerage Area) wastewater treatment plants to secondary level treatment to meet Canada-wide Strategy for the Management of Municipal Wastewater Effluent (CWS-MMWE) requirements and timelines.	Continuing	Continuing in Action 13.1 (wastewater treatment infrastructure will be operated using the CWS-MMWE Environmental Risk Management Framework). Continuing in Action 13.4 (upgrade wastewater treatment processes and plants according to the Wastewater Treatment Plant Upgrade and Expansion Schedule).

1.3.5 (a) The intended site for the North Shore Sewerage Area secondary facility is the Metro Vancouver owned property located between Pemberton, Philips, and McKeen Avenues and West First Street in the District of North Vancouver. The existing outfall will be retained as part of the upgraded facility. The outfall discharges to embayed marine waters as defined in the *Environmental Management Act*, *Municipal Sewage Regulation*.	Removed	This sub-action is removed from the LWMP as specifics regarding the siting of the North Shore Wastewater Treatment Plant and outfall are outdated.
1.3.5 (b) The intended site for the Vancouver Sewerage Area is the property immediately adjacent and east of the existing Iona Island plant in the City of Richmond. The existing outfall will be retained as part of the upgraded facility. The outfall discharges to open marine waters as defined in the *Environmental Management Act, Municipal Sewage Regulation*.	Removed	This sub-action is removed from the LWMP as specifics regarding the siting of the Iona Island Wastewater Treatment Plant and outfall are addressed separately.
1.3.5 (c) Based on the CWS-MMWE and the assessment made by the Environmental Monitoring Committee, the Lions Gate upgrade should be completed within 10-years subject to the appropriate financial arrangements being in place as indicated in the Financial Plan.	Removed	This sub-action is removed from the LWMP as specifics regarding the North Shore Wastewater Treatment Plant (previously Lions Gate) upgrade are addressed separately.
1.3.5 (d) Based on the CWS-MMWE and the assessment made by the Environmental Monitoring Committee, the Iona Island upgrade should be completed within 20 years. In spite of this, Metro Vancouver has a strong desire to accelerate the completion of the Iona Island upgrade as soon as is reasonably possible in a 10 to 20 year timeframe, because of the significance of this upgrade to Metro Vancouver's Sustainable Region Initiative. The Region will strive to the greatest extent possible to achieve this. Risk factors to overcome include resolution of technical and land tenure issues, construction logistics and will be subject to appropriate financial arrangements being in place as indicated in the Financial Plan. In collaboration with provincial and federal governments, Metro Vancouver will engage in resolving these obstacles to complete the Iona Island upgrade at the earliest practicable time.	Removed	This sub-action is removed from the LWMP as specifics regarding the Iona Island Wastewater Treatment Plant upgrade are addressed separately.
1.3.5 (e) Metro Vancouver will seek assistance from both senior levels of government in resolving First Nations rights and title issues associated with these secondary treatment plant upgrades.	Continuing	Continuing in Action 13.4 (b) (Metro Vancouver will engage with First Nations on planned wastewater treatment upgrades when preparing and updating the Wastewater Treatment Plant Upgrade and Expansion Schedule, and will do so in a manner that is consistent with applicable federal and provincial law, and according to the level of First Nations interest).
1.3.6 Maintain interim maximum daily concentration limits for wastewater effluent of 130 mg/L BOD_5 at both Lions Gate and Iona Island plants and 130 mg/L TSS at Lions Gate and 100 mg/L TSS at Iona Island until such time as secondary treatment is operational, and operate the plants to meet requirements specified in each facility's Operating Certificate.	Continuing	Continuing in Action 13.1 (wastewater treatment infrastructure will be operated using the CWS-MMWE Environmental Risk Management Framework) and 14.1 (wastewater treatment plants will meet or surpass requirements specified in each facility's operating certificate and the CWS-MMWE National Performance Standards for wastewater effluent).

1.3.7 Assess environmental monitoring results (see Strategy 3.3) to determine whether any actions are required to meet Ministry of Environment/ Canada-wide Strategy for the Management of Municipal Wastewater Effluent (CWS-MMWE) requirements.	Continuing	Continuing in Action 13.1 (wastewater treatment infrastructure will be operated using the CWS-MMWE Environmental Risk Management Framework), Action 13.2 (continue to monitor the quantity and characteristics of Metro Vancouver's wastewater treatment plant effluent discharges and assess effluent quality in accordance with the CWS-MMWE) and Action 13.3 (continue to monitor influent and the receiving environment where wastewater treatment plants discharge and assess results to determine whether any actions, such as additional source control or treatment upgrades, are required).
1.3.8 Continue odour control programs at wastewater treatment plants and implement odour control programs for targeted facilities in the regional sewer system and for relevant energy and material recovery processes (see Action 3.3.4).	Continuing	Continuing in Action 18.5 (continue odour management programs at wastewater treatment plants and targeted facilities in the regional sewer system).
1.3.9 Develop and implement air emissions management programs for standby power generators and biogas production, including assessment of desirability of retrofit and accelerated asset replacement where appropriate.	Continuing	Continuing in Action 18.3 (manage air emissions from standby power generators) and Action 18.4 (develop and undertake a program to characterize emissions from various processes at wastewater treatment plants (e.g., digesters, exhausts, stacks) during operation, preventative maintenance, and emergency maintenance. Metro Vancouver will identify potential concerns, and, where appropriate, undertake studies of best economically feasible control processes or technologies).
1.3.10 Develop and implement programs to reduce greenhouse gas emissions from the regional liquid waste management systems to help achieve federal, provincial and Metro Vancouver greenhouse gas targets (see Action 3.3.4).	Continuing	Continuing in Action 18.2 (continue to develop and implement programs and procurement policies to reduce greenhouse gas emissions associated with the design, construction, operation, and management of wastewater collection and treatment systems, to help achieve federal, provincial, and Metro Vancouver greenhouse gas reduction targets).
1.3.11 Develop and implement operational plans for municipal sewerage facilities to ensure infrastructure reliability and optimal performance.	Continuing	Continuing in Action 1.1 (maintain the condition and performance of the sewerage system to serve a growing population in a changing climate) and Action 2.3 (continue to plan, locate, design, and adapt infrastructure, assets, and operations to address identified hazards, risks, and vulnerabilities, including climate change impacts).
1.3.12 Work with Metro Vancouver to develop and implement emergency sanitary sewer overflow plans including contingency plans to minimize impacts of unavoidable sanitary sewer overflows resulting from extreme weather, system failures or unusual events.	Removed	Removed. Emergency management planning is regularly conducted as part of ongoing operations as required under British Columbia's *Emergency and Disaster Management Act* and no longer needs to be included in the LWMP.
1.3.13 Work with private marina operators, Ministry of Environment and Environment Canada to develop and implement regulations to ensure all new marinas and marinas where planned renovations exceed 50 % of the assessed existing improvements value have pleasure craft pump-out facilities.	Completed Continuing	Completed to varying extents if applicable by different member jurisdictions as reported in Biennial reports. Continuing in Action 20.3 (same as 2011 ILWRMP).
1.3.14 Require all pleasure craft pump out facilities to connect to a municipal sanitary sewerage system or a provincially permitted on-site treatment and disposal system or have established enforceable protocols for transporting liquid waste for disposal at a permitted liquid waste management facility.	Completed Continuing	Completed to varying extents if applicable by different member jurisdictions as reported in Biennial reports. Continuing in Action 20.4 (same as 2011 ILWRMP).

1.3.15 Continue existing municipal odour control programs and implement new programs for targeted municipal sewer facilities (see Action 3.3.4).	Completed Continuing	Completed to varying extents by different member jurisdictions as reported in Biennial reports. Continuing in Action 18.6 (continue existing municipal odour control programs and implement new programs for targeted municipal sewer facilities).
1.3.16 Develop and implement air emissions management programs for standby power generators at municipal sewer pump stations.	Continuing	Continuing in Action 18.3 (continue to develop and implement air emissions management programs for standby power generators at municipal sewer pump stations).
1.3.17 Develop and implement programs to reduce greenhouse gas emissions from municipal liquid waste management systems to help achieve federal, provincial and municipal greenhouse gas targets (see Action 3.3.4).	Continuing	Continuing in Action 18.2 (continue to develop and implement programs and procurement policies to reduce greenhouse gas emissions associated with the design, construction, operation, and management of wastewater collection and treatment systems, to help achieve federal, provincial, and Metro Vancouver greenhouse gas reduction targets).
1.3.18 Include Metro Vancouver and municipalities in the Ministry's processes to review and establish official water uses and official water quality objectives for specific water bodies within Metro Vancouver.	Completed Continuing	Completed as reported in 2023 Biennial Report Volume 1 (Metro Vancouver was invited by the Ministry of Environment and Climate Change Strategy and səlilwətaɬ (Tsleil-Waututh Nation) to participate in the review of Burrard Inlet Water Quality Objectives and has provided monitoring, other data, and feedback on the proposed objectives). Continuing in Action 20.2 (participate in provincial processes to review and establish water uses and water quality objectives for specific water bodies within Metro Vancouver).
2.1.1 Assess each sewerage area using an integrated resource recovery business case model that:	Completed	Integrated Resource Recovery business case models and reports were completed for all four sewerage areas from 2011 to 2023.
2.1.1 (a) evaluates opportunities to expand the recovery of energy, nutrients and water from the liquid waste system; specifically:		
2.1.1 (a) 1 · energy from biogas at wastewater treatment plants including investigating new sludge and wastewater treatment technologies and the co-digestion of other organic wastes such as organics in municipal solid waste, oils and greases;	Completed Continuing	Completed as reported in 2013, 2015, and 2019 Biennial reports - trucked liquid wastes were evaluated for energy-generating potential through the Annacis Co-Digestion Program and a review of Metro Vancouver's Trucked Liquid Waste Program. Findings indicated that Metro Vancouver cannot compete with the private sector for the types of waste best suited for co-digestion and energy generation. Continuing in Action 16.1 (recover energy from the liquid waste system); Action 17.1 (new methods to expand recovery and use of energy, nutrients, water, and other resources from the liquid waste system).
2.1.1 (a) 2 · heat energy from new pump stations, sewer replacement and rehabilitation and major wastewater treatment plant projects;	Continuing	Continuing in Action 16.1 (recover energy from the liquid waste system); Action 17.1 (new methods to expand recovery and use of energy, nutrients, water, and other resources from the liquid waste system).
2.1.1 (a) 3 · biodiesel from trucked liquid waste, waste grease and sewer grease.	Completed	Completed as reported in 2013, 2015, and 2019 Biennial reports - trucked liquid wastes were evaluated for energy-generating potential through the Annacis Co-Digestion Program and a review of Metro Vancouver's Trucked Liquid Waste Program. Findings indicated that Metro Vancouver cannot compete with the private sector for the types of waste best suited for co-digestion and energy generation.

