To: Liquid Waste Committee

From: Abin Antony, Program Manager, Policy Planning & Analysis, Liquid Waste Services

Date: October 23, 2024 Meeting Date: October 30, 2024

Subject: **Draft Updates to the Liquid Waste Management Plan**

RECOMMENDATION

That the Liquid Waste Committee receive for information the report dated October 23, 2024, titled "Draft Updates to the Liquid Waste Management Plan".

EXECUTIVE SUMMARY

Over the last three years, municipal and Metro Vancouver staff have worked to update the 2011 *Liquid Waste Management Plan* (LWMP). The plan covers all aspects of municipal and regional sanitary and rainwater systems. The new LWMP focuses on reducing demands at source to extend the deferral of capacity expansions and ultimately lower future costs. The plan includes strategies and actions related to sanitary and rainwater systems, and creating more meaningful opportunities for First Nations to have a voice in the delivery of sewer services. The Regional Engineers Advisory Committee (REAC) and the REAC Liquid Waste subcommittee have been extensively engaged throughout 2024 in co-developing updated strategies and actions for the LWMP.

Key elements in the attached LWMP will be reviewed on October 30, 2024, and subsequently submitted to the Liquid Waste Committee and the GVS&DD Board for consideration at their November 2024 meetings. If endorsed, the LWMP will be shared with municipal councils and First Nations councils to gather additional comments before the Board's final approval to submit the LWMP to the Province in 2025.

PURPOSE

To provide the Liquid Waste Committee the Interim Draft *Liquid Waste Management Plan* for discussion at the October 30, 2024 Liquid Waste Committee Workshop.

BACKGROUND

Municipal members and Metro Vancouver are required to update the region's LWMP. The scope of the LWMP includes both sanitary and rainwater systems, inclusive of privately-owned sewer lines, municipal, and regional facilities.

The updated LWMP comprises actions proposed by municipal and regional staff for consideration by the Liquid Waste Committee. The Interim Draft LWMP (Attachment 1) was received for information by the Regional Engineers Advisory Committee at its meeting on October 4, 2024, and by the Regional Administrative Advisory Committee at its meeting on October 15, 2024.

DEVELOPMENT OF THE UPDATED LWMP

Since 2021, municipal and Metro Vancouver staff have been considering updates to the LWMP. The Regional Engineers Advisory Committee and subcommittees focused on liquid waste and rainwater

have dedicated several meetings in 2024 to co-developing updated strategies and actions for the LWMP. A Public Advisory Committee also developed recommendations for the plan (Attachment 2).

There are five goals in this LWMP, with the biggest policy direction being reducing demands on the system. This initiates a major shift from supplying bigger infrastructure, to reducing demands on the sanitary and rainwater systems. Some reduction efforts are relatively simple, such as encouraging kitchen waste to go to green bins rather than down sinks. Other reduction efforts are more challenging, such as fixing leaky pipes on private property that introduce excessive rainwater into systems designed for sanitary wastewater. Embracing this shift now will help engineers design conveyance and treatment facilities in the future that are more compact, less expensive, and efficient at meeting demands of a growing population.

After review of the Draft LWMP by the Liquid Waste Committee at the workshop on October 30, 2024, a refreshed draft will be submitted to the Liquid Waste Committee and the GVS&DD Board for consideration at their November 2024 meetings. Additional review by municipal councils, First Nations, and stakeholders will follow, before the final version of the LWMP is considered by the Board for submission to the BC Ministry of Environment and Climate Change Strategy in Q2 2025.

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

FINANCIAL IMPLICATIONS
There are no financial implications.

CONCLUSION
A draft of updates to the LWMP, co-developed by municipal and Metro Vancouver staff, is attached for information.

ATTACHMENTS
1. Interim Draft Liquid Waste Management Plan (October 2024)
2. From Source to System to Sea: Public Advisory Committee Recommendations for Metro Vancouver's Liquid Waste Management Plan
3. Draft Updates to the Liquid Waste Management Plan Presentation

71247025

Interim Draft Liquid Waste Management Plan

For Discussion at October 30, 2024 Liquid Waste Committee Workshop

October 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:n̓ƛ̓ən̓ (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

Introduction 1
Executive Summary 1
Vision 2
Goals 3
Plan Context 5
History 5
Working Collaboratively with First Nations 7
Governance 8
Roles and Responsibilities 9
Scope of the Plan 10
Alignment and Linkages 11
Strategies and Actions 14
Snapshot 14
System Resilience 17
Strategy 1 Ensure system can serve a growing population in a changing climate 18
Strategy 2 Improve resilience of wastewater system to climate change and natural hazards 20
Demand Reduction and Source Control 21
Strategy 3 Reduce flows and loadings into the system 21
Strategy 4 Prevent pollution at the source 24
Sanitary Sewer Overflows 25
Strategy 5 Reduce excess rainwater entering into private lateral sewers 27
Strategy 6 Enhance transparency and accountability for reducing inflow and infiltration 29
Strategy 7 Minimize impacts of sanitary sewer overflows on human health and the environment 31
Combined Sewer Overflows 33
Strategy 8 Assess impact of combined sewer overflows on receiving environment 34
Strategy 9 Separate combined sewers to eliminate overflows 37
Rainwater Management 39
Strategy 10 Manage rainwater and urban development for watershed health 41
Strategy 11 Update and harmonize municipal tools for rainwater management 43
Strategy 12 Enhance interagency collaboration to improve watershed health across the region 45
Wastewater Treatment 46
Strategy 13 Treat wastewater so effluent meets or surpasses regulatory requirements 47
Strategy 14 Operate and maintain wastewater treatment plants to meet or surpass regulatory requirements 49
Biosolids 50
Strategy 15 Diversify options to beneficially use Nutrifor biosolids 50

Circular Water Economy 52
Strategy 16 Implement proven resource recovery technologies 52
Strategy 17 Research and pilot innovative technologies to advance the circular water economy.. 54
Environmental Management 56
Strategy 18 Minimize impacts of liquid waste management on the atmosphere and air quality ... 56
Strategy 19 Environmental monitoring to protect public health and the environment 58
Strategy 20 Collaborate on regional environmental management initiatives 60
Monitoring and Reporting 62
Financial Implications 65
Glossary 67
Appendix A – Wastewater Treatment Plant Upgrade and Expansion Schedule ... 73
Appendix B – Performance Indicators 74
Appendix C – Reporting on LWMP Actions 76
Appendix D – Status of Past Actions from 2011 LWMP 83
Appendix E – Status of Past Actions from 2002 LWMP 101
Appendix F – List of Policies from 2002 LWMP 114

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 requires liquid waste infrastructure that is 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, 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.

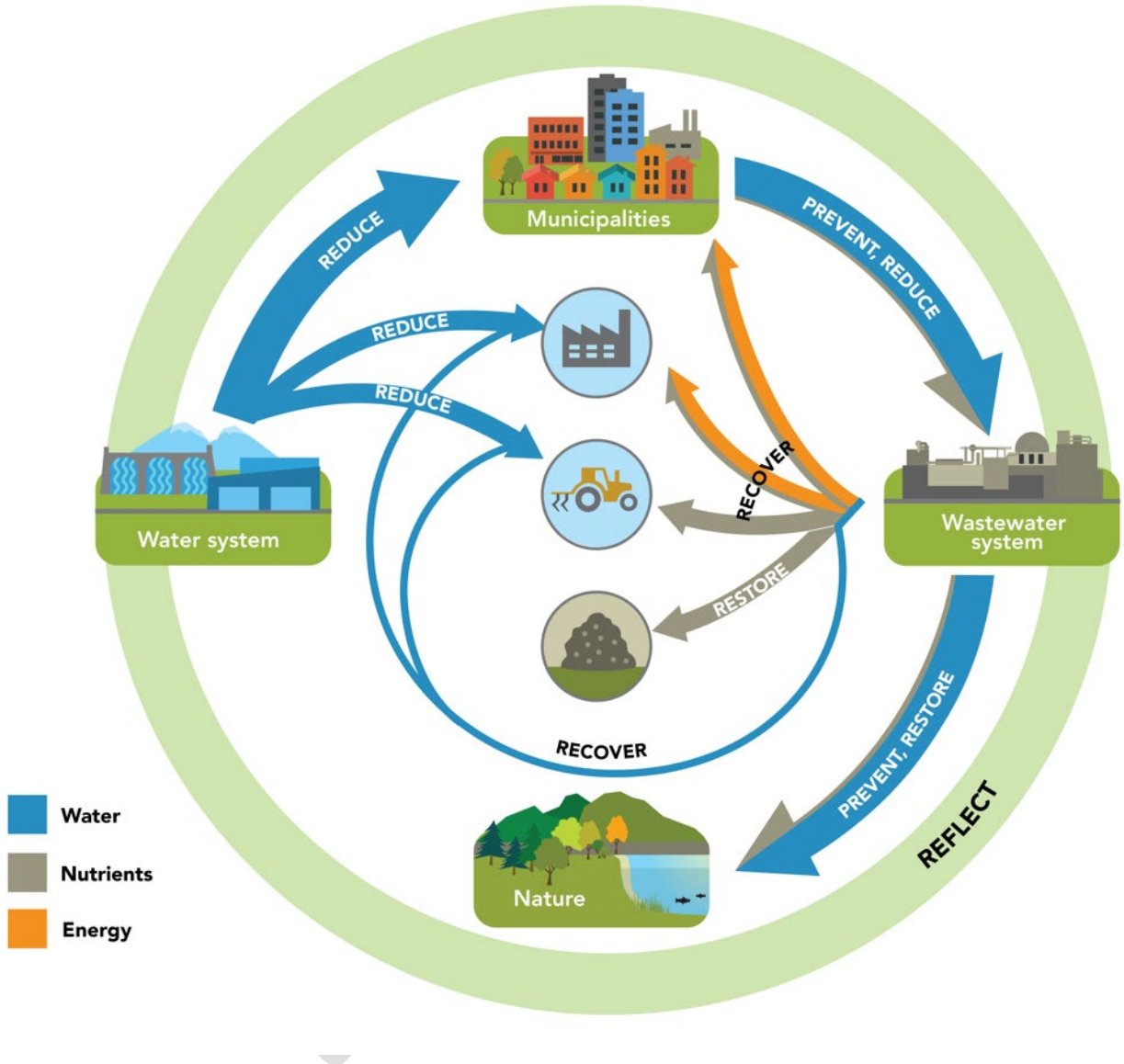


Figure 1 – Circular Water Economy

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 resource 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

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

1911
Beaches were closed in summer due to sewage pollution

Four municipalities form the Burrard Peninsula Joint Sewerage Commission to build regional sewer system

1913
R.S. Lea Report: first "Master Plan" to direct raw sewage discharges away from beach areas

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

1956
Greater Vancouver Sewerage & Drainage District Act establishes four sewerage areas

1961
Lions Gate WWTP opens

1963
Iona Island WWTP opens

1969
Updated A.M. Rawn report recommends treatment plants on Lulu Island and Annacis Island

1973
Lulu Island WWTP opens

1974
Interceptors are completed, ending the discharge of untreated sewage

1975
Annacis Island WWTP opens

1989
Stage 1 LWMP: Desire to further improve receiving water quality and end overflows of untreated sewage

1991
Inception of Metro Vancouver's biosolids beneficial use program

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

2001
LWMP establishes deadlines for separating combined sewers and eliminating combined sewer overflows, and sets requirement to eliminate sanitary sewer overflows at chronic sites

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

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

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

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

2030
Planned secondary treatment implementation at North Shore WWTP

2035-2040
Planned secondary treatment implementation at Iona WWTP

2050
Planned combined sewer elimination in Vancouver Sewerage Area

2075
Planned combined sewer elimination in Fraser Sewerage Area

1910 1920 1930 1940 1950 1960 1970 1980 1990 2000 2010 2020 2030 2040 2050 2060 2070 2080

Iona Island Wastewater Treatment Plant

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

Property owners

- 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 – 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.

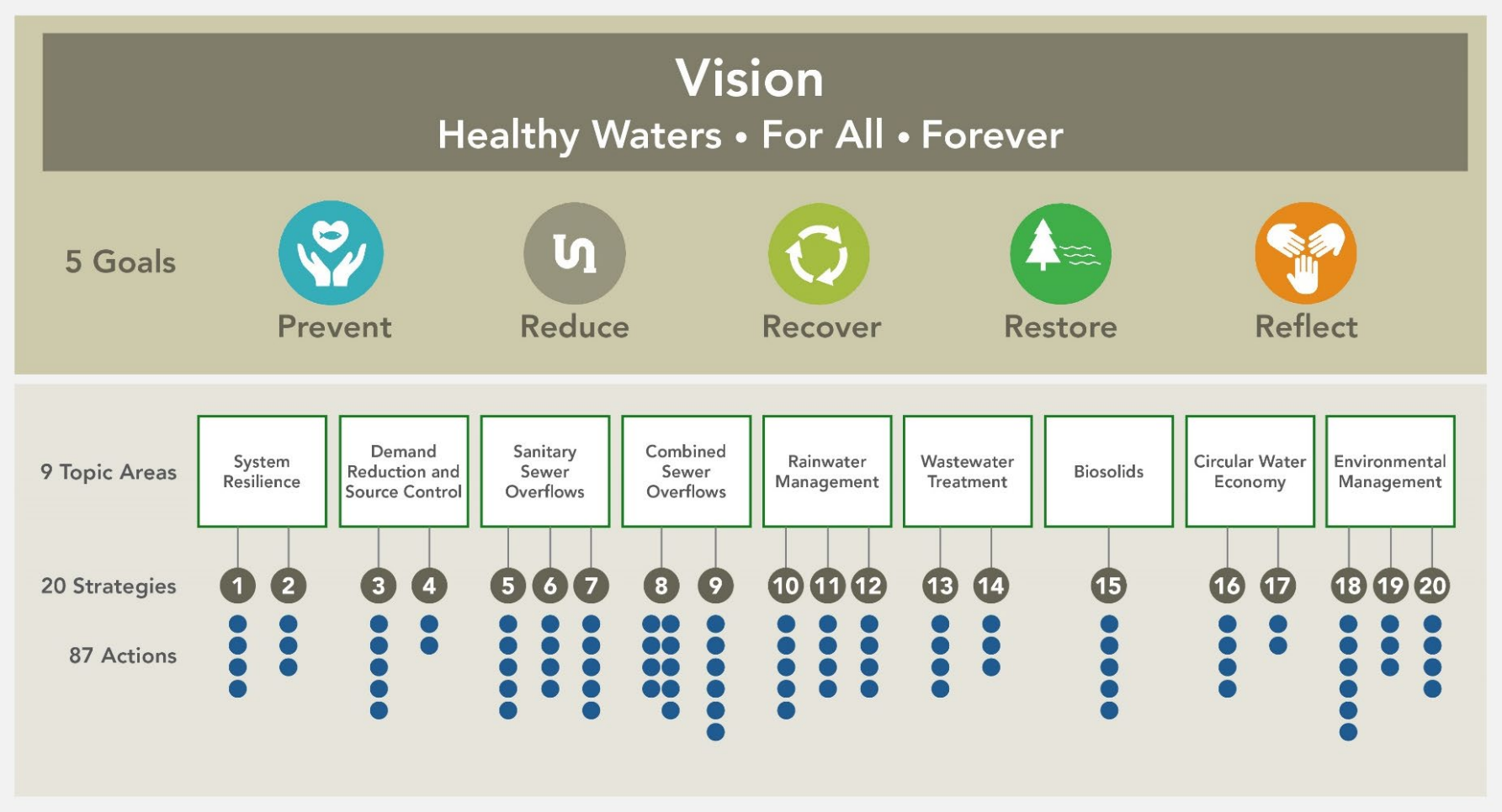
- ***Board Strategic Plan (2022-2026)*** — Annual work plans are prepared for Metro Vancouver's service areas that respond to the directions of the *Board Strategic Plan*. These work plans include high-level performance indicators that have been developed across the organization to evaluate trends, determine 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.

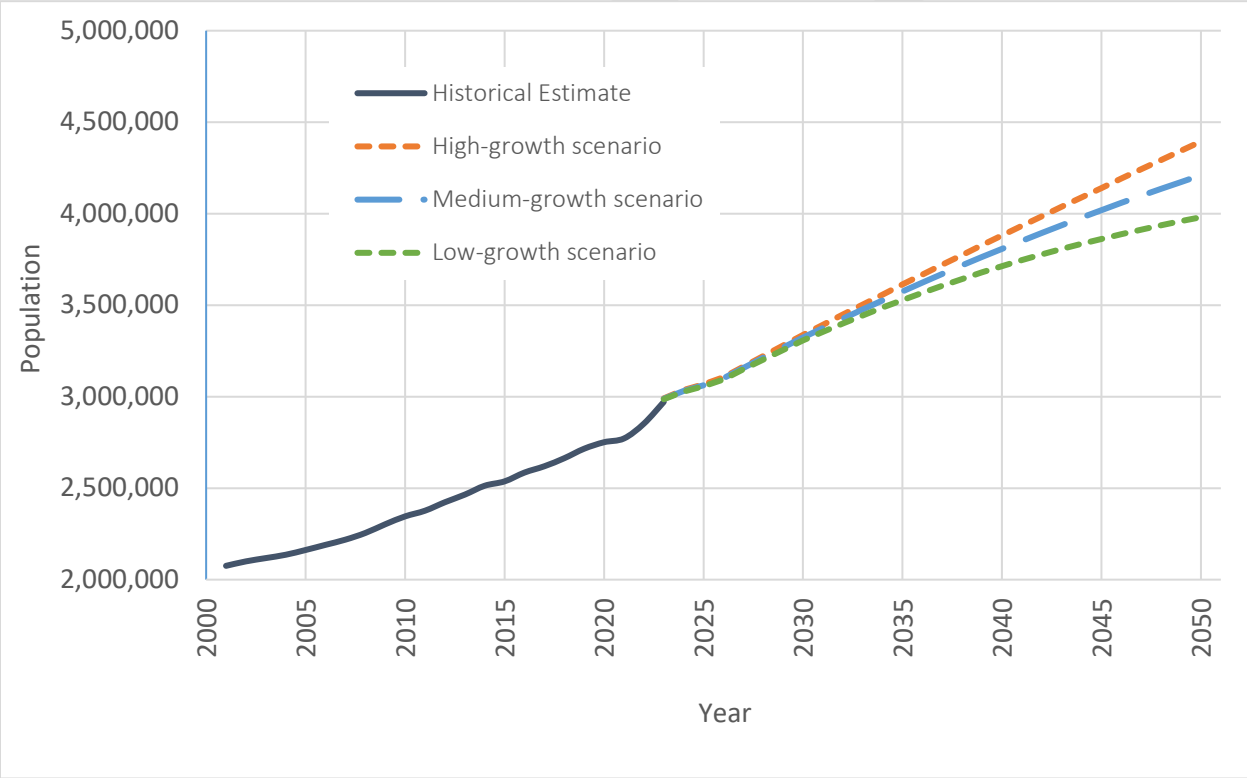


Figure 3 – Metro Vancouver population growth and projections from 2000 to 2050

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.

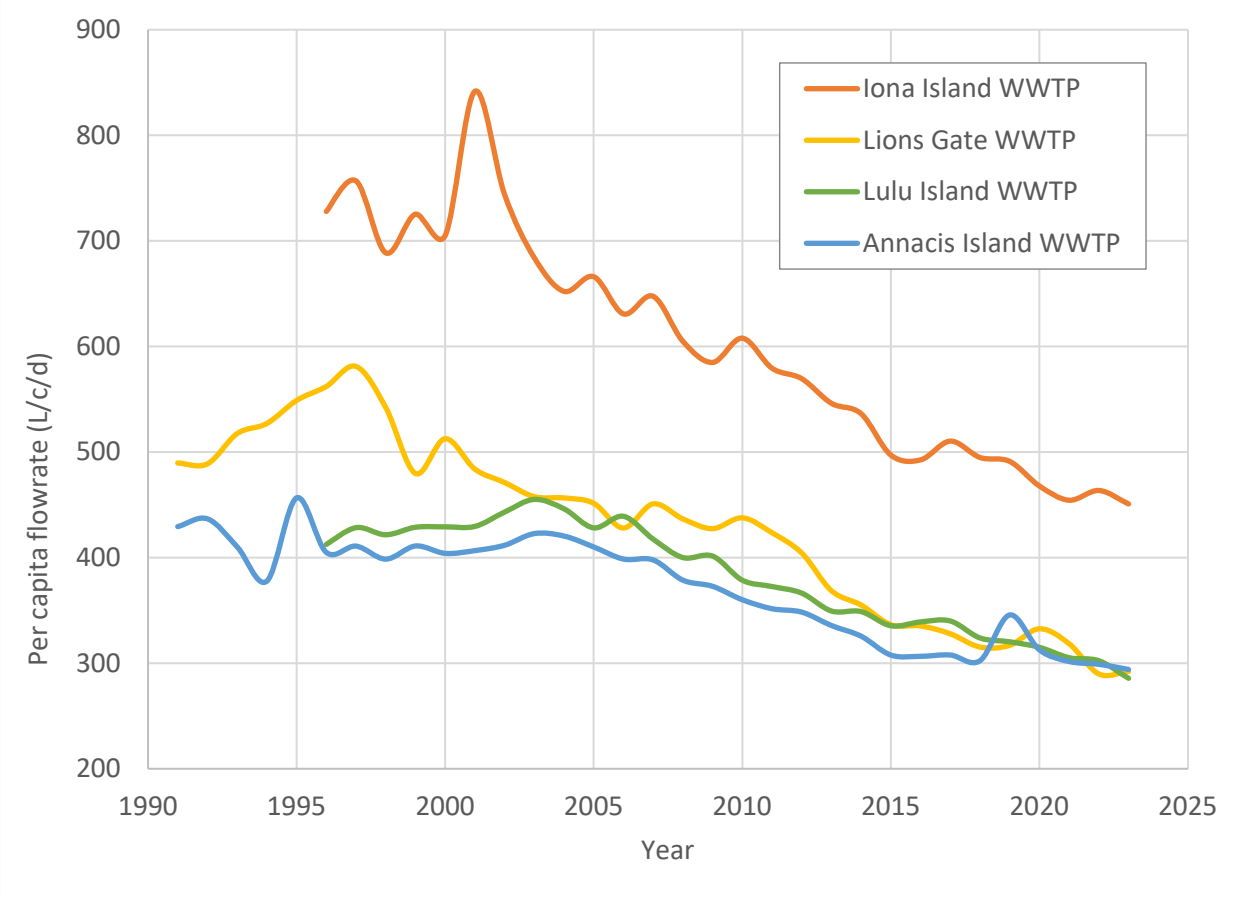


Figure 4 – Wastewater flows into Metro Vancouver wastewater treatment plants 1990 to 2023

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

Sewer pipes are sized to carry a certain amount of flow, which can be exceeded during substantial rain storms. 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

Each year, the Greater Vancouver Sewerage and Drainage District (GVS&DD) apportions its annual expenditures among the member municipalities. Until recently, the cost apportionment was based on dry weather flows from each member to the regional sewer system. However, this does not adequately reflect the full costs associated with conveying and treating sewage, and is inequitable since members with excessive wet weather flows – which require larger, costlier conveyance and treatment infrastructure – are effectively being subsidized by other members.