2.1.1 (a) 4 · energy from biosolids and sludge;	Continuing	Continuing in Action 15.2 (beneficially use dried Nutrifor biosolids pellets as a low carbon fuel and fertilizer product); Action 15.3 (explore technologies that convert sludge to low carbon fuel), Action 15.4 (process biosolids at Metro Vancouver Waste-to-Energy Facility when other markets or uses cannot be accessed); Action 16.1 (recover energy from the liquid waste system); Action 17.1 (new methods to expand recovery and use of energy, nutrients, water, and other resources from the liquid waste system).
2.1.1 (a) 5 · nutrients, such as phosphorous from liquid waste and biosolids; and	Continuing	Continuing in Action 15.1 (grow the land application program); Action 15.2 (beneficially use dried Nutrifor biosolids pellets as a low carbon fuel and fertilizer product); Action 16.3 (recover nutrients and other materials from liquid waste); Action 17.1 (new methods to expand recovery and use of energy, nutrients, water, and other resources from the liquid waste system).
2.1.1 (a) 6 · alternatives to potable water for non-drinking purposes, such as rainwater harvesting, greywater reuse and reclaimed treated wastewater;	Continuing	Continuing in Action 16.2 (recover water from the liquid waste system); Action 17.1 (new methods to expand recovery and use of energy, nutrients, water, and other resources from the liquid waste system).
2.1.1 (b) identifies linkages between liquid waste resource recovery opportunities and other systems (solid waste, drinking water, land use/buildings, parks, air quality, energy); and	Completed	Completed as reported in 2022 biennial report. Linkages between liquid waste resource recovery opportunities and other systems (solid waste, drinking water, land use/buildings, parks, air quality, energy) were assessed in Integrated Resource Recovery studies completed for each sewerage area from 2011 to 2023. Linkages between the liquid waste system and other regional systems are described in the 'Alignment and Linkages' section of this LWMP.
2.1.1 (c) develops and evaluates business cases for integrated resource recovery/use opportunities.	Completed	Integrated Resource Recovery business case models and reports were completed for all four sewerage areas from 2011 to 2023.
2.1.2 Implement appropriate business cases based on the results of 2.1.1.	Continuing	Continuing in Action 16.1 (recover energy from the liquid waste system); Action 16.2 (recover water from the liquid waste system); Action 16.3 (recover nutrients and other materials from liquid waste).
2.1.3 Work with municipalities to adapt plans and infrastructure for long term needs based on the results of 2.1.1.	Continuing	Continuing in Action 16.1 (recover energy from the liquid waste system); Action 16.2 (recover water from the liquid waste system); Action 16.3 (recover nutrients and other materials from liquid waste).
2.1.4 Work with Metro Vancouver to give effect to 2.1.1, 2.1.2 and 2.1.3.	Continuing	Continuing in Action 15.5 (members will continue to use Nutrifor landscaping soil in municipal projects when feasible); Action 16.4 (members will recover and use recovered energy and water when feasible)
3.1.1 Assess the performance and condition of regional sewerage systems by:	Continuing	Continuing in Action 1.1 (maintain the condition and performance of the sewerage system to serve a growing population in a changing climate).
3.1.1 (a) inspecting regional sanitary sewers on a twenty-year cycle; and	Continuing	Continuing in Action 1.1 (maintain the condition and performance of the sewerage system to serve a growing population in a changing climate).
3.1.1 (b) maintaining current maps of sewerage inspection, condition, and repairs.	Continuing	Continuing in Action 1.1 (maintain the condition and performance of the sewerage system to serve a growing population in a changing climate).

3.1.2 Create incentives to reduce inflow and infiltration by adjusting Tier I sewerage cost allocation formulae within each sewerage area from an average dry weather flow basis (25th percentile) to average wet weather flow (75th percentile) with appropriate adjustments for combined sewerage areas. Tier II cost allocation would remain unchanged.	Completed Continuing	Completed as reported in 2023 Biennial Report Volume 1 (Wet Weather Pricing was approved by the GVS&DD Board in February 2023). Continuing in Action 6.4 (Metro Vancouver will review the wet weather sewer pricing formula every four years, and will adjust if needed to further incentivize inflow and infiltration reductions by members).
3.1.3 In consultation with municipalities, review Metro Vancouver's safe-operating head for regional sewers.	Continuing	Continuing in Action 1.2 (provide sanitary sewer and wastewater treatment plant hydraulic capacity for peak dry weather flow plus an inflow and infiltration allowance of 11,200 L/ha/d, to ensure hydraulic gradelines stay within safe operating levels).
3.1.4 Develop and implement asset management plans targeting a 100 year replacement or rehabilitation cycle for regional sewerage infrastructure.	Continuing	Continuing in Action 1.1 c) (continue to develop and implement asset management plans that address risks, including climate change and seismic events, and target a 100-year replacement or rehabilitation cycle for sewerage infrastructure).
3.1.5 Update and implement asset management plans for wastewater treatment plants which address risks, including climate change and seismic events, and maintain performance in wet weather.	Continuing	Continuing in Action 1.1 (continue to develop and implement asset management plans that address risks, including climate change and seismic events, and target a 100-year replacement or rehabilitation cycle for sewerage infrastructure) and Action 14.2 (update and implement asset management plans to enhance the operational efficiency of wastewater treatment plants, maintain the reliability of the existing infrastructure and equipment for wastewater treatment plants that address risks, including climate change and seismic events, and maintain performance in wet weather).
3.1.6 Assess the performance and condition of municipal sewerage systems by:	Continuing	Continuing in Action 1.1 (maintain the condition and performance of the sewerage system to serve a growing population in a changing climate).
3.1.6 (a) inspecting municipal sanitary sewers on a twenty-year cycle;	Continuing	Continuing in Action 1.1 a) (maintain the condition and performance of the sewerage system by inspecting sanitary sewers on a 20-year cycle;)
3.1.6 (b) maintaining current maps of sewerage inspection, condition and repairs; and	Continuing	Continuing in Action 1.1 b) (maintain the condition and performance of the sewerage system by maintaining current maps of sewerage inspection, condition, and repairs;)
3.1.6 (c) using the Metro Vancouver "Sewer Condition Reporting Template Standard Report, November 2002" as a guide to ensure a consistent approach to sewer system evaluation and reporting.	Continuing	Continuing in Action 1.1 (Metro Vancouver will use the National Association of Sewer Service Companies Pipeline Assessment Certification Program and Manhole Assessment Certification Program for (a) and (b). Members are encouraged to use these programs for (a) and (b) to ensure a consistent approach).
3.1.7 Work with Metro Vancouver to give effect to 3.1.2, 3.1.3 and 3.1.4.	Completed Continuing	Completed as reported in 2023 Biennial Report Volume 1 (Wet Weather Pricing was approved by the GVS&DD Board in February 2023). Continuing in Action 1.1 (continue to develop and implement asset management plans that address risks, including climate change and seismic events, and target a 100-year replacement or rehabilitation cycle for sewerage infrastructure); Action 1.2 (provide sanitary sewer and wastewater treatment plant hydraulic capacity for peak dry weather flow plus an inflow and infiltration allowance of 11,200 L/ha/d, to ensure hydraulic gradelines stay within safe operating levels); and Action 6.4 (review the wet weather sewer pricing formula every four years, and adjust if needed to further incentivize inflow and infiltration reductions my members).

3.1.8 Develop and implement asset management plans targeting a 100 year replacement or rehabilitation cycle for municipal sewerage infrastructure and provide copies of such plans to Metro Vancouver.	Continuing	Continuing in Action 1.1 (c) (continue to develop and implement asset management plans that address risks, including climate change and seismic events, and target a 100-year replacement or rehabilitation cycle for sewerage infrastructure).
3.2.1 With financial support from provincial and federal governments and the University of British Columbia, develop the Annacis Island Sustainability Academy to support innovative research and demonstration projects in liquid waste management.	Completed	Completed as reported in 2023 Biennial Report Volume 1 (The Annacis Research and Event Centre supports technology trials, training, conferences and education with wastewater treatment technology projects conducted in partnership with the University of British Columbia, the Vancouver Aquarium and other agencies, private firms, and academic institutions).
3.2.2 Collaborate with local and senior governments, academic institutions and industry in research on wastewater treatment technology and stormwater management and associated demonstration projects, training and development of educational toolkits.	Completed Continuing	Completed as reported in 2023 Biennial Report Volume 1 (Three innovative wastewater treatment technology research and pilot projects were highlighted: Hydrothermal Processing Demonstration facility, Lulu Island Pilot Digestion Optimization Facility, Advanced Resource Recovery from Wastewater [a five-year Industry Research Chair program at the University of British Columbia Okanagan co-funded by Natural Sciences and Engineering Research Council and Metro Vancouver]). Continuing in Action 17.1 (research, develop and pilot new methods through collaborating with researchers at academic institutions and other utilities and water research organizations); Action 17.2 (foster circular water economy innovation within the liquid waste system by promoting circular water economy innovation and research through sharing our story and actively participating in industry organizations and regional networks).
3.2.3 Undertake an annual internal audit of best practices of one regional liquid waste management sub program and environmental management system to identify opportunities for innovation and improvements.	Removed	Removed. Replaced by updated actions that require ongoing continuous improvement, monitoring and accountability. For more information, see 'Monitoring and Reporting' Section of this LWMP.
3.2.4 Undertake a tri-annual internal audit of best practices of one municipal liquid waste management sub-program in each municipality to identify opportunities for innovation and improvements.	Removed	Removed. Replaced by updated actions that require ongoing continuous improvement, monitoring and accountability. For more information, see 'Monitoring and Reporting' Section of this LWMP.
3.3.1 Continue to monitor the ambient environment conditions of relevant water bodies in the region in conformance with the Canada-wide Strategy for the Management of Municipal Wastewater Effluent (CWS-MMWE) requirements, and work with the Ministry of Environment in developing Environmental Quality Objectives.	Continuing	Continuing in Action 13.3 (continue to monitor influent and the receiving environment where wastewater treatment plants discharge and assess results to determine whether any actions, such as additional source control or treatment upgrades, are required); Action 20.2 (Metro Vancouver will continue to participate, and members may participate, in provincial processes to review and establish water uses and water quality objectives for specific water bodies within Metro Vancouver).
3.3.2 (Part 1) Continue to monitor the quantity and characteristics of Metro Vancouver's liquid waste point discharges to the environment	Continuing	Continuing in Action 13.2 (continue to monitor the quantity and characteristics of Metro Vancouver's wastewater treatment plant effluent discharges and assess effluent quality in accordance with the CWS-MMWE).

3.3.2 (Part 2) Continue to monitor Metro Vancouver's conformance with the Canada-wide Strategy for the Management of Municipal Wastewater Effluent (CWS-MMWE) requirements to meet Environmental Discharge Objectives.	Continuing	Continuing in Action 13.2 (continue to monitor the quantity and characteristics of Metro Vancouver's wastewater treatment plant effluent discharges and assess effluent quality in accordance with the CWS-MMWE).
3.3.3 Continue to operate its regional data collection network for sewers, rainfall and streams and use that data to assess the effectiveness of actions taken under this plan.	Continuing	Continuing in Action 6.3 (monitor municipal sewer flows and levels in their existing network to inform their inflow and infiltration dashboards. Members will expand the monitoring network if needed to better understand where inflow and infiltration is happening); Action 8.9 (maintain monitors at combined sewer overflow sites); Action 10.1 (use the Stormwater Monitoring and Adaptive Management Framework (AMF) to monitor watershed health); Action 10.2 (continue to develop, review and update Integrated Watershed Management Plans (IWMPs)).
3.3.4 In collaboration with municipalities, estimate and document the greenhouse gas emissions and odours associated with the operation of the municipal and regional liquid waste management systems (see Actions 1.3.8, 1.3.10, 1.3.15, and 1.3.17).	Continuing	Continuing in Action 18.5 (continue odour management programs at wastewater treatment plants and targeted facilities in the regional sewer system); Action 18.6 (continue existing municipal odour control programs and implement new programs for targeted municipal sewer facilities); Action 18.1 (develop and implement programs and policies to track greenhouse gas emissions associated with the construction and operation of wastewater collection and treatment systems, including developing and implementing new monitoring plans where necessary).
3.3.5 Estimate and report on the frequency, location and volume of sewage overflows from regional combined and sanitary sewers, and where feasible identify and address the probable causes.	Continuing	Continuing in Action 7.3 (report annually on the number and location of sanitary sewer overflows, and, where feasible, the estimated volumes and probable causes); and Action 8.2 (estimate and report annually on the frequency, location and volume of sewage overflows from regional combined sewers, and where feasible identify and address the probable causes)
3.3.6 In collaboration with Metro Vancouver, estimate and document the greenhouse gas emissions and odours associated with the operation of the municipal and regional liquid waste management systems.	Continuing	Continuing in Action 18.5 (continue odour management programs at wastewater treatment plants and targeted facilities in the regional sewer system); Action 18.6 (continue existing municipal odour control programs and implement new programs for targeted municipal sewer facilities); Action 18.1 (develop and implement programs and policies to track greenhouse gas emissions associated with the construction and operation of wastewater collection and treatment systems, including developing and implementing new monitoring plans where necessary).
3.3.7 Estimate and report on the frequency, location and volume of sewage overflows from municipal combined and sanitary sewers, and where feasible identify and address the probable causes.	Continuing	Continuing in Action 7.3 (report annually on the number and location of sanitary sewer overflows, and, where feasible, the estimated volumes and probable causes); and Action 8.4 (Members with combined systems will continue to estimate and report annually on the frequency, location and volume of combined sewer overflows from municipal sewers, and where feasible identify and address the probable causes).
3.3.8 Maintain and, if necessary, expand the existing municipal sewer flow and sewer level monitoring network.	Continuing	Continuing in Action 6.3 (monitor municipal sewer flows and levels in their existing network to inform their inflow and infiltration dashboards. Members will expand the monitoring network if needed to better understand where inflow and infiltration is happening).
3.4.1 Design and adapt infrastructure and operations to address identified risks and long-term needs including risks associated with climate change.	Continuing	Continuing in Action 13.1 (plan, design, operate and maintain wastewater treatment infrastructure using the CWS-MMWE Environmental Risk Management Framework to address and adapt to identified risks and long term needs, and will additionally incorporate risks associated with climate change into the framework).