Basing costs on wet weather flows instead better reflects the full regional costs of serving each member and is more fair. This "user pays" approach for wastewater is similar to that long in place for drinking water services: members who use more water – and hence more regional infrastructure – pay a greater share of the costs, while those who use less pay less.

In 2023 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 Sewer Separation

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.

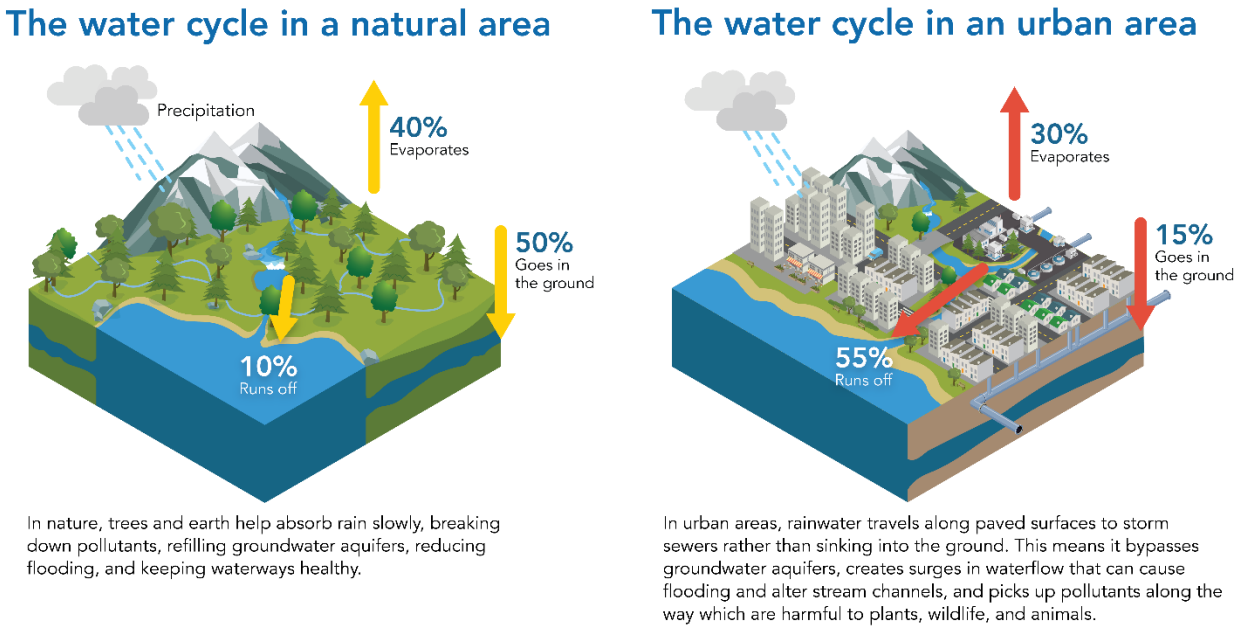


Figure 5 – The water cycle in a natural area vs. an urban area

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 recovery 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 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 removed 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.

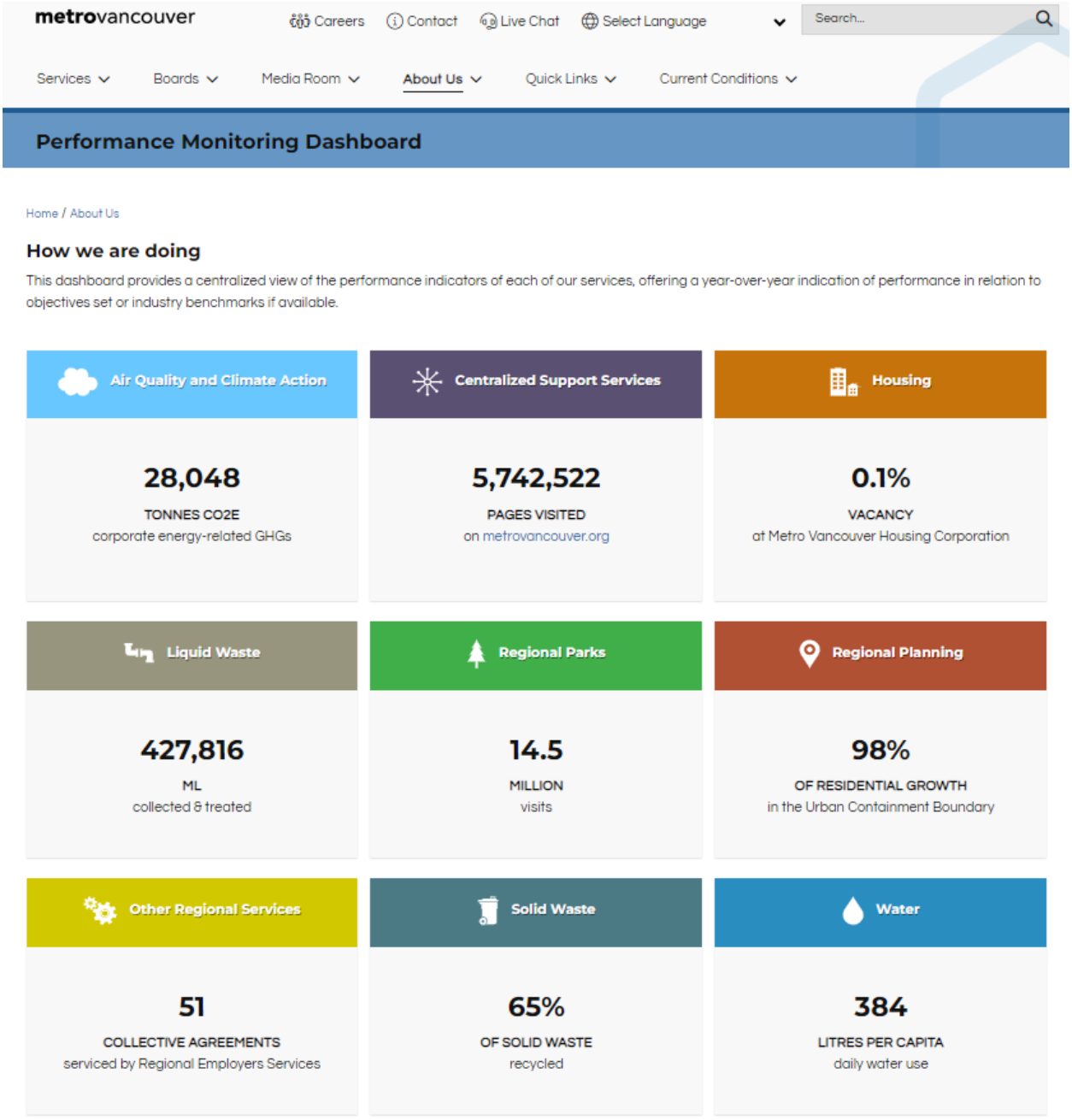
- *Explanations of missed deadlines for action completion.*
  Some actions have specific timeframes for completion. If implementation has been delayed, explanations will be provided in this section and new timelines established.

- *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		
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, Katsie 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 is 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 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.

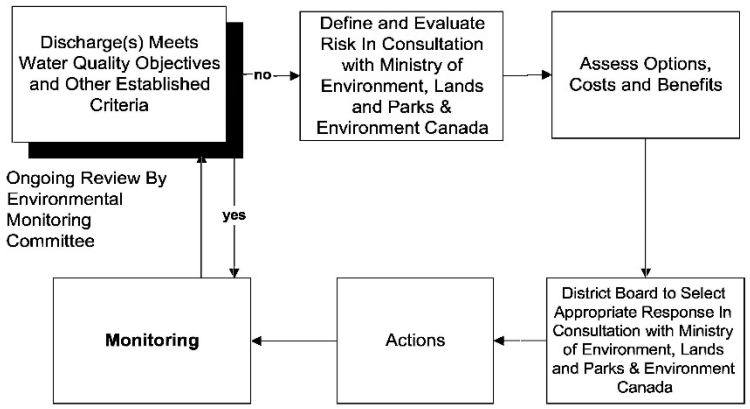


Figure 3 – Upgrading "trigger" mechanism

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.

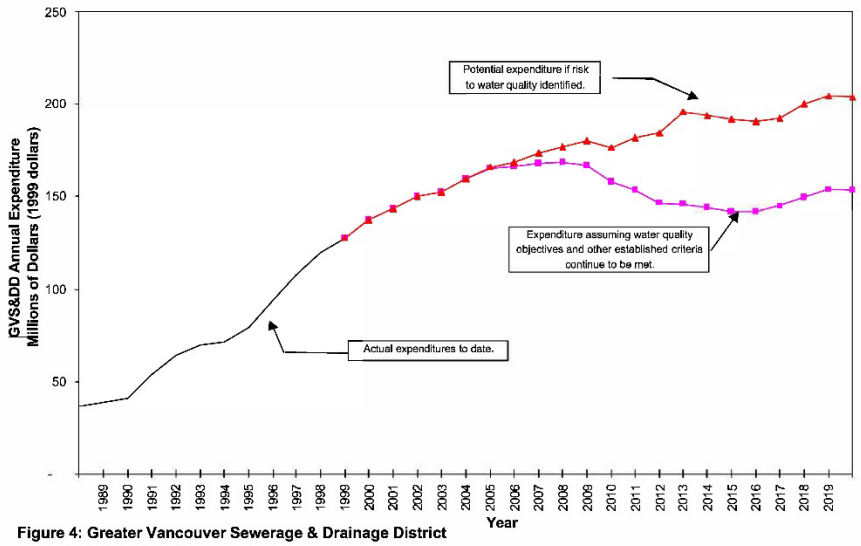
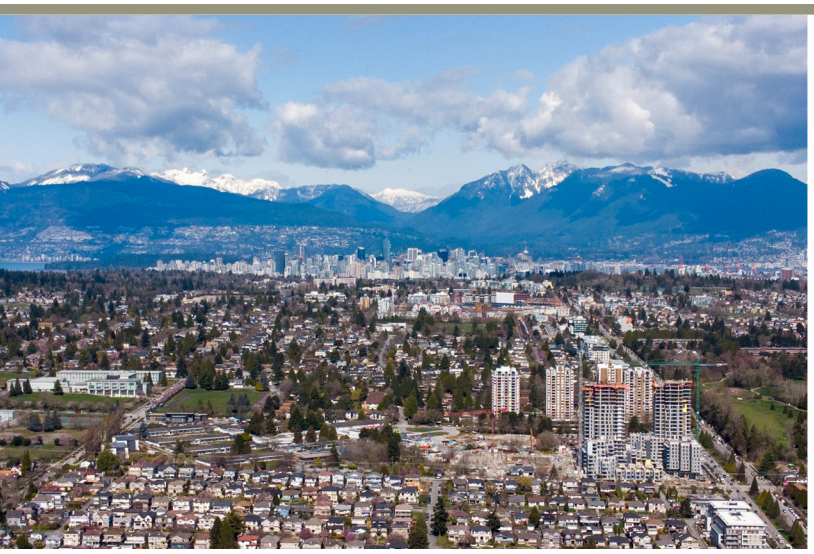


Figure 4: Greater Vancouver Sewerage & Drainage District Liquid Waste Management Plan Potential GVS&DD Expenditure Envelope



From Source to System to Sea

Public Advisory Committee Recommendations for Metro Vancouver's Liquid Waste Management Plan

Indigenous Territorial Acknowledgement

Metro Vancouver acknowledges that the region’s residents live, work, and learn on the shared territories of many Indigenous peoples, including 10 local First Nations: q̓icə̓y̓ (Katzie), q̓ʷɑ:n̓ƛ̓ən̓ (Kwantlen), kʷikʷəƛ̓əm (Kwikwetlem), máthxwi (Matsqui), xʷməθkʷəy̓əm (Musqueam), qiqéyt (Qayqayt), Semiahmoo, Sḵwx̱wú7mesh Úxwumixw (Squamish), scəw̓aθən məsteyəxʷ (Tsawwassen) and səlilwətaɬ (Tsleil-Waututh).