3.4.2 In collaboration with municipalities and the Integrated Partnership for Regional Emergency Management (IPREM), develop emergency management strategies and response plans for municipal and regional wastewater collection and treatment systems, including identifying and maintaining a system of emergency wastewater overflow locations.	Removed	Removed. Emergency management planning is regularly conducted as part of ongoing operations as required under British Columbia's *Emergency and Disaster Management Act* and no longer needs to be included in the LWMP.
3.4.3 Ensure liquid waste infrastructure and services are provided in accordance with the Regional Growth Strategy and coordinated with municipal Official Community Plans.	Continuing	Continuing in Action 1.4 (Metro Vancouver and members' provision of liquid waste infrastructure and services will be consistent with the Regional Growth Strategy and coordinated with municipal Official Community Plans).
3.4.4 In collaboration with Metro Vancouver and the Integrated Partnership for Regional Emergency Management (IPREM), develop emergency management strategies and response plans for municipal and regional wastewater collection and treatment systems.	Removed	Removed. Emergency management planning is regularly conducted as part of ongoing operations as required under British Columbia's *Emergency and Disaster Management Act* and no longer needs to be included in the LWMP.
3.4.5 Adapt infrastructure and operations to address risks and long-term needs.	Continuing	Continuing in Action 2.3 (continue to plan, locate, design, and adapt infrastructure, assets, and operations to address identified hazards, risks, and vulnerabilities, including climate change impacts).
3.4.6 Ensure liquid waste infrastructure and services are provided in accordance with the Regional Growth Strategy and coordinated with municipal Official Community Plans.	Continuing	Continuing in Action 1.4 (Metro Vancouver and members' provision of liquid waste infrastructure and services will be consistent with the Regional Growth Strategy and coordinated with municipal Official Community Plans).
3.4.7 Develop and implement integrated stormwater management plans at the watershed scale that integrates with land use to manage rainwater runoff	Continuing	Continuing in Action 10.4 (align land-use planning and development with IWMPs to ensure development decisions support watershed health objectives, including protecting riparian areas and agricultural areas).
3.5.1 Establish a new overarching committee, the Integrated Utility Management Advisory Committee (IUMAC), to advise Metro Vancouver on plan implementation, particularly from the perspectives of integrated planning and resource recovery across utility systems.	Removed	The structure of the Integrated Utility Management Advisory Committee was appropriate for the 2011 LWMP at the time of development and adoption. The REAC Liquid Waste Sub-Committee (staff representatives from Metro Vancouver and member jurisdictions) is better suited to track ongoing progress on member actions in the LWMP. Progress on Metro Vancouver actions in this LWMP will be discussed and tracked through meetings with the Province. Refer to 'Monitoring and Reporting' section of the LWMP for more information.
3.5.2 Continue to receive advice from the Environmental Monitoring Committee (EMC) and Stormwater Interagency Liaison Group (SILG) as subcommittees under the IUMAC.	Removed Continuing	The Integrated Utility Management Advisory Committee no longer exists so reference to this committee is removed. Continuing in Action 12.1 (coordinate a revision of the interagency group's terms of reference, possibly to operate as a sub-committee under the Regional Engineer's Advisory Committee (REAC), to lead local research on rainwater management, to be the primary regional advocate with regulators, to promote education and outreach on rainwater management, and to coordinate region-wide accountability on IWMP actions); and Action 19.1 (continue to receive advice from the Environmental Monitoring Committee).

3.5.3 Use the Burrard Inlet Environmental Action Program and the Fraser River Estuary Management Program Management Committee (BIEAP-FREMP) as the senior level forum for discussion of policy and assessment of the scientific work related to the plan, and for resolving toxicity concerns and any disputes among its members related to implementing the plan.	Continuing	Continuing in Action 20.1 (participate in relevant collaborative environmental program(s) for regional water bodies (i.e., Fraser River, Burrard Inlet, Strait of Georgia) along with First Nations, senior government, and interested parties).
3.5.4 Biennially produce a progress report on plan implementation for distribution to the Ministry of the Environment that:	Removed	Removed. Biennial reporting will be replaced by a short LWMP Annual Report, dashboards, and progress meetings. Refer to reporting commitments described in 'Monitoring and Reporting' Section of this LWMP.
3.5.4 (a) summarizes progress from the previous two years on plan implementation for all Metro Vancouver actions, including the status of performance measures	Removed	Removed. Biennial reporting will be replaced by a short LWMP Annual Report, dashboards, and progress meetings. Refer to reporting commitments described in 'Monitoring and Reporting' Section of this LWMP.
3.5.4 (b) includes summaries and budget estimates for proposed LWMP implementation programs for the subsequent two calendar years.	Removed	Removed. Replaced with reporting commitments described in 'Monitoring and Reporting' section of this LWMP.
3.5.5 Hold a public accountability session based on the biennial reports (Actions 3.5.4 and 3.5.8) by making the report available through Metro Vancouver's website and by holding a special meeting of the Metro Vancouver Waste Management Committee to receive public comments and input on the report.	Removed	Removed. Biennial reporting will be replaced by a short LWMP Annual Report, dashboards, and progress meetings. Refer to reporting commitments described in 'Monitoring and Reporting' section of this LWMP.
3.5.6 Report directly to the Ministry of Environment annual progress on integrated stormwater management plan implementation and all occurrences of sanitary sewer overflows.	Continuing	Continuing in Action 7.2 (inform the Province, regional health authorities, and the First Nations Health Authority of any sanitary sewer overflows as soon as they occur); Action 7.3 (report annually on the number and location of sanitary sewer overflows, and, where feasible, the estimated volumes and probable causes); Action 10.1 (use the Stormwater Monitoring and Adaptive Management Framework to monitor watershed health). Refer to reporting commitments described in 'Monitoring and Reporting' section of this LWMP.
3.5.7 In collaboration with members and the Ministry of Environment, undertake a comprehensive review and update of the plan on an eight year cycle.	Removed	Removed. This action is superseded due to a provision from the Ministry of Environment and Climate Change Strategy to make mid-plan amendments during the approximately 10-year cycle of the LWMP, should any changes be required.
3.5.8 Biennially, through Metro Vancouver, produce a progress report on plan implementation for distribution to the Ministry of the Environment that:	Removed	Removed. Biennial reporting will be replaced by a short LWMP Annual Report, dashboards, and progress meetings. Refer to reporting commitments described in 'Monitoring and Reporting' section of this LWMP.
3.5.8 (a) summarizes progress from the previous two years on plan implementation for all municipal actions, including the status of performance measures.	Removed	Removed. Biennial reporting will be replaced by a short LWMP Annual Report, dashboards, and progress meetings. Refer to reporting commitments described in 'Monitoring and Reporting' section of this LWMP.
3.5.8 (b) includes summaries and budget estimates for proposed LWMP implementation programs for the subsequent two calendar years.	Removed	Removed. Replaced with reporting commitments described in 'Monitoring and Reporting' section of this LWMP.
3.5.9 Report through Metro Vancouver to the Ministry of Environment annual progress on integrated stormwater management plan implementation and all occurrences of sanitary sewer overflows.	Continuing	Continuing in Action 7.2 (inform the Province, regional health authorities, and the First Nations Health Authority of any sanitary sewer overflows as soon as they occur); Action 7.3 (Members will report annually on the number and location of sanitary sewer overflows, and, where feasible, the estimated volumes and probable causes); Action 10.1 (use the Stormwater Monitoring and Adaptive Management Framework to monitor watershed health). Refer to reporting commitments described in 'Monitoring and Reporting' section of this LWMP.

3.5.10 Work with Metro Vancouver to give effect to 3.5.2, 3.5.5 and 3.5.7.	Removed Continuing	The Integrated Utility Management Advisory Committee no longer exists so reference to this committee is removed. Reporting actions removed (3.5.5 and 3.5.7). Biennial reporting will be replaced by a short LWMP Annual Report, dashboards, and progress meetings. Refer to reporting commitments described in 'Monitoring and Reporting' Section of this LWMP. 2011 LWMP Action 3.5.2 is continuing in Action 12.1 (coordinate a revision of the interagency group's terms of reference, to possibly operate as a sub-committee under the Regional Engineer's Advisory Committee (REAC), to lead local research on rainwater management, to be the primary regional advocate with regulators, to promote education and outreach on rainwater management, and to coordinate region-wide accountability on IWMP actions. Metro Vancouver and members will actively participate in the revitalized interagency group); and Action 19.1 (continue to receive advice from the Environmental Monitoring Committee).

Appendix E – Status of Past Actions from 2002 LWMP

Actions - Ministerial Conditions (MCs)	Status	Rationale
MC 1 Provide an opportunity for the public to have meaningful input into the implementation of the LWMP. Within two months of the publication of the biennial report referred to on page 55 of the LWMP, the district will notify the public of the existence of the report and receive comments and submissions at a special meeting of the district's Sewerage and Drainage Committee. The district will forward the minutes of this meeting, and copies of any submissions made, to Douglas Pope, Regional Environmental Protection Manager (the manager).	Completed Removed	Completed as reported in 2010 biennial report (a special meeting was held on March 11, 2009 to receive public input on the September 2008 Biennial Report, minutes from which were forwarded to the Ministry). Removed as an action, superseded by more recent direction from the Province regarding engagement and public involvement, and replaced with reporting commitments described in 'Monitoring and Reporting' section of this LWMP.
MC 2 Develop the environmental "triggers" used in the monitoring process by January 31, 2004, recognizing that the environmental monitoring process in the LWMP is based on discharge indicator trend analysis such that action will be implemented before Water Quality Objectives or other criteria are met or exceeded. The monitoring program shall include sediment quality, bioaccumulation of contaminants in marine life forms and structure of biological community, in addition to water quality parameters;	Completed Removed	Completed as reported in 2010 biennial report (Metro Vancouver submitted the "Cautions, Warnings, and Triggers Process" to the Ministry of Environment. A version of the triggers process similar to Metro Vancouver's environmental triggers concept was also adopted by the CCME CWS-MMWE (Canada Wide Strategy for the Management of Municipal Wastewater Effluent) through its Risk Management Strategy in 2009). Removed as an action, superseded by the CCME CWS-MMWE and the development of Effluent Discharge Objectives (EDOs).
MC 3 Establish a linkage between biosolids quality and the effectiveness of source control programs;	Completed	Completed as reported in 2008 biennial report (Metro Vancouver has worked to eliminate batch discharge of materials at point sources which can cause rapid metal concentrations in liquid waste discharges. Increasing awareness of downstream impacts with industrial and commercial dischargers through visible sewer monitoring and targeted education programs have successfully prevented metals spikes that were more frequent before implementation of these programs).
MC 4 Eliminate chronic sanitary sewer overflows at Cloverdale and Maillardville by January 31, 2005 and eliminate all sanitary sewer overflows in the district that occur during storm or snowmelt events with less than a 5-year return period, by January 31 , 2012;	Removed Continuing	Removed. With aging infrastructure and more frequent extreme weather events, the locations of chronic sanitary sewer overflows are changing over time so these may be outdated. Continuing in Action 7.5 (continue to develop and implement municipal-regional sanitary overflow management plans to eliminate overflows at chronic locations).
MC 5 a) Modify C8 contained in the Policy and Commitment Document relating to upgrading schedule and toxicity as follows: a) Commitment C8 of Addendum No. 1 shall include a requirement that the district will upgrade Iona Island and Lions Gate sewage treatment plants to full secondary treatment no later than 2020 and 2030, respectively;	Removed	Removed and replaced with Wastewater Treatment Plant Upgrade and Expansion Schedule in this LWMP that will show the planned timing and treatment levels for wastewater treatment plants. Refer to Appendix A for this table.