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

About Metro Vancouver

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

Front cover: (clockwise from top left) Looking north from 59th Avenue and Cambie Street;
Iona Island Wastewater Treatment Plant; Pacific Spirit Regional Park.

4515 Central Boulevard, Burnaby, BC, V5H 0C6
metrovancouver.org
August 2024

Introduction

Metro Vancouver is located where the mighty Fraser River meets the Salish Sea. The river and its lower watersheds, with hundreds of creeks and streams, are now home to more than three million people, but are still alive with salmon and many other species.

The Liquid Waste Management Plan Public Advisory Committee ("the Committee") acknowledges the important role First Nations play in stewarding the region for millennia according to laws and customs that have historically ensured abundance, rich biodiversity, and sustainable economies, and further notes the necessary work of reconciliation and ensuring that First Nations title and Rights and inherent authority in their territories is recognized in land and water management in the Metro Vancouver region.

Clean, abundant water is vital for all of us in this region. Fish and wildlife are also highly dependent on the health of our local streams and rivers and coastal waters. We have a shared responsibility as a community to manage our impacts on this irreplaceable resource and source of life.

Guiding principles for these recommendations:

- Emphasize source control and pollution prevention
- Employ a holistic, watershed-based approach
- Ensure Specific, Measurable, Achievable, Relevant and Time-bound (SMART) metrics, leading to the improvement of water quality

The Liquid Waste Management Plan Public Advisory Committee

The Committee was convened in fall 2021 to advise Metro Vancouver on the review and update of the existing regional Liquid Waste Management Plan (LWMP, 2011). The Plan is required to meet the responsibilities of Metro Vancouver and its members under the BC Environmental Management Act. The updated Plan will set the course for how the region will manage wastewater and stormwater for the next 10 years and includes actions for Metro Vancouver and its members.

The Committee is made up of nine community members who bring a variety of perspectives to wastewater and stormwater issues, including technical and legal experts, wastewater management specialists, environmentalists, and business representatives. The Committee was formed to receive information, ask questions, provide recommendations, and engage in discussion concerning regional wastewater and stormwater management issues.

Deborah Carlson, Co-Chair
Staff Lawyer, West Coast Environmental Law

Dr. Peter Ross, Co-Chair
Senior Scientist & Director, Water Pollution, Raincoast Conservation Foundation

Matt Brown
Director, Western Watersheds, Swim Drink Fish Canada

Dr. Stephanie Chang
Professor, School of Community and Regional Planning, and Institute for Resources, Environment, and Sustainability, UBC

Russell Elliot
Campaigns Manager, Georgia Strait Alliance

Deborah Jones
Rain Gardens Coordinator, Cougar Creek Streamkeepers

Jacek Redlinski
Zone Director, Lower Mainland, Building Officials Association of BC

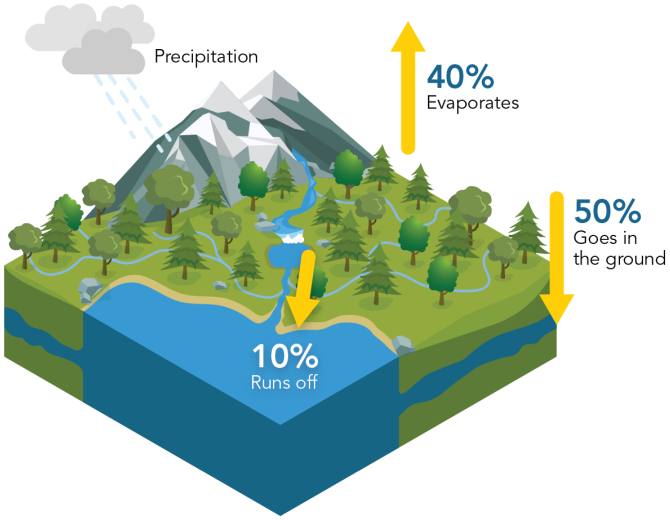
Dr. Chi Ho Sham
Independent Consultant; Former President, American Water Works Association

Graham With
Head Brewer, Parallel 49 Brewing Company

We'd also like to acknowledge the contributions of former Committee members Lucero Gonzalez Ruiz, formerly of Georgia Strait Alliance, and Lauren Brown Horner, formerly of Swim Drink Fish.

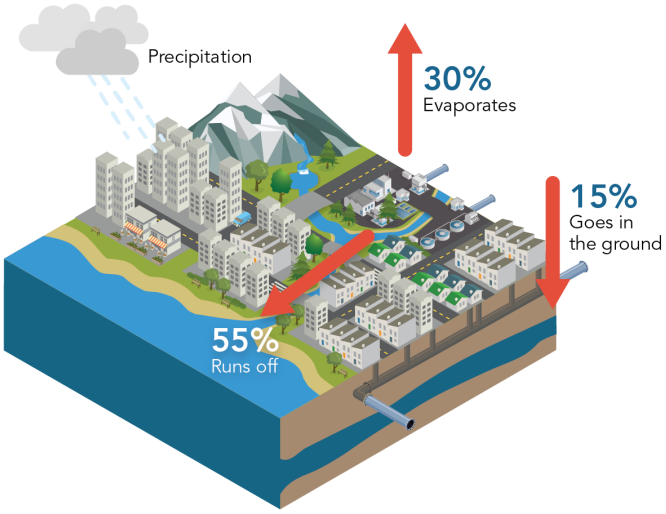
Guided by the journey of wastewater and stormwater in Metro Vancouver watersheds, from **source to system to sea**, the Committee worked over the past three years and generated a list of more than 50 recommendations, which have been refined into the following thirteen priority recommendations for the next Liquid Waste Management Plan.

The water cycle in a natural area



In nature, trees and earth help absorb rain slowly, breaking down pollutants, refilling groundwater aquifers, reducing flooding, and keeping waterways healthy.

The water cycle in an urban area



In urban areas, rainwater travels along paved surfaces to storm sewers rather than sinking into the ground. This means it bypasses groundwater aquifers, creates surges in waterflow that can cause flooding and alter stream channels, and picks up pollutants along the way which are harmful to plants, wildlife, and animals.

*Urban water cycle for areas with 75 – 100% impervious surface, from "Impervious Surface Coverage: The Emergence of a Key Environmental Indicator" Arnold and Gibbons, 1996.

Public Advisory Committee Recommendations for the LWMP:

To encourage everyone to take action to **improve the quality** and **reduce the quantity** of wastewater at the source:

	RECOMMENDATION
1	Engage and educate all producers of wastewater (residents, business, industry, institutions, governments) to recognize the impact their actions have on the health of local waters and their role in reducing the pollutants entering our wastewater, and the overall quantity of water entering the wastewater management system.
2	Encourage water conservation to reduce the need for moving larger volumes of wastewater, the demand for additional wastewater treatment capacity, the cost of wastewater management, and greenhouse gas (GHG) emissions associated with the pumping and treatment of wastewater.
3	Investigate and identify best practices to intercept pollutants in stormwater (urban run-off) before they reach streams and waterways, and support restoration initiatives and studies across the region with a focus on fish-bearing streams.
4	Create a list (e.g., "Top Ten") of priority pollutants in stormwater and wastewater, and monitor progress to reduce them across Metro Vancouver.
5	Cooperate with researchers to advance understanding of impacts on aquatic species and ecosystems from stormwater and wastewater pollution, and develop effective prevention measures.
6	Engage all levels of government to identify, regulate, enforce, and incentivize the reduction or elimination of pollutants at the source.

Result: This will make our local waters healthier and reduce the cost to treat wastewater for the region's taxpayers.

To **improve the quality** of the region's stormwater/wastewater and **reduce the pollutants** it carries:

RECOMMENDATION	
7	Continue to increase the implementation of green infrastructure across the region, in alignment with the Climate 2050 Roadmap for Nature and Ecosystems, and the Regional Green Infrastructure Network: Invest in the maintenance of green infrastructure and monitor and assess its outcomes for stormwater management in a changing climate, to constantly improve its success.
8	Monitor the implementation of Integrated Watershed Management Plan (formerly known as Integrated Stormwater Management Plans) objectives in land use practices across Metro Vancouver members. In particular, require Metro Vancouver members to monitor and report changes within each Integrated Watershed Management Plan area in: a. Effective impervious area, permeable surface, or effective permeable surface b. Tree canopy cover (riparian and non-riparian) c. Conditions for indigenous fish populations
9	Work to remove regulatory barriers (such as in the BC Building Code) to encourage the use of green infrastructure rather than restrict it. Green infrastructure and associated stormwater management practices that require regulatory update include: • Disconnection of roof downspouts from storm sewers • Authorization of stormwater diversion from one property to another, in safe circumstances (for example, school parking lot to municipal boulevard; municipal street to hospital landscaping; residential building roofs to adjacent parkland) • Increased protection of tree canopy • More use of bioswales, enhanced ditches (i.e., informally landscaped), green roofs, rain gardens
10	Invest in green infrastructure, in conjunction with appropriate grey infrastructure, as a response to climate and land use changes, and prioritize improvements in problematic stormwater catchment areas that convey the highest amount of pollutants to the most vulnerable receiving waters.
11	Create a regional map and dashboard that provide information and data on: • The types of pollutants that enter the systems and their sources (e.g. industry, homes, businesses) • Integrated Watershed Management Plan (IWMP) trends, indicators, measures for success, and outcomes • IWMP implementation • The sewage and stormwater systems, showing where wastewater enters and exits the system • All green infrastructure installations in the region • The progress of sewer separation • The annual number and volume of combined and sanitary sewer overflows • Environmental and ecological information • First Nations cultural sites and activities *An IWMP provides direction for future development plans and identifies infrastructure needs while better understanding the impacts of development on the environment. The goal is to balance land use planning, stormwater engineering, flood and erosion protection, and environmental protection.

Result: This will help protect the health of the region's rivers and streams, as well as the performance of the wastewater system.

To strengthen our knowledge and understanding of **local water quality** and **emerging and traditional pollutants:**

RECOMMENDATION	
12	Encourage the gathering of high-quality data and knowledge among First Nations, environmental and academic organizations, Metro Vancouver, member jurisdictions, and senior levels of government. Create a data clearing house to coordinate monitoring, data standards, data objectives, data quality, analytics, and study framework.
13	Facilitate a network to share and analyze data across the region.

Result: This will advance the region's ability to act strategically and effectively to protect local waterways.

Guidance for Implementing the Recommendations

Implementing these recommendations will require:

- Close collaboration among Metro Vancouver members and with provincial and federal agencies, and First Nations
- Tapping into complementary funding sources such as those allocated for salmon conservation, climate resilience and adaptation, and biodiversity protection
- Careful prioritization and optimization of recommended activities based on data analysis

Iona Beach Regional Park

Conclusion

As community members who bring interests, experience, and technical expertise in the areas of wastewater and stormwater issues, we appreciate the opportunity to offer our advice and guidance to the update of the Liquid Waste Management Plan.

The previous Plan laid the foundation for this update and it is critical that we continue to work collaboratively to adapt and prepare for the future in a period of rapid change.

By taking an integrated grey and green infrastructure approach to designing and managing the system, we will safeguard our communities and our ecosystems effectively and affordably.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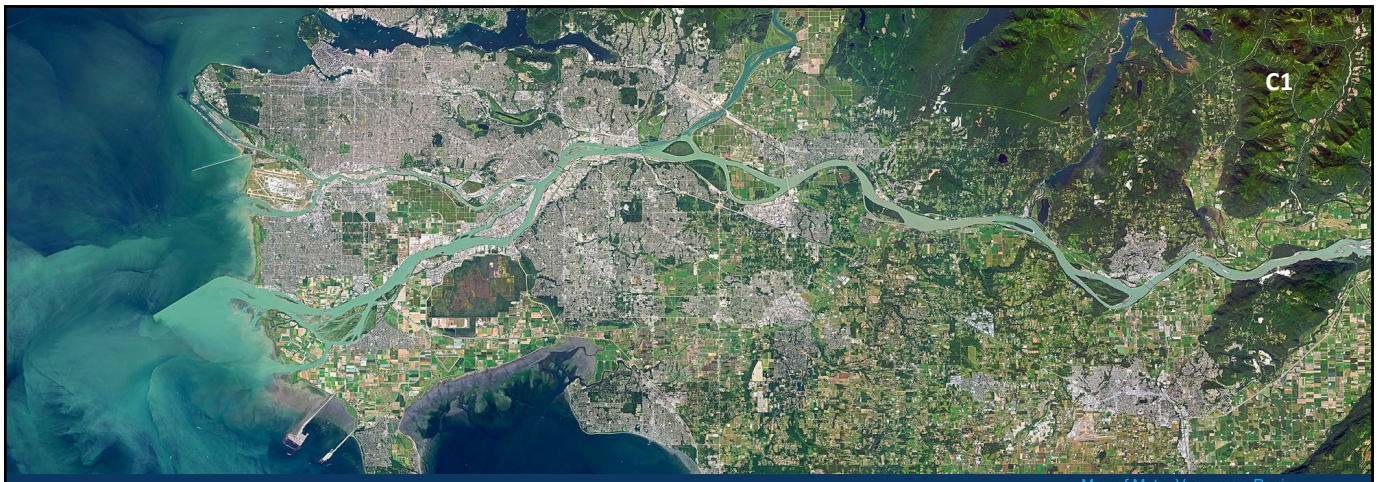
SERVICES AND SOLUTIONS FOR A LIVABLE REGION

ATTACHMENT 3



Map of Metro Vancouver Region

Liquid Waste Management Plan Update

COLLECTIVE ACTION TO PROTECT PUBLIC HEALTH AND THE ENVIRONMENT

Liquid Waste Committee Special Workshop, October 30, 2024

70312611

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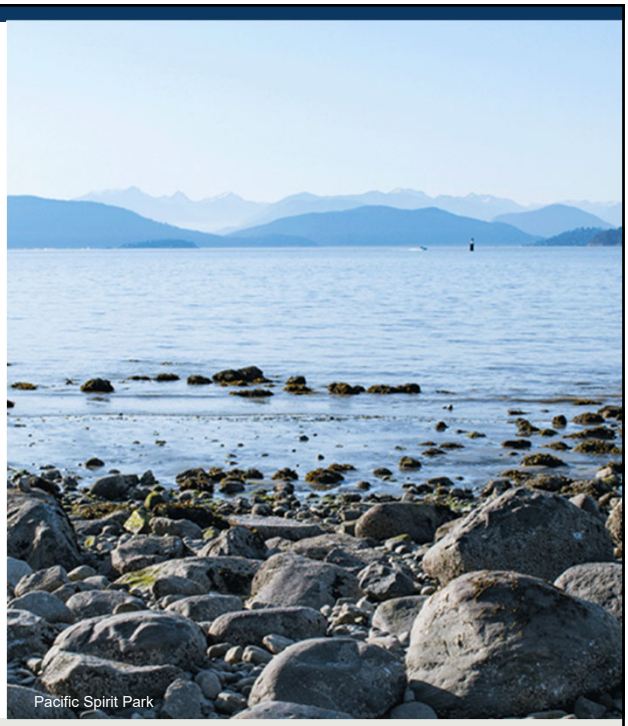
1

WORKSHOP PURPOSE

Hear different perspectives and review key actions from the updated Liquid Waste Management Plan, before recommendation to proceed to Phase 3 engagement.



Pacific Spirit Park

2

3

THE JOURNEY TO COLLECTIVE ACTION

4

PROVINCIAL OBJECTIVES FOR LWMP

Required

1. **Protect public health and the environment**
   - Provide secondary treatment at a minimum
   - Prevent sanitary sewer overflows
   - Prevent combined sewer overflows

PROVINCIAL OBJECTIVES FOR LWMP

Required

2. **Engage First Nations and public**
   - Greater First Nations influence is embedded in updated LWMP actions
   - Feedback from First Nations that rainwater management and protecting watershed health are priorities

PROVINCIAL OBJECTIVES FOR LWMP

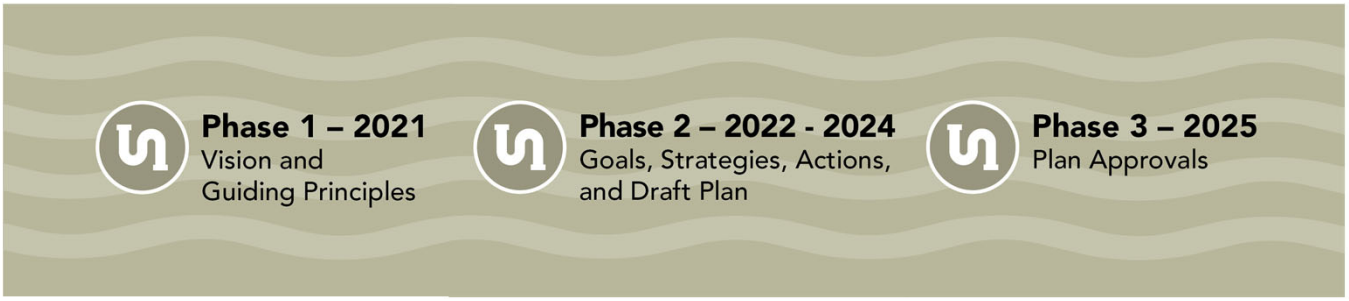
Encouraged

3. **Show leadership and innovation in:**
   - Climate change adaptation and mitigation
   - Resource recovery
   - Water conservation
   - Watershed health

7

RECAP

Currently in Phase 2



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RECAP

Phases 1 and 2 involved 103 meetings and 5 workshops

LWMP Co-Developers	Meetings
SILG	17
REAC-LWSC	16
REAC	12
RAAC	4
Liquid Waste Committee	3
GVS&DD Board	2

First Nations	Meetings
First Nations	21

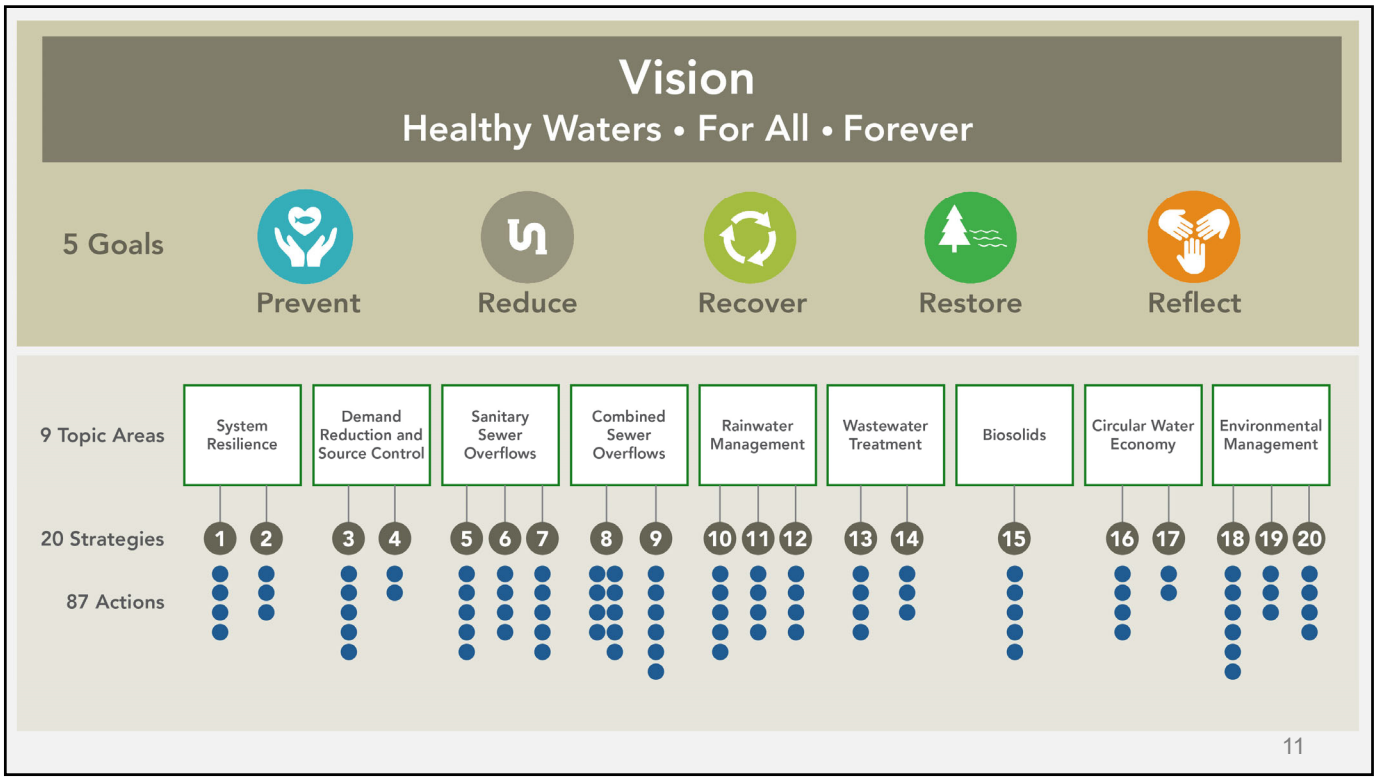
Public	Meetings
Public Advisory Committee (PAC)	13
Public events and webinars	10

Workshops	Attendees
3 technical workshops	First Nations, Province, PAC, REAC, REAC-LWSC, SILG
2 Metro Vancouver Conference Days	REAC, REAC-LWSC, SILG

RECAP

Phase 1 and 2 engagement feedback

Group	Key interests
Ministry of Environment and Climate Change Strategy	Better environmental outcomes
First Nations	Improved water quality More influence in decision making
Public Advisory Committee	Healthy habitats for people, fish, and wildlife
Members	Improved affordability
Metro Vancouver	Improved clarity and accountability



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GOALS

Providing policy direction

- **Prevent** pollution
- **Reduce** demands
- **Recover** resources
- **Restore** ecological systems
- **Reflect** First Nations' priorities

12

TOPIC AREAS

Responding to today's challenges

- Rainwater management
- System resilience
- Demand reduction and source control
- Sanitary sewer overflows
- Combined sewer overflows
- Wastewater treatment
- Biosolids
- Circular water economy
- Environmental management