MC 5 b) Modify C11 contained in the Policy and Commitment Document relating to upgrading schedule and toxicity as follows: Third paragraph of Commitment C11 shall be revised to read, '' ... The district will determine whether the cause of failed bioassay toxicity tests on effluent from Lions Gate and Iona Island treatment plants is only due to ammonia. The district shall, in consultation with the Environmental Monitoring Committee, evaluate options to address non-ammonia-related toxicity, and prepare and submit to the manager within 90 days an action plan to significantly reduce non-ammonia-related acute toxicity at the point of discharge. The action plan shall include a repetitive process for continuous improvements both upstream and to treatment if acute toxicity has not been significantly reduced once the original action plan is implemented."	Completed	Completed as reported in 2010 biennial report (In 2008 and 2009, all unsuccessful bioassay tests at Annacis and Lulu Island, Lions Gate, and Northwest Langley wastewater treatment plants were shown to be due to ammonia/pH shift. At the Iona Island Wastewater Treatment Plant, high oxygen demand and resulting low oxygen concentrations was the cause of all unsuccessful bioassay test results. Methods to prevent toxicity were implemented).
MC 6 Complete, by January 31 , 2007, each of the following: a) cost/benefit studies directed at implementing effective water conservation measures, including evaluating implementation of a universal water metering system throughout the district;	Completed	Completed as reported in the 2008 biennial report (economic analysis concluded that certain demand management measures were cost effective and sustainable and these were included as actions in the 2005 *Drinking Water Management Plan*).
MC 6 Complete, by January 31 , 2007, each of the following: b) reclaimed water projects at the treatment plants and elsewhere within the district; and	Completed	Completed as reported in the 2008 biennial report (construction of the Annacis effluent reclamation plant was completed in 2005 to demonstrate that water, suitable for a variety of applications, can be reclaimed from wastewater effluent thereby reducing the overall demand for high quality potable water).
MC 6 Complete, by January 31 , 2007, each of the following: c) a biosolids management plan.	Completed	Completed as reported in the 2010 biennial report (Key strategies for biosolids management contained in the Biosolids Management Plan Framework, submitted to the Ministry in late 2006, have been incorporated into the update of the LWMP).
MC 7 By January 31, 2003, establish a program to study endocrine disrupting chemicals (EDCs), persistent organic pollutants (POPs) and other microcontaminants such as pharmaceutical drugs found in regional (the district) liquid waste, and their potential environmental impacts. This should include, but not be limited to, effluent characterization to identify and quantify the contaminants and biological assays using new techniques such as gene chip arrays to determine their sublethal impacts. It would be coupled with determining the environmental fate of priority contaminants and be carried out in consultation with the district LWMP Environmental Monitoring Committee. The district will work with the Capital Regional District on such studies if the Capital Regional District undertakes similar work.	Completed	Completed as reported in the 2010 biennial report (As part of Metro Vancouver's comprehensive program to characterize the effluent from its five wastewater treatment plants, Metro Vancouver collaborates with Simon Fraser University, the University of British Columbia, and Environment Canada on studying micro-contaminants in treated wastewater).
Actions - Commitments (C)	**Status**	**Rationale**
Receiving Environment		
C1. Official Designation for Water Uses The District and municipalities will take an active role in providing information to the Ministry of Environment, Lands and Parks (MELP) so that appropriate water uses receive official designation from MELP through a consultative process for each of the major water bodies within the region. A review of a designated water use may be initiated by the District or a member municipality. The consultative process will follow Track 1 – Setting Guidelines from Principles as documented in the Ministry of Environment, Lands and Parks Guidelines and Standards Procedure, dated October 7, 1997. The process as outlined in Track 1 requires the preparation of a draft report by the Ministry. The following process will apply to local government participation during the preparation of the draft report to be prepared by the Ministry under the Guidelines and Standards Procedure:	Continuing	Continuing in Action 20.2 (continue to participate, and members may participate, in provincial processes to review and establish water uses and water quality objectives for specific water bodies within Metro Vancouver).

1. The Ministry will advise the District and its member municipalities, in writing, when a water use or water quality objective initiative is commenced. 2. The Ministry will develop the scope of work for their draft report in consultation with the Environmental Monitoring Committee. The Ministry will review the draft report work progress with the Environmental Monitoring Committee on a regular basis. The Environmental Monitoring Committee will play an active role in the development of the report and cost implications to the District and member municipalities will be provided for inclusion in the report. 3. The cost and benefit of designated water uses, or proposed changes to designated water uses, and their associated water quality objectives will be fully documented in the draft report and the GVRD Board and municipal councils will have the opportunity to review and comment on the draft report.		
C2. Establishment of an Environmental Monitoring Committee The District will establish an Environmental Monitoring Committee comprised of members from the District, municipalities, B.C. Ministry of Environment, Lands, and Parks, Environment Canada, Fisheries and Oceans Canada, research institutions, and public (dependent on interest). The committee will be responsible for reviewing the scope and design of monitoring programs, review of monitoring results, predictive modelling, and risk assessments of waste discharges. The committee's recommendations with respect to upgraded service levels will be considered by the District and member municipalities during an options assessment process.	Continuing	Continuing in Action 19.1 (continue to receive advice from the Environmental Monitoring Committee. The Committee will continue to be responsible for reviewing the scope and design of monitoring programs, review of monitoring results, predictive modelling, and risk assessments of waste discharges).
C3. Development Of Discharge Indicators The District will continue to develop and refine indicators of environmental effects related to wastewater discharges and stormwater runoff within the region. These indicators will be used to guide the collection and interpretation of environmental information by the District and municipalities. The District report, "Discharge Rating Measures for LWMP Discharges," included in Appendix C, will form an initial basis for this work.	Removed	Superseded by several LWMP actions that monitor or assess receiving environments. For examples, see actions in Strategy 7 Minimize impacts of sanitary sewer overflows on human health and environment; Strategy 8 Assess combined sewer overflows' impact on receiving environment; Strategy 10 Manage rainwater and urban development for watershed health; Strategy 19 Environmental monitoring to protect public health and the environment.
C4. Monitoring Programs The District and member municipalities will undertake monitoring, assessment and forecasting to evaluate the effects of wastewater and stormwater discharges to receiving environments - Effluent quality monitoring at all treatment plants for selected physico-chemical and biological characteristics (e.g., BOD, TSS, ammonia, and trace metals as well as appropriate bioassays and fecal coliform). Detailed effluent characterization of trace organic contaminants will be conducted periodically at the recommendation of the Environmental Monitoring Committee. - Routine monitoring of bacteriological water quality of beach areas within Burrard Inlet, Sturgeon Banks, Roberts Bank, and Boundary Bay. Sampling sites and frequency will be modified to provide a better understanding of point and non-point contaminant sources. - Ambient receiving environment monitoring in areas where water quality (as indicated by water quality objective criteria) is potentially affected by wastewater and/or stormwater. The Iona Island deep-sea outfall receiving environment program will be maintained. The need for, and details associated with, additional programs will be determined in consultation with the Environmental Monitoring Committee. - Occurrence and duration monitoring of CSO events at all District owned outfalls. Detailed effluent characterization of trace contaminants at a limited number of outfalls will be conducted periodically at the	Continuing	Continuing in Action 7.4 (conduct risk assessments at any new significant regional sanitary sewer overflow locations and will holistically compare the risk assessments of all sanitary sewer overflow locations to determine their relative risk, considering risks to public health and the environment); Action 8.5 (continue to assess change in receiving environment water quality resulting from any measures taken to address combined sewer overflow discharges. Metro Vancouver will report out, as applicable, in the *Environmental Management and Quality Control Annual Report*); Action 10.1 (use the Stormwater Monitoring and Adaptive Management Framework (AMF) to monitor watershed health); Action 13.2 (continue to monitor the quantity and characteristics of Metro Vancouver's wastewater treatment plant effluent discharges and assess effluent quality in accordance with the CWS-MMWE), Action 13.3 (continue to monitor influent and the receiving environment where wastewater treatment plants discharge and assess results to determine whether any actions, such as additional source control or treatment upgrades, are required); Action 19.2 (continue to monitor recreational water quality (seasonal beach monitoring) throughout the region , will continue to share this information with municipal beach operators and local Health Authorities, and will share this information with the First Nations Health Authority)

recommendation of the Environmental Monitoring Committee. - Monitoring and assessment of sensitive receiving environments following the discharge of SSOs.		
C5. Risk Assessment for Fraser River Irrigation Water Use The District will undertake an analysis of risks associated with the use of Fraser River water for agricultural irrigation within the GVRD area. Options for managing the defined risks will be developed and assessed.	Completed	Completed as reported in 2010 Biennial Report (study titled *Preliminary Risk Assessment for Use of Fraser River Water for Irrigation in the Greater Vancouver Regional District, December 2002*).
C6. Harmonization with Federal Legislation The District will work with the Federal Government to harmonize approaches regarding municipal discharges. The District will assist in the development of a national municipal effluent strategy, which is being led by Environment Canada.	Completed	Completed as reported in 2010 Biennial Report (Metro Vancouver has worked with senior governments and contributed to the development of a Canada-wide strategy for the management of municipal wastewater effluent. The strategy was developed by the Canadian Council of Ministers of the Environment (CCME), and endorsed by the CCME on February 17, 2009).
C7. Data Sharing and Communication The District will share environmental information and knowledge with member municipalities, other agencies, and the public in an open and timely fashion. Moreover, the District will proactively seek out venues, technologies, and media through which to efficiently communicate environmental information to the public.	Completed Removed Continuing	Completed as reported in 2010 Biennial Report (Metro Vancouver posts monthly data on effluent quality from the wastewater treatment plants on its website and provides annual reports on the monitoring programs for wastewater, biosolids and receiving water quality on the following website: https://metrovancouver.org/services/liquid-waste/reports-and-resources). Data from the Recreational (beach) Water Monitoring Program is shared with Vancouver Coastal Health, Fraser Health, (and municipalities, if requested) on an ongoing basis and the data is used by the public health authorities to help determine the suitability of beaches for primary contact recreation. All final reports for environmental monitoring work are placed in Metro Vancouver's Harry Lash Library for public access). Removed as an action in this LWMP. Continuing as described in the 'Monitoring and Reporting' section of this LWMP. LWMP Annual Report, dashboards, and the *Environmental Management and Quality Control Annual Report* will be posted publicly on Metro Vancouver's website.
Treatment Plants		
C8. Upgrading of Iona Island and Lions Gate Treatment Plants The District will upgrade the Iona Island and Lions Gate treatment plants by adding facilities for chemical addition (enhanced primary treatment) if necessary to maintain the established base level of treatment as defined by Policy P4. The District will construct facilities for biological treatment in the following circumstances: – if necessary to address environmental concerns in accordance with Policy P2. – to maintain effluent concentration and loading levels which are beyond the capability of enhanced primary treatment.	Completed Removed	Completed as reported in the 2010 biennial report (project definition reports and conceptual designs for new wastewater treatment plants were initiated). Removed and replaced with Wastewater Treatment Plant Upgrade and Expansion Schedule in this LWMP that shows the planned timing and treatment levels for wastewater treatment plants. Refer to Appendix A for this table.