13

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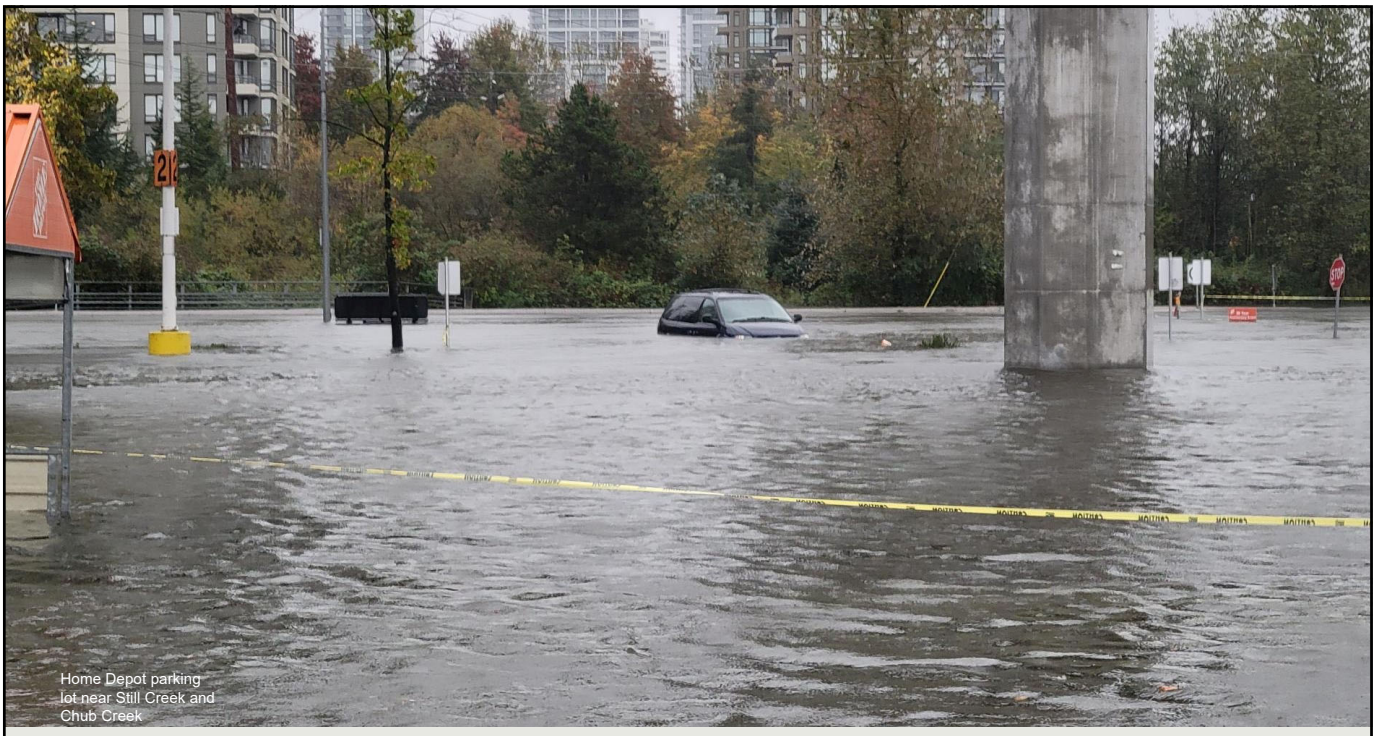

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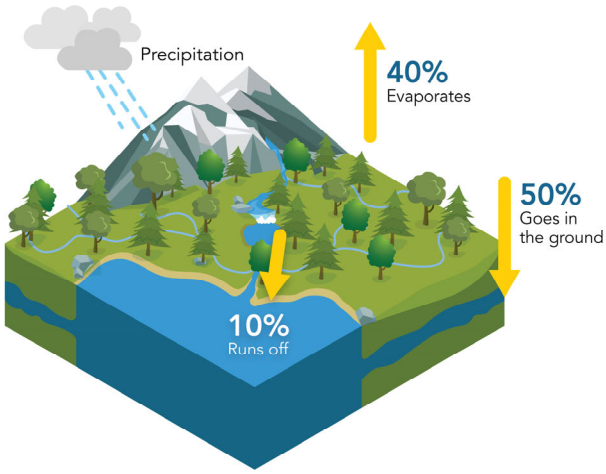
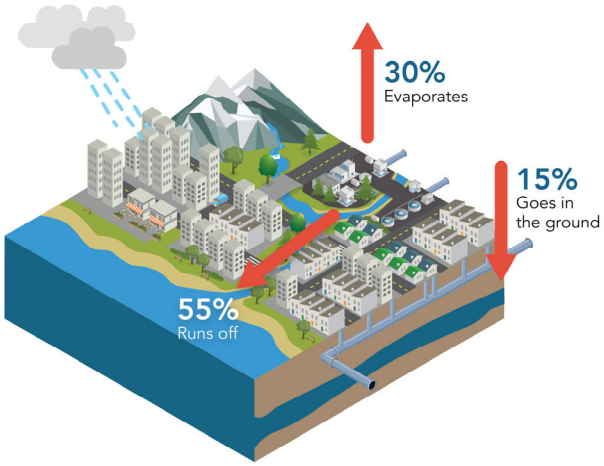
The water cycle in a natural area



The water cycle in an urban area



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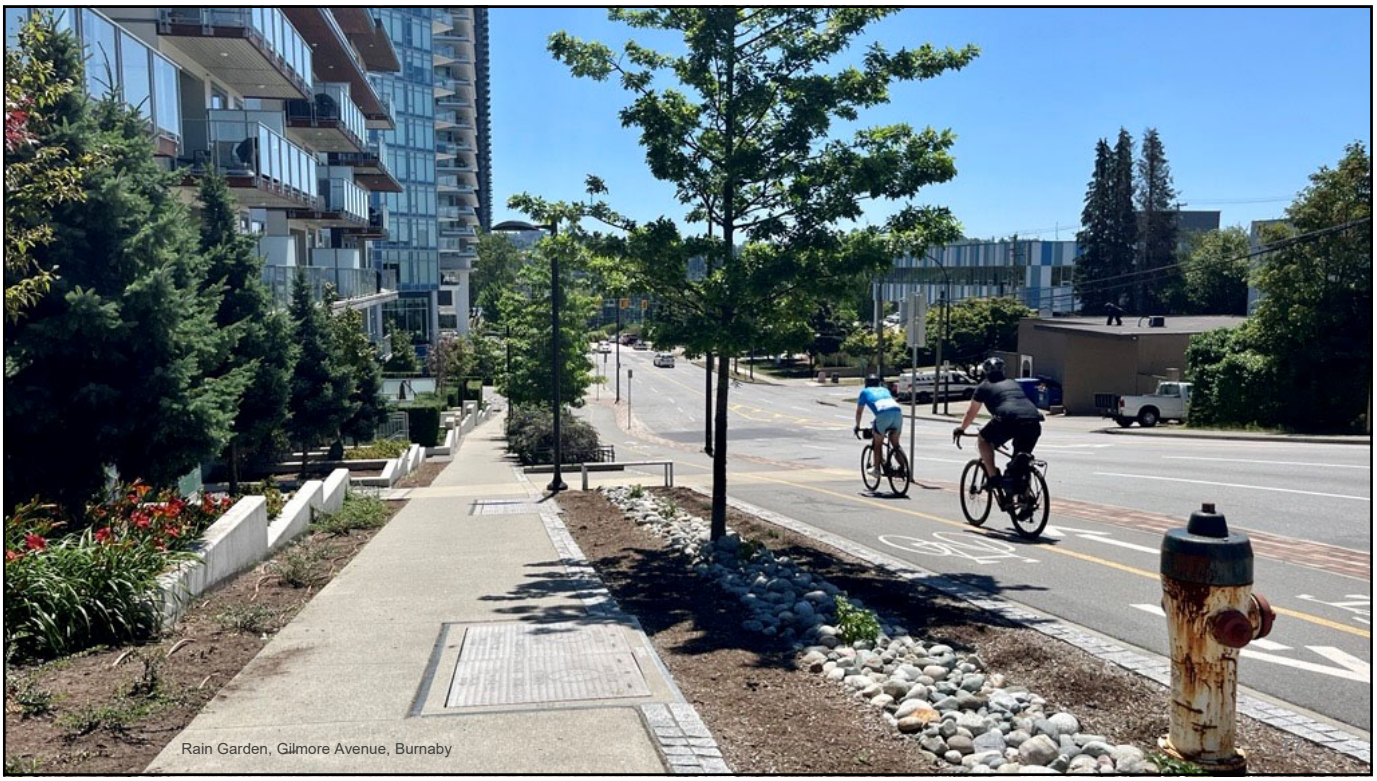


17

RAINWATER MANAGEMENT & WATERSHED HEALTH

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

18

RAINWATER MANAGEMENT & WATERSHED HEALTH

Notable actions

- Members will involve First Nations in developing Integrated Watershed Management Plans (IWMPs)
- Members will align land-use planning and development decisions with IWMPs
- Members will expand green infrastructure
- Members will dedicate budget for rainwater management

19

20

Delta

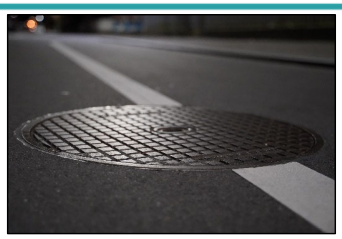
City of Delta's Perspective

Harvy S. Takhar, P.Eng., M.A.Sc., MBA
Manager of Drainage & Natural Hazards

21

Rainwater Management & LWMP

Rainwater management plays a large role with liquid waste



Current State
- ISMP Progress
- AMF Monitoring
- Service separation
- Green infrastructure

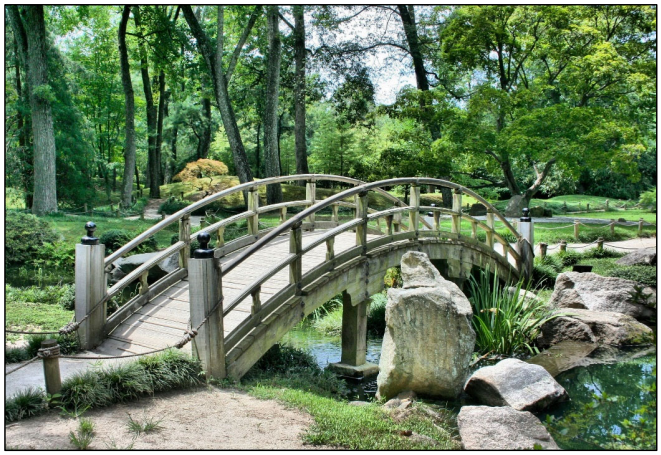
Future State
- Harmonize green infrastructure guidelines
- Standardize green infrastructure

Challenges
- Rainwater management interconnected
- Is current framework effective?

22

What we're excited about

- Synergies of sewer and rainwater management can be formalized
- Harmonizing and standardizing solutions become cost effective



23

LWMP Update:
The Role of the Stormwater Interagency Liaison Group

Robb Lukes, P.Eng.
Associate Director of Green Infrastructure
City of Vancouver

CITY OF VANCOUVER

Vancouver

24

LWMP & SILG

Strategy 10 & 11 – Actions Needing SILG Support

- Harmonizing rainwater policies across the region
- IWMP monitoring dashboards & metric consistency
- Regular updates to regional SWM guidance and
- Incorporate green infrastructure standards into MMCD
- Advocate with other levels of government to resolve conflicts and barriers

Challenge: Requires centralized specialist resources

25

25

LWMP & SILG

Strategy 12 – SILG Focused Actions

- SILG terms of reference update
  - Consider transitioning to a sub-committee of REAC
- Studies & Tools
  - Regional study of densification on watershed health
  - Green infrastructure lifecycle and benefits cost report and calculator
- Hosting a progress forum at least every three years

Challenge: Requires centralized specialist resources

26

26

RAINWATER MANAGEMENT & WATERSHED HEALTH

Notable actions

- Members will dedicate budget for rainwater management

27

POLL AND DISCUSSION

Manage rainwater and urban development for healthy watersheds

Do you support dedicating municipal budget to rainwater management?