C9. Treatment Plant Upgrading Projections The District will monitor plant influent and effluent to determine plant performance and trends and maintain a minimum 10-year future projection to determine the adequacy of plant process components and to establish process component design capacities for Operating Certificates .	Continuing	Continuing in Action 13.1 (plan, design, operate and maintain wastewater treatment infrastructure using the CWS-MMWE Environmental Risk Management Framework to address and adapt to identified risks and long term needs); Action 13.3 (continue to monitor influent and the receiving environment where wastewater treatment plants discharge and assess results to determine whether any actions, such as additional source control or treatment upgrades, are required).
C10. Secondary Effluent Disinfection The District will undertake engineering investigations examining the potential for effluent disinfection using ultraviolet light as an alternative to the use of chlorine at its Northwest Langley, Annacis Island, and Lulu Island wastewater treatment plants.	Completed	Completed as reported in 2010 Biennial report.
C11. Treatment Plant Effluent Toxicity Assessment For treatment plant effluent the District will undertake toxicity assessments to determine the probable cause of effluent toxicity and its significance relative to the receiving environment as described by Policy P2. The District will conduct monthly 96-hour acute bioassays on full strength effluent at each of the five wastewater treatment plants and review the results with the Environmental Monitoring Committee. The District will examine the results of the bioassay tests at Lions Gate and Iona Island treatment plants to determine the cause of effluent toxicity. Within the limitations of the existing liquid waste management treatment process and infrastructure, the District will evaluate options for improving the results of the bioassay tests. The selection of any option by the District will be made in consultation with the Environmental Monitoring Committee.	Completed Continuing	Completed as reported in the 2010 Biennial report (toxicity assessments at all five wastewater treatment plants in 2008 and 2009). Continuing in Action 13.2 (continue to monitor the quantity and characteristics of Metro Vancouver's wastewater treatment plant effluent discharges and assess effluent quality in accordance with the CWS-MMWE); Action 13.3 (continue to monitor the receiving environment where wastewater treatment plants discharge and assess results to determine whether any actions, such as additional source control or treatment upgrades, are required).
Combined Sewer Systems		
C12. CSO Monitoring The District will install monitors at all 14 CSO outfall sites under its jurisdiction to determine depth and duration of combined sewer overflows and an estimate of volume.	Completed Continuing	Completed as reported in the 2010 Biennial report (For the period of 2008 to 2009, Metro Vancouver continued to monitor combined sewer overflow events at all 18 outfall sites under its jurisdiction. Refer to Appendix B – Combined Sewer Overflow Reporting in the 2010 Biennial report). Continuing in Action 8.9 (Metro Vancouver and members with combined systems will maintain monitors at combined sewer overflow sites).
C13. Operational Improvements Requires the implementation of specific projects for operational improvements at combined sewer outfall locations. In respect to the Clark Drive Outfall, the District and municipalities will implement the following projects: • Vernon Relief Drain CSO storage; • Copley / Collingwood sanitary sewer extension to 8th Avenue Interceptor • Redirection of Columbia Pump Station discharges to downstream of Yukon Gate; • City of Vancouver Thornton pump station and forcemain realignment (completed in 2000) • City of Vancouver Hastings Park lost-stream daylighting (part of combined sewer separation – Commitment C15)	Completed Continuing	Completed as reported in 2010 Biennial report (description of site-specific upgrades within Vancouver Sewerage Area, Poplar Landing combined sewer overflow storage tank, Columbia Pump Station; Source Control actions on mercury and silver) Continuing in Action 8.8 (continue to develop and implement system optimization projects in the near term to minimize combined sewer overflow sanitary sewage loading and minimize total combined sewer overflow volume spilled).

C13. Operational Improvements (cont'd) • Combined sewer separation programs (Commitment C15) In addition, the District will, in consultation with stakeholders, investigate further site-specific CSO management options at the Clark Drive Outfall location. The District will also investigate further operational improvements for the Clark Drive catchment. The District will complete feasibility studies and detailed cost-benefit analysis for the following projects that offer potential operational benefits, overflow frequency or loading reductions, or receiving environment improvements: • Glenbrook Trunk Sewer separation; • New Westminster Interceptor West Branch sewer separation; • English Bay Outfall and Alma-Discovery Outfall storage and disconnection of storm inflow to Alma-Discovery outfall; • Jervis and Chilco Pump Stations forcemain and control improvements; • Operational Improvements – Fraser River North Arm; • Operational Improvements – New Westminster Area; • Operational Improvements – Westridge Area; and • Source control initiatives targeting mercury and silver reductions. Based on environmental data, which indicates that there are measurable near-field impacts at the Clark Drive outfall into Burrard Inlet, the District will undertake further environmental assessments at Clark Drive to assess the benefits of the improvements. This work will be conducted under the supervision of the Environmental Monitoring Committee (see Commitment C2). The municipalities of Vancouver and Burnaby and the District will also undertake a review of combined sewer separation and system upgrade schedules necessary to fast-track the elimination of Clark Drive CSOs earlier than 2050. In addition to the ongoing monitoring program at the Glenbrook Outfall, the District and the City of New Westminster will undertake assessment of all other CSOs on the New Westminster waterfront for quality and environmental impact on a five-year frequency, commencing in 2001, and thereafter as part of the five-year plan review process, in order to evaluate program progress and effectiveness and determine the need for further action by New Westminster in accordance with Policy P2.		
C14. Biennial Liquid Waste Management Plan Progress Report The District will summarize the CSO monitoring results, CSO environmental monitoring and assessment results, sewerage and drainage expenditures for CSO projects, and results of CSO operational improvement investigations and implementation in a Liquid Waste Management Plan biennial progress report. The biennial reporting period will end on December 31st of every second calendar year and the report will be due by the end of March (90 days to compile). The first reporting period will end in the second whole year (not less than 24 months and not more than 36 months) following the year an LWMP is approved. An interim annual report will be submitted in March and will summarize the key achievements that occurred in the previous year.	Completed Removed Continuing	Completed as reported in 2010 Biennial report. Removed. Biennial reporting will be replaced by a short LWMP Annual Report, dashboards, and progress meetings. Refer to reporting commitments described in the 'Monitoring and Reporting' Section of this LWMP. Continuing in Action 8.2 (continue to estimate and report annually on the frequency, location and volume of sewage overflows from regional combined sewers, and where feasible identify and address the probable causes); Action 8.4 (continue to estimate and report annually on the frequency, location and volume of combined sewer overflows from municipal sewers, and where feasible identify and address the probable causes).

C15. Combined Sewer Overflow Elimination The cities of Vancouver, Burnaby, and New Westminster will implement combined sewer separation programs that will replace aging combined sewers with separate sanitary and storm sewers and lead to the elimination of combined sewer overflows. 1. The City of Vancouver will continue with the present combined sewer system separation program at approximately 1 per cent of the system per year to target elimination of combined sewer overflows in the Vancouver Sewerage Area by 2050. 2. The City of Burnaby will implement a combined sewer separation program that proceeds on an annual basis, at a uniform rate, and that targets elimination of combined sewer overflows in the Vancouver Sewerage Area by 2050 and in the Fraser Sewerage Area by 2075. 3. The City of New Westminster is committed to implementation of Combined Sewer Overflow (CSO) reduction measures which meet or exceed 1% per year, resulting in long-term CSO elimination by means of sewer separation as well as by other means (e.g., detention storage, source controls, etc.). The city will complete the installation of storm sewers within 22 per cent of the combined sewer area by 2012. This effort will focus on the lower Columbia catchment. Opportunistic sewer separation will also occur in other areas where capacity is an issue with existing combined sewers. The entire sewer system will be video inspected by 2012 and infiltration and inflow reduction achieved through sewer rehabilitation. In addition, source control projects (such as removal of rainwater roof leaders from direct connection to the sewer system) will be implemented, and the effectiveness of these methods will be evaluated. Overall, this program will produce CSO reductions at a rate in excess of 1% per year.	Continuing	Continuing in Action 9.2 (develop intermediate targets on a five-year interval for municipal and regional separation of prioritized combined catchments); Action 9.3 (Burnaby, New Westminster, and Vancouver will continue to work with Metro Vancouver to develop and implement Sewer Separation and Combined Sewer Overflow Elimination Plans to prevent combined sewer overflows, and in the interim, support the intermediate targets developed in action 9.2; Burnaby, New Westminster, and Vancouver will separate municipal collector sewers according to the Sewer Separation Plans).
C16. Operational Improvement Investigations Municipalities will complete feasibility studies and detailed cost benefit analysis for the following projects that offer potential operational benefits, overflow frequency or loading reductions, or receiving environment improvements: • Cambie Pump station and outfall improvements (Vancouver); • 1st and Boundary pump station realignment (Vancouver and Burnaby); and • Stormwater redirection to Grandview Cut (Vancouver).	Completed Continuing	Completed as reported in 2010 Biennial report (Studies are being undertaken to look at ways to achieve early combined sewer overflow reductions cost-effectively. These studies are ongoing in conjunction with the main line sewer separation program and private property separation program). Continuing in Action 8.8 (continue to develop and implement system optimization projects in the near term to minimize combined sewer overflow sanitary sewage loading and minimize total combined sewer overflow volume spilled, while also considering effects on sanitary sewage loading from sanitary sewer overflows).
C17. Best Management Practices The Cities of Vancouver, Burnaby, and New Westminster will continue with best management practices such as catch basin cleaning that reduce loads to combined sewers at source and rain barrel, impervious area reduction, or on-site storage that reduces peak flows or volumes of stormwater runoff to sewers.	Completed Continuing	Completed to varying extents by different municipalities with combined sewer systems as reported in 2008 Biennial report, Appendix 2. Continuing in Action 10.2 (continue to develop, review and update Integrated Watershed Management Plans (IWMPs)); and Action 10.5 (expand the use of green infrastructure, blue infrastructure, and other practices to mimic natural watersheds, reduce runoff and discharge, improve water quality and increase climate resilience. Members with combined sewers will expand the use of green infrastructure to complement combined sewer separation).

C18. Biennial Liquid Waste Management Plan Progress Report Every two years municipalities with combined sewers will summarize and forward to the District for inclusion in a biennial Liquid Waste Management Plan progress report the following information: • Sewer system mapping that indicates the overall extent of combined, sanitary, and storm sewers, the extent of combined sewers replaced by separate sewers in the past two years, the location of new storm outfalls, and the extent of private property combined service connections replaced by separate service connections. • A summary of sewerage and drainage system expenditures for the past two years. The biennial reporting period will end on December 31 of every second calendar year and the report will be due by the end of March (90 days to compile). The first reporting period will end in the second whole year (not less than 24 months and not more than 36 months) following the year an LWMP is approved. An interim annual report will be submitted in March and will summarize the key achievements that occurred in the previous year.	Removed	Removed. Biennial reporting will be replaced by a short LWMP Annual Report, dashboards, and progress meetings. Refer to reporting commitments described in 'Monitoring and Reporting' Section of this LWMP.
Separate Sanitary Sewer Systems		
C19. Infrastructure Management The District and its member municipalities will establish ongoing sanitary sewer system evaluation programs to determine the condition of the regional trunk sewerage system, the municipal sewerage system, and private property service laterals. As required, legislative and legal authority will be sought to address infiltration and inflow originating from private property service laterals. These evaluation programs will be ongoing and determine the condition of the entire sewer system over a 20-year time cycle. The District and its member municipalities will develop and apply a consistent approach to sewer system evaluation surveys. Repair and replacement programs will be established based on targets set for sanitary sewer overflow reduction and the severity of infiltration and inflow relative to the design allowance of 11,200 litres per hectare per day.	Completed Continuing	Completed to varying extents by member jurisdictions as reported in 2010 Biennial report. Completed via Metro Vancouver report "Private Sewer Lateral Programs: A Study of Approaches and Legal Authority for Metro Vancouver Municipalities." Continuing in Action 1.1 (maintain the condition and performance of the sewerage system to serve a growing population in a changing climate); Action 1.2 (provide local collector and regional trunk sanitary sewer capacity; and wastewater treatment plant hydraulic capacity for peak dry weather flow plus an inflow and infiltration allowance of 11,200 L/ha/d, to ensure hydraulic gradelines stay within safe operating levels)
C20. New Construction Objectives The District and its member municipalities will review engineering standards and guidelines for new sewer construction with the objective of ensuring a high standard for new construction to minimize future infiltration and inflow problems.	Completed Continuing	Completed as reported in the 2010 Biennial report (Master Municipal Construction Document design standards were modified to reduce inflow and infiltration). Continuing in Action 11.4 (coordinate, with members, an approach for seeking to update the Master Municipal Construction Documents such that green infrastructure guidelines become standards)
C21. Wet Weather Facilities The District will complete the conceptual designs and feasibility studies for the following wet weather facilities to reduce chronic sanitary sewer overflows: Cloverdale storage and operational improvements; and Maillardville sanitary sewer increased conveyance (growth pre-build).	Completed	Completed as reported in the 2010 Biennial report (The Cloverdale storage facility construction is complete).
C22. Flow Monitoring The District will maintain a network of flow monitors that will continually monitor sewer flows and will determine the daily average flow by specific catchments, or by municipality where the flow monitoring configuration is appropriate.	Completed	Completed as reported in the 2010 Biennial report (Metro Vancouver maintains an extensive sewer flow monitoring network for billing purposes and to assist in determining when capacity upgrades are needed. In addition, Metro Vancouver has upgraded its SCADA computer system and its data storage database).