28

29

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

30

SYSTEM RESILIENCE

Notable actions

- Create master sewer servicing plans to accommodate growth and urban development
- Complete climate change and natural hazard vulnerability assessments and prepare adaptation plans

31

32

DEMAND REDUCTION AND SOURCE CONTROL

Strategy 3. Reduce flows and loadings into the system

Strategy 4. Prevent pollution at the source

33

DEMAND REDUCTION AND SOURCE CONTROL

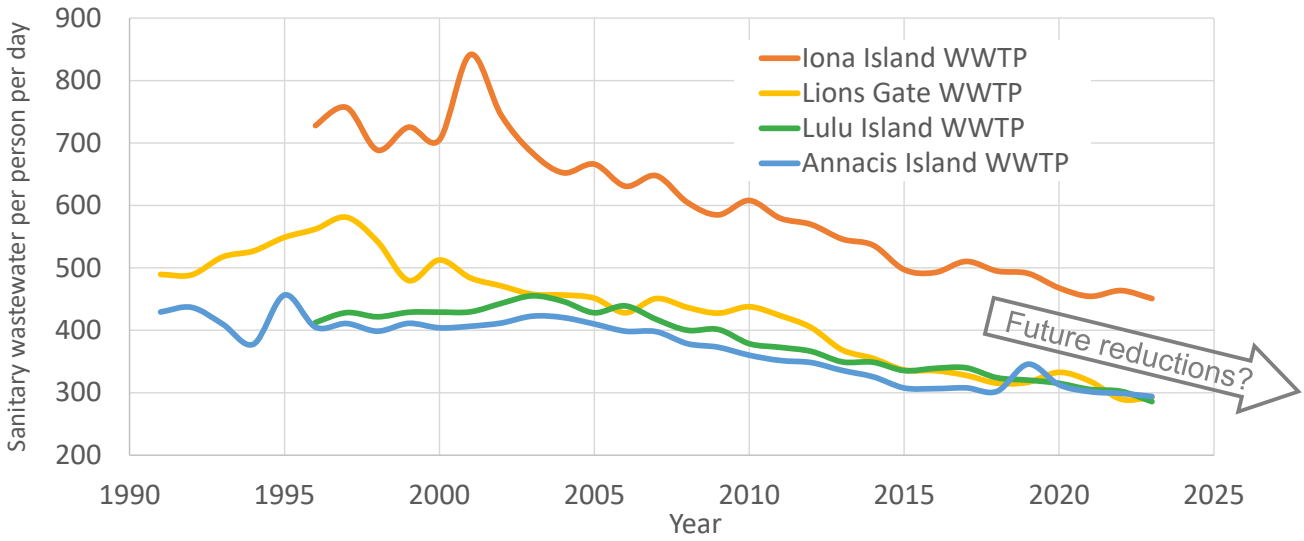
Targeted sectors and actions

- **Residents**: reduce food waste down drains and use green bin for kitchen scraps; prevent introduction of fats, oil, and grease (FOG)
- **Restaurants**: prevent introduction of FOG; improve grease interceptor maintenance
- **Industry**: reduce flows and organic loading

34

REDUCE DEMANDS

Drinking water conservation reduces sanitary wastewater flows



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REDUCE DEMANDS

Reduce flows and loadings to defer infrastructure expansions

Sanitary flow: reduce indoor water use

- Carry over 2011 Minister's wording on water conservation and metering
- Helps defer wastewater treatment plant expansions

Organic loading: reduce food waste down drains

Wet weather flow: reduce excessive rainwater into pipes

Flooding in District of West Vancouver

36


5-minute break
37

37


Sanitary Sewer Overflows
Sanitary Sewer Overflow

38

metrovancouver 39

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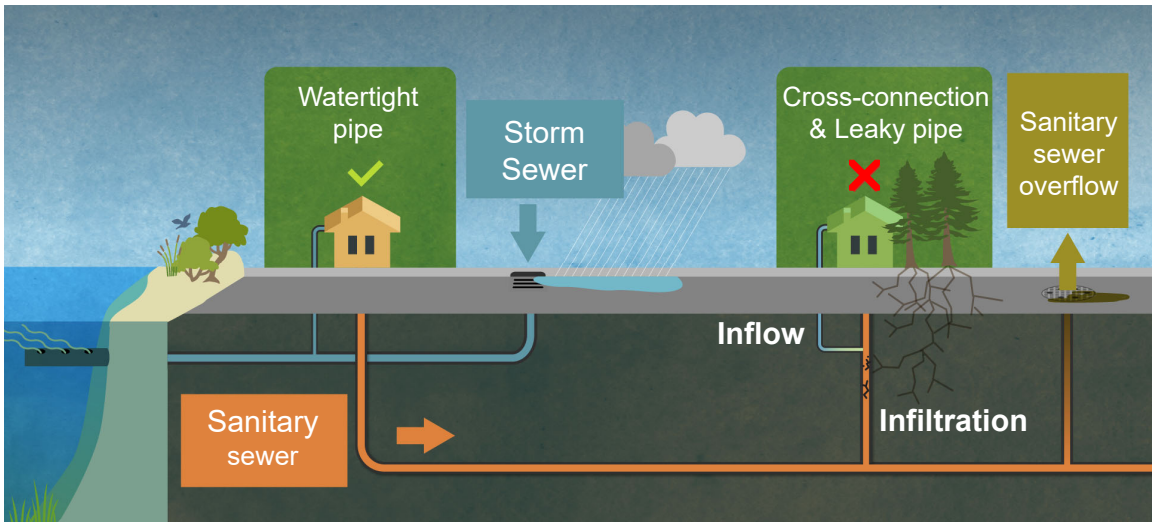
40

SANITARY SEWER OVERFLOWS

Up to 80% of inflow and infiltration comes from private properties



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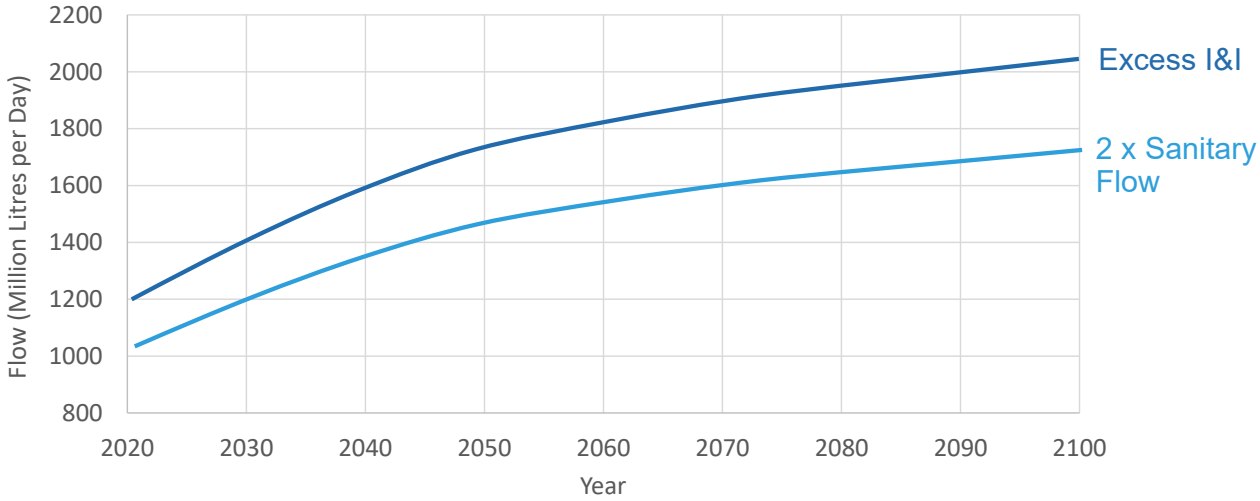
REDUCING I&I CAN DEFER EXPANSIONS

Example: Annacis Island WWTP flow demand



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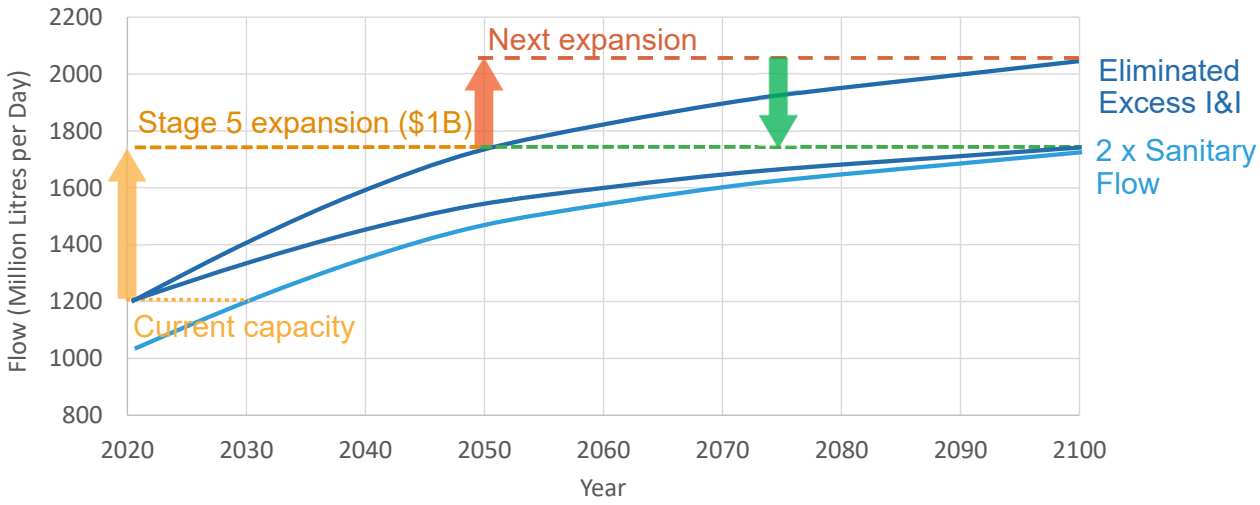
REDUCING I&I CAN DEFER EXPANSIONS

Example: Annacis Island WWTP flow demand and system capacity



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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 the environment

44

SANITARY SEWER OVERFLOWS

Notable actions

- Implement and adjust the wet weather pricing formula to further incentivize I&I reductions by members
- Public education and outreach on investing in I&I to reduce regional infrastructure costs
- Regional support for members to develop programs for property owners to rehabilitate private lateral pipes

45

46

City of Surrey's Perspective

Dave Matsubara, P.Eng
Director of Utilities

47

LWMP – Current Municipal Takeaways

- Most municipalities don't have dedicated "sewer engineering planning" teams, and therefore attention is always split between multiple responsibilities
- Change in staff often means a municipality is starting over for inhouse knowledge

48

LWMP – Current Municipal Takeaways

- More prescriptive actions are more successful (e.g. inspect 5% of pipes per year)
- Biennial report requires members to think about actions and reacquaint themselves with the LWMP actions
- There have been some good information-sharing initiatives; however not all are self-sustaining
- We learn best from each other, demonstrating evidence of programs to assess and improve sewer systems; this should be supported

CITY OF SURREY the future lives here.

49

LWMP 2025: New Challenges and Opportunities

Challenges

- System resilience strategies address the challenge of climate change. We should consider how current rainfall variability and future rainfall could impact inflow and infiltration and safe sewer operation.
- Reducing I&I includes new actions to manage sewer connections to homes. In Surrey we have more than 88,000 sewer connections. Inspecting and repairing this volume will be a challenge.

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LWMP 2025: New Challenges and Opportunities

Opportunities

- More frequent reporting and use of dashboards will provide better tools for management and information sharing
- New and updated tools and programs for watershed health should help focus efforts and improve results
- Resource recovery and reuse presents exciting opportunities

CITY OF SURREY
the future lives here.