C23. Biennial Liquid Waste Management Plan Progress Report Every two years, municipalities will summarize and forward to the District for inclusion in a biennial Liquid Waste Management Plan progress report, the following information: • Sewer system mapping that indicates the overall extent of the current cycle of the sanitary sewer system evaluation program and the condition of sewerage infrastructure. • The extent of new sewer construction and sewer repair and replacement work over the past two years. • A summary of the results of all flow monitoring work undertaken as part of the sewer system evaluation program. • The location and frequency of sanitary sewer overflows occurring from the municipal collection system. • A summary of sewerage system expenditures for sewer system evaluation work, and repair and replacement work. The biennial reporting period will end on December 31st of every second calendar year and the report will be due by the end of March (90 days to compile). The first reporting period will end in the second whole year (not less than 24 months and not more than 36 months) following the year an LWMP is approved. An interim annual report will be submitted in March and will summarize the key achievements that occurred in the previous year.	Completed Removed Continuing	Completed as reported in the 2010 Biennial report by different member jurisdictions. Removed. Biennial reporting will be replaced by a short LWMP Annual Report, dashboards, and progress meetings. Refer to reporting commitments described in 'Monitoring and Reporting' Section of this LWMP. Continuing in Action 6.1 (members will complete inflow and infiltration management plans); Action 6.2 (members will use the inflow and infiltration dashboard to track progress in reducing inflow and infiltration); Action 7.3 (Metro Vancouver and members will report annually on the number and location of sanitary sewer overflows, and, where feasible, the estimated volumes and probable causes).
Source Control and Demand Management		
C24. Reduction of Copper The District will recommend that the Greater Vancouver Water District (GVWD) consider the benefit of copper reduction in wastewater effluent and biosolids and meet the current implementation schedule for construction of facilities for pH adjustment of drinking water.	Completed	Completed as reported in the 2010 Biennial report (adjustments to pH are completed at Seymour and Coquitlam drinking water sources to reduce copper in potable water which also reduces copper in wastewater and biosolids).
C25. Sewer Use Bylaw Review The District will update the *Regional Sewer Use Bylaw* to reflect the most recent scientific and technical knowledge about the impact of substances discharged to sewer on human health and safety, performance of collection and treatment systems, and the receiving environment.	Completed Continuing	Completed as reported in the 2010 Biennial report (new Codes of Practice for Dry Cleaners and Photographic Imaging Operations). Continuing in Actions 3.3 (pursue reductions in industrial wastewater flow and loading, starting with updating fees in bylaws to create financial incentives that motivate industries to minimize their wastewater discharges); Action 4.1 (update Metro Vancouver's bylaws for industrial and commercial dischargers).
C26. Development of Peak Discharge Limits and Fees for Industry The District will develop, in co-operation with identified stakeholders, a system of limits and fees to be implemented across the District. Maximum daily loadings (limits) will be assigned to industrial operations that are discharging more than an established percentage of the annual loadings received by the wastewater treatment plant servicing the particular industry. Limits will be accompanied by a system of fees that will include additional charges for the difference between the average and maximum daily loadings and charges based on marginal costs for treating the loadings exceeding the assigned (authorized) maximum daily loadings.	Completed	Completed as reported in the 2010 Biennial report (new limits and fees for industrial dischargers in sewer use bylaw).
C27. Criteria for New Industrial Demand for More than 3% of Capacity The District will develop criteria to be used in development of a business case if a single industrial user proposes to exceed more than 3% of the system capacity.	Completed	Completed as reported in the 2008 Biennial report (new sustainability-based business case framework with new set of metrics).

C28. Reduction of Demand for Treatment Capacity The District will investigate initiatives that have the potential to reduce the per capita demand for treatment from the 1998 levels. Demand management for all sewer user sectors (residential, industrial, and commercial/institutional) will be examined and considered through business case development.	Completed Continuing	Completed as reported in the 2010 biennial report (via actions reported in C25 and C26). Continuing in Strategy 3 (Reduce flows and loadings into the system) and Strategy 5 (Reduce excess rainwater entering into private lateral sewers).
C29. Education Program The District will develop and implement an educational program for the residential, commercial, and institutional use targeting specific practices that have pollution prevention or demand management benefits. An education program on the use of food grinders will be developed.	Completed Continuing	Completed as reported in 2008 and 2010 biennial reports (surfactant reduction program, Smartsteps and Buildsmart programs, industry resource document). Continuing in Action 3.1 (pursue reductions in residential wastewater flow and loading through improving education and awareness, starting with discouraging disposal of food waste down drains); Action 4.2 (continue to motivate residents and businesses to prevent pollution at the source by properly managing what they send down drains and toilets).
C30. Sewer Use Charges for Commercial and Institutional Sector The District will assist member municipalities in reviewing sewer charges for the commercial and institutional sector, given that user pay charges are instrumental in cutting demand for service.	Completed	Completed as reported in 2008 biennial report (in 2005, a methodology for estimating both Metro Vancouver and municipal costs of conveying and treating commercial and institutional discharges was developed for municipalities to use).
C31. Evaluation of Current Industrial Pricing Strategy The District will evaluate the efficiency of the current BOD/TSS Industrial Pricing Strategy in reducing demand for treatment capacity.	Completed	Completed as reported in 2008 biennial report (*Evaluation of the Effectiveness of the Industrial BOD/TSS Pricing Strategy for Reducing Demand from Industry in the GVRD,* Compass Resource Management Ltd, March 15, 2004).
C32. Recognition for Water Conservation The District, in conjunction with the Greater Vancouver Water District (GVWD), will evaluate implementation of a recognition program that acknowledges reductions in water usage and wastewater generation. The District will consider loading-based permit limits, in addition to the existing concentration-based permit limits, for operations that can demonstrate consistent reductions of more than 10% in their water consumption (expressed as volume of water per unit of production).	Removed Continuing	Removed. This specific action may be outdated and may not be effective in making significant reduction in water consumption. Continuing in Strategy 3 (Reduce flows and loadings into the system).
C33. Notification to Environment Canada If, through environmental monitoring and assessment, a substance is identified as a potential concern in the aquatic environment but is not listed in the Canadian Environmental Protection Act, the District will notify Environment Canada and request that they commence a substance review in accordance with current process for such reviews.	Completed Continuing	Completed as reported in the 2010 biennial report (notified Environment Canada that flame retardants containing PBDE should be banned). Continuing in Action 4.1 (prioritize contaminants for source control using the Canadian Council of Ministers of Environment (CCME) Canada-wide Strategy for Management of Municipal Wastewater Effluent (CWS-MMWE) Environmental Risk Management Framework. Metro Vancouver will take further source control actions such as educating target sectors to reduce discharges, advocating for increased provincial and federal regulations on the manufacturing and use of products with contaminants, and updating Metro Vancouver's bylaws for industrial and commercial dischargers).

Residuals Management		
C34. Iona Island Treatment Plant Biosolids At the Iona Island Wastewater Treatment Plant site, the District commits, as a minimum, to recycling or disposing of ongoing biosolids production once the land area and lagoons are full.	Completed Continuing	Biosolids produced at the Iona Island Wastewater Treatment Plant are now dewatered and beneficially used in land application. Continuing in Action 15.1 (grow the land application program).
C35. Biosolids Growing Medium The District commits to produce and distribute biosolids growing medium which meet standards set out in the Organic Matter Recycling Regulation Draft 2.0, dated July 1999. As currently drafted this regulation would allow distribution of Class A biosolids growing medium with no limit on quantity and without the need to obtain permits or approvals from the Ministry of Environment, Lands and Parks. Prior to the proposed regulation being passed the District will work with the Ministry of Environment, Lands and Parks to include the requirements for the distribution of biosolids in the operating certificates for the District's facilities.	Continuing	Continuing in Action 15.1 (grow the land application program). All biosolids used in land application (including Biosolids Growing Medium and Class A Compost from biosolids) meets or surpasses the requirements of the Organic Matter Recycling Regulation.
Stormwater Management		
C36. Interagency Liaison Group Stormwater management planning will build on the improved information on stormwater problems and solutions developed during the Liquid Waste Management Plan process. To facilitate the ongoing exchange of information on stormwater issues, and implementation of the Liquid Waste Management Plan, municipalities and the District will participate in an interagency liaison group similar to the existing Stormwater Management Task Group. The group will provide advice to the District about stormwater issues.	Continuing	Continuing in Action 12.1 (coordinate a revision of the interagency group's terms of reference, possibly to operate as a sub-committee under the Regional Engineer's Advisory Committee (REAC)).
C37. Stakeholder Participation The community, senior and local government agencies, and other stakeholders will be invited to participate in the integrated planning process intended to proactively address issues on a long-term basis.	Continuing	Continuing in Action 12.4 (host a forum at regular intervals to report progress on IWMPs and LWMP rainwater actions, and to foster collaboration and knowledge sharing among members, First Nations, and interested parties).
C38. Policies and Bylaws Municipalities, in consultation with the District where appropriate, and the Stormwater Interagency Liaison Group, commit to adopting or updating, policies or bylaws related to improving stormwater management for at least two stormwater issues over the five year period of the stormwater plan. Issues to be considered may include, source control, flood protection, sediment and erosion control, soil conservation and topsoil removal, impervious area, and protection of riparian areas.	Completed Continuing	Completed to varying extents by different municipalities as reported in 2010 biennial report, Appendix 2. Continuing in Action 11.2 (update rainwater policies, programs, and bylaws in a harmonized manner).
C39. Rate of Watershed-scale Stormwater Planning Work Municipalities commit to undertake (or review) integrated stormwater management planning at a watershed scale for urban watersheds (less than 80% of watershed area is in the Green Zone as defined in the 1996 Livable Region Strategic Plan). Watershed-scale planning will be ongoing and evolving and proceed such that plans for all watersheds will be completed within the first twelve years following approval of the LWMP. Each watershed plan will be reviewed at least once every twelve years. The Stormwater Interagency Liaison Group will develop a terms of reference template for integrated stormwater management planning to facilitate the implementation of watershed-scale stormwater management plans in the municipalities. The District will participate in watershed-scale stormwater management plans as appropriate and where watersheds include two or more municipalities, a coordinated approach will be undertaken by appropriate municipalities.	Completed Continuing	Completed to varying extents by different municipalities as reported in 2010 biennial report. Continuing in Action 10.1 (use the Stormwater Monitoring and Adaptive Management Framework (AMF) to monitor watershed health).

Pleasure Craft Sewage		
C40. Pump-Out Facility Inventory The District will complete an inventory of all available pump-out facilities in the region.	Completed	Completed as reported in 2006 biennial report (inventory of pump-out facilities in the region was completed).
C41. New Marinas and Major Renovations Municipalities will modify or adopt bylaws that require all new marinas, or marinas undergoing renovations that exceed 50 per cent of their assessed value, to install pump-out facilities for access by pleasure craft. As appropriate, these facilities should be connected to the municipal sewer system or designed for handling by trucked liquid waste.	Completed Continuing	Completed to varying extents by different municipalities as reported in the 2008 and 2010 biennial reports. Continuing in Action 20.3 (work with private marina operators, the Province and the federal government to develop and implement regulations to ensure all new marinas and marinas where planned renovations exceed 50 per cent of the assessed existing improvement value have pleasure craft pump-out facilities).
C42. Existing Marinas The District, in consultation with municipalities, marina operators, boaters, and senior government agencies, will undertake a feasibility study to determine how existing marinas can accommodate pump-out facilities, the cost to install such facilities, and how they would be financed, maintained, and operated.	Completed Continuing	Completed as reported in 2006 biennial report (feasibility study for pump-out facilities at existing marinas). Continuing in Action 20.4 (require all pleasure craft pump-out facilities to connect to a municipal sanitary sewerage system or a provincially permitted on-site treatment and disposal system or have established enforceable protocols for transporting liquid waste for disposal at a permitted liquid waste management facility)
On-site Sewage Disposal Systems		
C43. On-site Disposal Mapping The District and its member municipalities will complete an inventory map of areas containing on-site disposal systems on a watershed basis. The District and its member municipalities will also prepare mapping indicating projected on-site system densities to 2021.	Completed	Completed as reported in 2010 Biennial report (A map of the on-site disposal systems has been completed. The mapping is shown in Appendix 1).
C44. Performance to be Considered by Ministry of Health The Ministry of Health will be requested to consider the performance of existing systems, known pollution issues, and projected on-site system densities in the watershed when approving new systems.	Removed	Removed because onsite sewage disposal systems are regulated provincially.
C45. Performance to be Considered by Ministry of Environment, Lands and Parks. The Ministry of Environment, Lands and Parks will be requested to consider the performance of existing systems and the projected density of on-site systems when assessing nitrate contamination levels in groundwater aquifers.	Completed	Completed as reported in the September 2008 Biennial report (case studies of the impacts of on-site sewage systems on ground and surface waters were completed and were to be sent to the Province).
C46. Environmental Monitoring and Assessment The District will undertake environmental monitoring and assessments in the region's waterways to identify and determine if on-site disposal systems are contributing to waterway degradation.	Completed	Completed as reported in the September 2008 Biennial report (case study completed that developed mapping and monitoring methods and provided preliminary direction for determining limits to on-site system densities).

Agricultural Runoff		
C47. Compilation of Agricultural Watershed Water Quality Data The District will compile the monitoring information and findings from past scientific studies to determine the current base-line data associated with water quality in agricultural watersheds and in receiving waterways.	Completed Continuing	Completed as reported in Metro Vancouver 2008 Biennial report (completed in 2004, in 2005, Environment Canada collated information into a single electronic database this commitment in *Acquisition and Collation of Nutrients Data from Agricultural Areas of the Fraser Valley).* Continuing in Action 10.3 (ensure IWMPs integrate rainwater and groundwater management, consider agricultural land rainwater runoff, and reflect the provisions of the Province's *Watershed Security Strategy* once it is launched).
C48. Environmental Monitoring and Assessment The District will include waterways in agricultural areas and the associated receiving waterways in its comprehensive water quality monitoring and environmental assessment program. This work will be coordinated with the Nutrient Management Action Plan for the Lower Fraser Valley under the Fraser Basin Council.	Completed Continuing	Completed as reported in Metro Vancouver 2008 Biennial report (completed in 2004, in 2005, Environment Canada collated information into a single electronic database this commitment in *Acquisition and Collation of Nutrients Data from Agricultural Areas of the Fraser Valley).* Continuing in Action 10.3 (ensure IWMPs integrate rainwater and groundwater management, consider agricultural land rainwater runoff, and reflect the provisions of the Province's *Watershed Security Strategy* once it is launched).
C49. Identification of Water Uses and Water Quality Objectives Through their integrated stormwater management programs, municipalities will identify water uses and water quality objectives for waterways, or confirm the applicability of existing uses and objectives.	Continuing	Continuing in Action 20.2 (continue to participate, and members may participate, in provincial processes to review and establish water uses and water quality objectives for specific water bodies within Metro Vancouver).
Note: POLICIES (Ps) in the 2002 LWMP were not classified as actions. Hence, they were not reported in the biennial reports and do not have a status to include in this table. Appendix F lists the policies separately for reference.		

Appendix F – List of Policies from 2002 LWMP

The 2002 LWMP had Policies which were included in the plan, but were not reported in the Biennial or Interim reports. These Policies are included below for reference and new actions that align with specific policies have been noted as such under the action.

Receiving Environment

P1. Designated Water Uses will be Protected.

The District and member municipalities will manage wastewater and stormwater to protect receiving water uses which have been designated by the Ministry of Environment, Lands and Parks (MELP).

P2. Upgraded Service Levels will be Determined Based on Environmental Need, with Consideration to Cost and Benefit, Regional Priorities, and all Applicable Legislation.

Commitments included in this plan address infrastructure management needs and confirmed public health and environmental issues. Upgraded service levels will be provided in the future where an environmental need has been forecasted or demonstrated, with consideration to cost and benefit, regional priorities, and all applicable legislation. The following process and "triggering" mechanisms (Figure 3) will be used to determine environmental need.

Environmental monitoring conducted by the District and member municipalities will determine if, and where, wastewater or stormwater discharges are contributing to exceedances of water quality objectives. The Environmental Monitoring Committee (see Commitment C2 – Establishment of an Environmental Monitoring Committee) will assess the monitoring results and, where warranted, "trigger" an environmental risk assessment of the particular discharge(s). The assessment may involve more comprehensive receiving environment and laboratory analysis, modelling, and forecasting, to determine the degree of environmental risk. Options for managing the defined risks will be developed by the District and member municipalities and assessed according to cost and environmental benefit criteria. The Environmental Monitoring Committee will be responsible for guiding the assessment processes for both risk and the environmental benefits of options. When a "trigger" is identified the Environmental Monitoring Committee will suggest the time-line to complete the risk and options assessment processes.

When risks, options, costs and benefits have been adequately assessed the District Board, with consideration of costs and Greater Vancouver Regional District benefits, regional priorities, and all applicable legislation, will select the appropriate response and actions. In their consideration the Board will consult with the Ministry of Environment, Lands and Parks and Environment Canada.

Environmental monitoring will be conducted following implementation of any option to determine the need for additional risk mitigation measures.

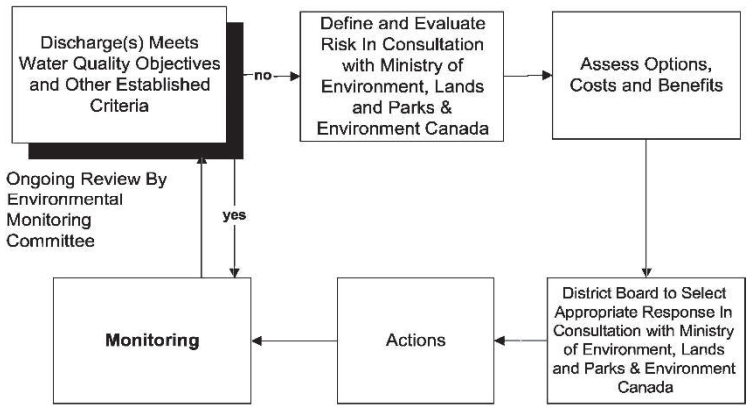


Figure 3 – Upgrading "trigger" mechanism

Treatment Plants

P3. Treatment Plant Operations and Maintenance

The District will operate and maintain the regional treatment plants to minimize risks to public health and the environment.

P4. Base Levels of Treatment at District Plants

The District will size plant process components on the basis of established historical flows and loads and projected future changes in accordance with good engineering practice and treatment plant design standards that are periodically approved by the District Board. Plant performance will be measured against authorised levels for flow, concentrations, and loads established in the operating certificates. Maximum daily (flow proportioned 24-hour composite sample) concentration levels are:

	BOD (mg/l)	TSS (mg/l)
Iona Island	130	100
Lions Gate	130	130
Annacis Island	45	45
Lulu Island	45	45
Northwest Langley	45	45

If these maximum daily concentration levels are exceeded on an operational basis then:

- the District will investigate the cause and an incident report to determine the significance and probable cause will be prepared.

- the District will evaluate the significance against its treatment plant design guideline to determine if plant expansion, upgrading, or additional source control initiatives are justified. The determination of environmental significance will be undertaken in consultation with the Environmental Monitoring Committee.

Annual effluent loads will not exceed the following maximum annual loading levels:

	BOD (t/year)	TSS (t/year)
Iona Island	72,600	55,850
Lions Gate	5,770	5,770
Annacis Island	no limit	no limit
Lulu Island	no limit	no limit
Northwest Langley	no limit	no limit

At the Annacis Island, Lulu Island, and Northwest Langley Wastewater Treatment Plants the District will provide secondary treatment for flows up to two times measured dry weather sanitary flow. Wet weather management plans to manage infiltration and inflow and stormwater will be developed for flows in excess of secondary treatment capacity.

At the Lions Gate Treatment Plant the District will provide primary treatment for flows up to two times measured dry weather sanitary flow. Wet weather management plans to manage infiltration and inflow and stormwater will be developed for flows in excess of primary treatment capacity.

For the Iona Island Treatment Plant the District will provide primary treatment for flows up to a maximum of 17 cubic metres per second. This plant capacity will be reviewed every 5 years based on flow determinations arising out of progress in the combined sewer separation programs.

P5. Upgrading from Base Levels of Treatment

The District will upgrade the level of treatment, or initiate source control measures, if the base level of treatment is not adequate to protect the aquatic environment as defined by Policy P2 and determined by the receiving water environmental objectives and performance measures.

Combined Sewer Systems

P6. Combined Sewer Overflows

No new combined sewers will be constructed in the GVRD geographic area. Existing combined sewers will be replaced by separate sanitary and storm sewers through infrastructure replacement and sewer capacity upgrading programs. Private combined sewer service connections will be replaced with separate sanitary and storm sewer

connections when a property is redeveloped or when substantive building or site renovations are undertaken.

The policy of the District is to eliminate all combined sewer overflows from its facilities. Priority will be given to reducing or eliminating those combined sewer overflows identified by the Environmental Monitoring Committee as having significant environmental impact.

P7. Combined Sewer Overflow Monitoring

Combined sewer overflow volumes will be monitored and trended at all outfalls under the District's jurisdiction to measure the effect and progress of combined sewer replacement programs. Environmental monitoring and assessment will determine risks and the need for any additional interim measures at combined sewer outfalls.

Separate Sanitary Sewer Systems

P8. Infrastructure Management

The District and its member municipalities will establish sewer system infrastructure management programs that will maintain the regional trunks and interceptors, the municipal collection system, and the private service laterals in a state of good repair. The objective will be to ensure the sustainability of the collection system so that expensive repair and rehabilitation is not deferred to future generations and that the average daily infiltration and inflow will not exceed 11,200 litres per hectare per day as a result of a storm with less than a five year return period.

P9. Basic Sanitary Sewer Service Capacity

The District will establish a basic level of service capacity for all District sanitary sewers that provides for the conveyance of measured dry weather flows plus a wet weather allowance for infiltration and inflow of 11,200 litres per hectare per day, such that the hydraulic grade lines do not exceed established safe operating levels.

P10. Sanitary Sewer Overflow Documentation And Targets

The District will document all sanitary sewer overflows from the collection system under its jurisdictions and determine the cause of overflow. The District and its member municipalities will establish targets for sanitary sewer overflow reduction as part of their sewer system infrastructure management programs to target reduction and long term elimination of wet weather sanitary sewer overflows caused by storms of less than a five year return period. Areas experiencing high growth and chronic sanitary sewer overflows with associated health or environmental risks will receive the highest priority for elimination of sanitary sewer overflows.

P11. Sanitary Sewer and Combined Sewer Interaction

In parts of the collection system where both sanitary and combined sewer overflows are occurring due to the interaction of these sewer systems, and operational improvements are being considered to minimize overflows, the objective will be to minimize the total volume of sanitary sewage (contained in combined and sanitary sewer overflows as a component together with stormwater) that is discharging to the receiving waterways.

P12. Consideration of Consequence

When addressing sanitary sewer overflow issues, the District and its member municipalities will prioritize efforts and consider emergency spill locations to mitigate the consequence of overflows in the following priority:

1. Discharges that compromise public health;
2. Discharges that compromise public and private property damage; and
3. Discharges that have confirmed near-field environmental impacts.

P13. Emergency Overflow Locations For Unavoidable Sanitary Sewer Overflows

The District and its member municipalities will maintain a system of emergency overflow locations and prepare emergency spill contingency plans to minimize the consequence of unavoidable sanitary sewer overflows caused by extreme wet weather, system failures, and unusual events.

Source Control and Demand Management

P14. Control of Toxic Substances Discharged to Sewer

The District's Source Control Program will be consistent with the Canadian Environmental Protection Act (CEPA) control options for toxic substances. This will be in addition to the list of prohibited and restricted substances included in the Regional Sewer Use Bylaw.

P15. Promotion of Pollution Prevention

Control of the quality and quantity of discharges to sewer by applying the principles of pollution prevention will be emphasized and promoted in all sewer permits, codes of practices, waste management practices and education programs that are issued, developed and implemented by the District.

P16. Best Available Technology

Where pollution prevention fails to eliminate contaminants from discharges, the District will recommend Best Available Technology, which is proven and economically feasible, to be applied to remove contaminants of concern prior to discharge to sewer.

P17. Control of Peak Daily Demand from Industry

The District will control the peak daily demand from industry through a system of flow and load limits and fees.

P18. Usage of Capacity by the Users of the Sewer System

Any trend or projected demand that would affect the historical proportions of usage of system capacity (conveyance and treatment) will be brought to the attention of the District Board and its impact considered. The policy of business casing any new industrial demand for more than 3% of the system capacity will be continued.

P19. Promotion of Water Conservation

The District will encourage water conservation initiatives by recognizing reductions in water usage and wastewater generation.

P20. Elimination of Stormwater Discharges into Sanitary Sewers

The District will not permit new stormwater sources to be connected to its sanitary sewer system and will continue its current policy of eliminating stormwater discharges currently authorized by Authorizations and Permits. Any exception to this policy will be evaluated and considered in consultation with the affected discharger, host municipality, and representatives of the senior level of governments in charge of environmental protection.

The District, in addition to not issuing new authorizations for discharges of stormwater into sanitary sewers, will continue the program of eliminating all stormwater contributions allowed under the existing industrial permits. Each industrial operation will be required to develop and implement a plan for removal of the stormwater components from their sanitary sewer discharge.

Residuals Management

P21. Cost Effectiveness and Recycling

The District will manage its residuals in a cost-effective, environmentally sound, and reliable manner.

The District will manage its biosolids based on the principle of recycling, but will continue to evaluate cost-effective, non-recycling options.

P22. Grit and Screenings Disposal

Grit and screenings will continue to be sent to disposal facilities (landfill or incineration), both within the GVRD solid waste system and, when necessary, to other facilities within B.C. or outside of the province.

P23. Recycling Program Cost Allocation

It is intended that the District's Biosolids Recycling Program will continue to be funded annually as a regional program. Direct costs (those directly attributable to recycling projects) will be allocated to the four sewerage areas at the end of each year based on the tonnes of biosolids recycled for each sewerage area in that year. Indirect costs will be allocated to the four sewerage areas at the end of each year based on the tonnes of biosolids produced by each sewerage area during that year.

Stormwater Management

P24. Five Year Time-Frame

The stormwater management policies and commitments will apply to all District municipalities, and as appropriate the District, for a period of five years after approval of the Liquid Waste Management Plan, at which time they will be reviewed and updated.

P25. Integrated Planning Approach

The member municipalities, in consultation with the District where appropriate, will undertake a proactive integrated planning approach to municipal stormwater management, in areas serviced by separated stormwater systems, thereby improving the efficiencies and effectiveness of regulatory approvals. This integrated planning approach will integrate watershed, catchment, master drainage plans, and stormwater plans into relevant municipal planning processes such as Official Community or Neighbourhood Concept plans, Recreation and Parks Master plans, Strategic Transportation plans, etc., in order to address the impacts of stormwater management on relevant community values. These values include recreation, agriculture, fisheries, greenways, heritage, archaeology, safety, transportation, economics, property values, flood protection, affordability, the environment, and related issues.

Stormwater management planning would strive to be consistent with the stormwater management guiding principles as referenced in Table 13-1 of the Liquid Waste Management Plan Discussion Document. One of the guiding principles is to strive to plan at a watershed scale even in non-urban (greater than 80% of watershed area is Green Zone as defined in the 1996 Livable Region Strategic Plan) watersheds where municipalities may have limited infrastructure.

Non-Point Source Pollution Management

Pleasure Craft Sewage

P26. Designation of No-Discharge Zones

Where investigations have shown that discharges from pleasure craft is leading to waterway degradation or high bacterial levels, the District will request the province to nominate the waterway, or portion thereof, for designation as a no-discharge zone under the federal Pleasure Craft Sewage Prevention Regulation.

On-Site Sewage Disposal Systems

P27. Sewer Extensions and the Green Zone

Prior to extending sewers into the Green Zone, as defined by The Livable Region Strategic Plan, the District will request municipalities to examine local servicing and alternate advanced treatment systems.

P28. On-site systems and disposal to waterways

The following guidelines should apply regarding discharges from on-site disposal systems to adjacent waterways. Where there is a conflict between these guidelines and Provincial regulations, the regulations will apply:

- Property owners with BC Hydro service and road access should investigate all land based options including approved innovative technologies and demonstrate that such land based options are non-viable solutions prior to any consideration of sewage effluent discharge into an adjacent water body.
- Property owners in "isolated" locations without road access, should investigate conventional land-based options and demonstrate that such land-based options are non-viable solutions prior to any consideration of effective innovative technology or sewage effluent discharge into an adjacent water body.
- The minimum acceptable level of treatment for properties in "isolated" locations having neither BC Hydro service or road access, should be a properly designed septic tank that provides treatment of domestic sewage prior to effluent discharge required to be in accordance with standards stipulated in the new Waste Management Act Municipal Sewage Regulation.
- There should be no discharge of untreated domestic sewage to the marine/aquatic environment under any circumstances.
- Property owners discharging to the marine/aquatic environment should obtain discharge permits from the appropriate jurisdiction.
- Property owners discharging or proposing to discharge effluent into an adjacent water body should obtain a "water body" easement for the placement and maintenance of a discharge outfall pipe, from the appropriate jurisdiction.
- Where the authority having jurisdiction for sewage discharge or sewage disposal is other than the local government, and where the bylaws or policies of the local government stipulate standards or requirements higher than those of the authority having jurisdiction, then the authority having jurisdiction should make best efforts to issue approvals which comply with requirements of the local government.

P29. Assurance Plans

No innovative treatment systems will be installed in the GVRD unless an assurance plan is in place for the proper operation, maintenance, and performance of the facility. The assurance plan will be developed in accordance with guidelines being prepared under the Ministry of Environment, Lands and Parks Municipal Sewage Regulation.

Agricultural Runoff

P30. Stormwater Consideration by Municipalities

Municipalities will consider stormwater runoff from agricultural lands when undertaking integrated stormwater management planning for their municipality.

Finance

P31. Funding Future Projects

In its 10-year financial plan the District will include future projects for upgraded service levels that have been determined to be needed in accordance with Policy P2.

In accordance with Policy P2, upgraded service levels will be provided in the future where an environmental need has been forecasted or demonstrated, with consideration to cost and benefit and regional priorities. Figure 4 shows the probable range in future annual District expenditure. The upper range represents annual expenditures if additional secondary treatment plant upgrading projects are required at Lions Gate and Iona, in accordance with demonstrated need, and they are constructed over a 10-year period commencing after 2005. The lower range represents annual District expenditures assuming no secondary treatment upgrading projects are required at Lions Gate and Iona and that the water quality objectives and other established criteria continue to be met.

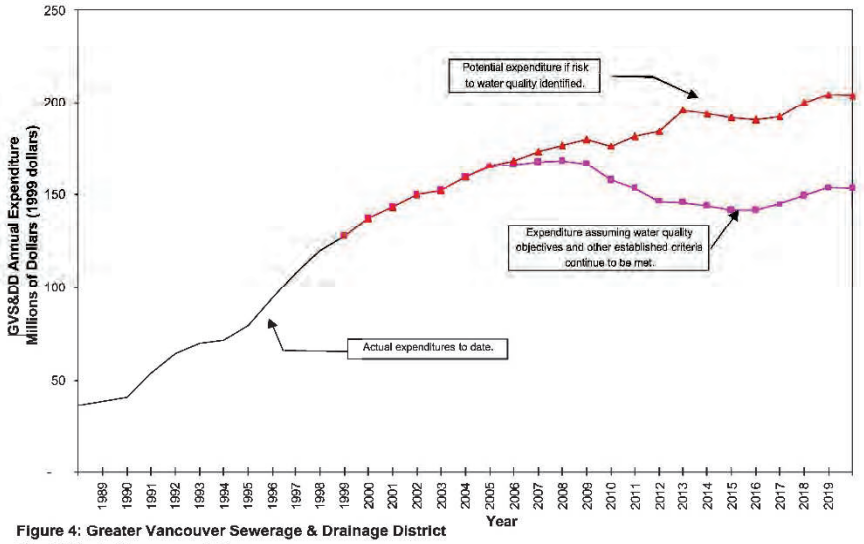


Figure 4: Greater Vancouver Sewerage & Drainage District Liquid Waste Management Plan Potential GVS&DD Expenditure Envelope

April 10, 2025 - Media Release

Public engagement begins on TransLink's 2025 Investment Plan

Proposal would expand bus service, advance BRT routes, defer potential transit cuts

April 10, 2025

NEW WESTMINSTER, BC – TransLink today launched engagement on a 2025 Investment Plan that will increase bus service, reduce overcrowding, and deliver projects that will improve the region's transportation system. The proposal also defers any potential cuts to transit services by fully funding TransLink operations until the end of 2027.

Public consultation and comments on the 2025 Investment Plan are being accepted starting today until April 24. Those interested can participate on TransLink's website here.

Following public consultation, the plan will be voted on for approval by the Mayors' Council and TransLink's Board on April 30.

Expanding Transit

Proposed investments advance early priorities in the Access for Everyone Plan, and could begin as early as September 2025. Proposals include:

- The largest increase in bus service since 2018, including:
    - Increasing service on up to 50 bus routes to address overcrowding
    - 40 new or improved routes to support transit-oriented communities, industrial areas, as well as neighbourhoods with limited or no transit services
    - Seven new or improved seasonal services to parks and beaches
    - Extending the North Shore's R2 RapidBus to Metrotown by 2027
- Design of three BRT corridors
- Additional HandyDART trips in response to growing ridership
- Adding West Coast Express train cars to address customer demand
- More funding for the Major Road Network, including funding to address the deterioration of road conditions in many areas of the region
- Continuing investments in local active transportation infrastructure and bus priority infrastructure, which also speeds up bus service and makes it more cost-efficient to deliver

Funding the Investment Plan

TransLink has been facing a structural deficit of more than $600 million annually due to a shortage of operating funding caused primarily by declining fuel tax revenue, increasing costs, and fare increases being capped under the rate of inflation between 2020 and 2024. This plan fully funds services through to the end of 2027 and cuts the structural deficit nearly in half starting in 2028.

Funding this plan will include several measures, including:

- A transit fare increase of five per cent in July 2026 followed by two per cent increases annually. This amounts to a $0.14 increase for an average trip in 2026.
- An increase in the YVR AddFare by $1.50 in July 2026 followed by two per cent increases annually. This will be the first increase in this fare since its inception in 2009.
- An additional 0.5 per cent increase to the median household's property tax in 2025, which equates to $20 for the median household.
- An increase in off-street parking taxes from 24 per cent to 29 per cent.
- Annual operating funding from the Government of British Columbia.

TransLink is committed to continuing to manage its budget prudently. Last year, TransLink announced $90 million in annual cost efficiencies that reduced headcount by eliminating corporate roles, reduced outsourcing contracts by bringing more services in-house, and increased fare evasion enforcement, among other actions. TransLink also had an expert review organizational efficiency, accepted all recommendations that did not reduce transit services, and will identify further cost-efficiencies and savings.

TransLink appreciates the investments by its government partners on the Mayors' Council on Regional Transportation and the Province of B.C. to advance these critical initiatives that will help ensure the delivery of quality transit services in the Metro Vancouver region. These investments will position transit as a catalyst for growth, resilience, and long-term prosperity to keep Metro Vancouver and its economy moving.

More information:
Participate in engagement here

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