51

City of Coquitlam
Engineering and Public Works

City of Coquitlam's Perspective

Sergio Garcia, P.Eng, M.Sc., M.Eng.L
Manager of Utility Planning

coquitlam.ca/

Coquitlam

52

Current State of I&I Reduction Program

Municipal pipes	Private pipes
~50%	~50%
Point repairs	Lateral grant
Asset replacement	Smoke testing
Monitoring	Redevelopment

Takeaways

- Data collection helps streamline the decision making process
  - Collaboration with MV
  - Dashboard
- Smoke inspection is a cost effective method to identify cross-connections

Opportunities

- Replacement of private connections
  - Potential cost savings using CCTV
  - Educational campaign

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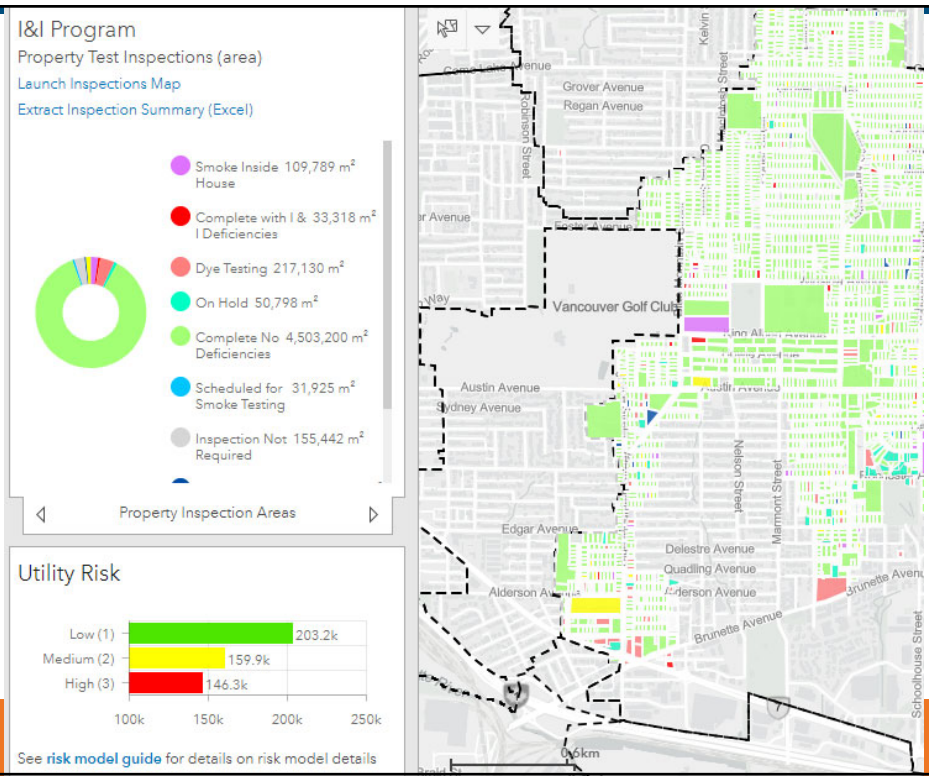


54

Future State

Challenges

- Balance between affordability and climate resilience
- Funding a long-term, city-wide I&I program

Opportunities

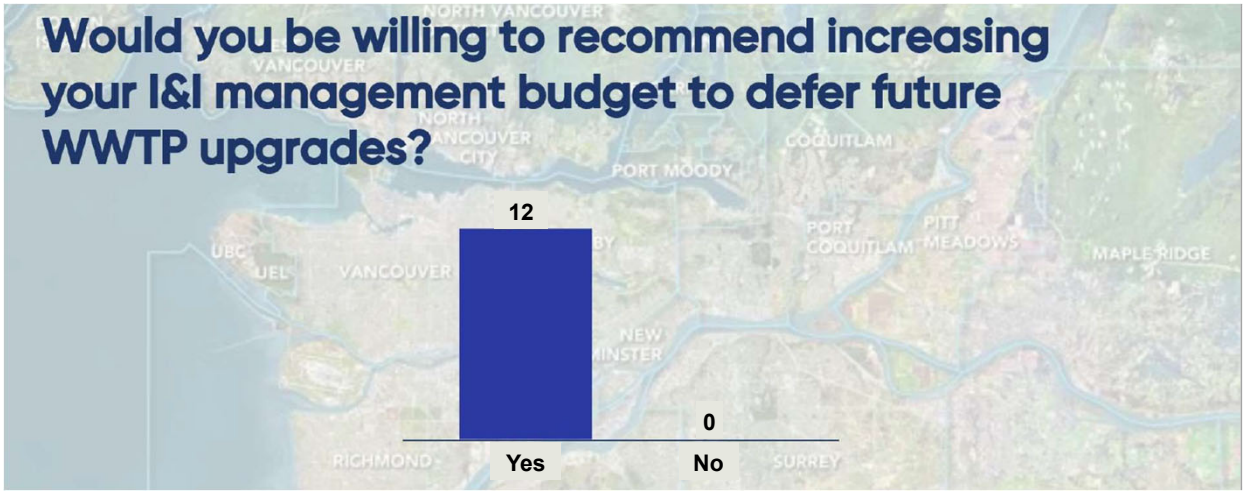
- Streamline reporting process
  - Share real-time data
  - Enhance inter-municipal collaboration
- Improve communication with the community

55

56

SANITARY SEWER OVERFLOWS

REAC Liquid Waste Sub-Committee poll, March 2024



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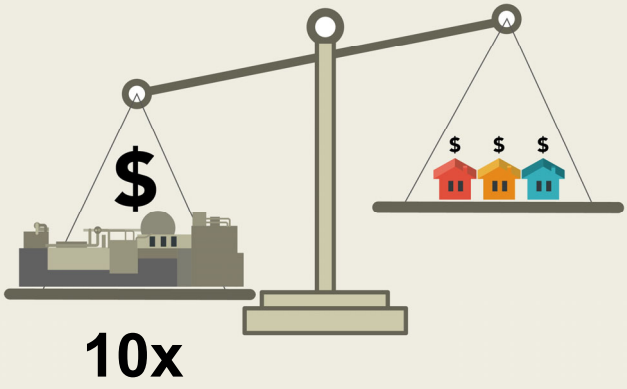


SANITARY SEWER OVERFLOWS

Conveying and treating excess rainwater costs **10 times more** than fixing leaky pipes at the source

58


Cloverdale Storage Tank

SAVINGS THROUGH DEMAND REDUCTION

Member I&I reduction programs cost $150,000 to $2,500,000 annually.

Reducing I&I at the source will save **$2 billion** by removing 17 sanitary sewer overflow storage tanks from the long range capital plan.

59

POLL AND DISCUSSION

Reduce inflow & infiltration to eliminate overflows and defer expansions

Do you support member jurisdictions increasing their budgets to reduce I&I?

60

61

COMBINED SEWER OVERFLOWS

Strategy 8. Assess impact of combined sewer overflows on receiving environment

Strategy 9. Separate combined sewers to eliminate overflows

62

COMBINED SEWER OVERFLOWS

Notable actions

- Implement system operational changes to minimize sanitary sewage in combined sewer overflows
- Remove flows from creeks, lakes, and underground streams from combined sewers
- Carry-over separation deadlines of 2050 for Vancouver Sewerage Area and 2075 for Fraser Sewerage Area

63

64

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

65

WASTEWATER TREATMENT

Notable actions

- Upgrade wastewater treatment processes and plants according to the WWTP Upgrade and Expansion Schedule:
  - engage with First Nations on planned upgrades
  - engage with public and other interested parties on planned upgrades
  - upgrade WWTPs in accordance with the timelines in the Schedule
  - report changes in the Schedule to the Ministry

66

WASTEWATER TREATMENT

WWTP Upgrade and Expansion Schedule

WWTP	Scope	Anticipated operation
North Shore	Upgrade	2030
Northwest Langley	Upgrade and expansion	2030 – 2035
Annacis Island	Expansion	2030 – 2035
	Regional biosolids dryer	2032 – 2037
	Partial ammonia removal	2038 – 2043
Iona Island	Upgrade	2035 – 2040

67

68

BIOSOLIDS

Strategy 15. Diversify options to beneficially use Nutrifor biosolids

69

BIOSOLIDS

Notable actions

- Build a regional biosolids dryer to produce pellets that can be used as low carbon fuel and as fertilizer
- Members will use Nutrifor landscaping soil in municipal projects when feasible

70

71

CIRCULAR WATER ECONOMY

Strategy 16. Implement proven resource recovery technologies

Strategy 17. Research and pilot innovative technologies to advance the circular water economy

72

CIRCULAR WATER ECONOMY

Notable actions

- Recover energy from the liquid waste system, including:
  - Biogas from WWTPs
  - Heat from sewage and effluent
- Pilot new technologies to expand the recovery and use of resources from liquid waste

73

74

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

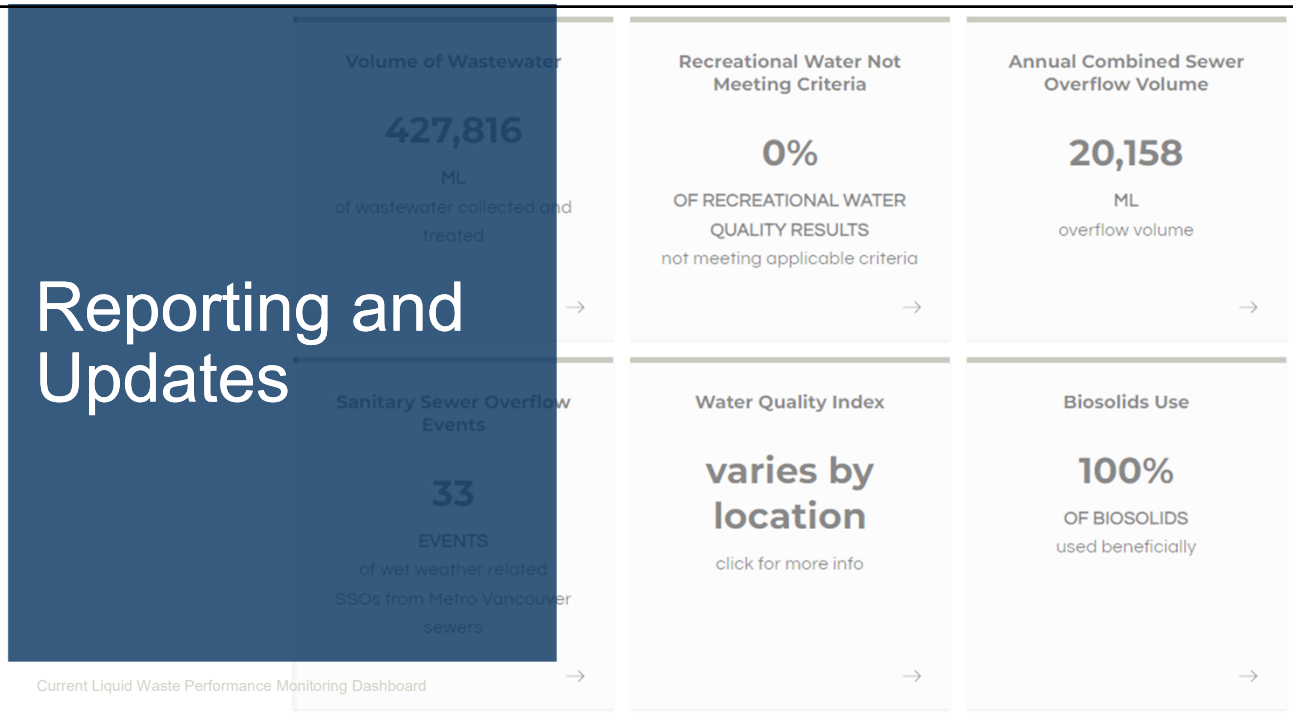
Strategy 20. Collaborate on regional environmental management initiatives

ENVIRONMENTAL MANAGEMENT

Notable actions

- Reduce greenhouse gas (GHG) emissions from wastewater systems
- Monitor substances of interest in effluent and monitor environmental fate of priority contaminants
- Collaborate on programs for regional water bodies with First Nations, senior governments, and interested parties

Reporting and Updates



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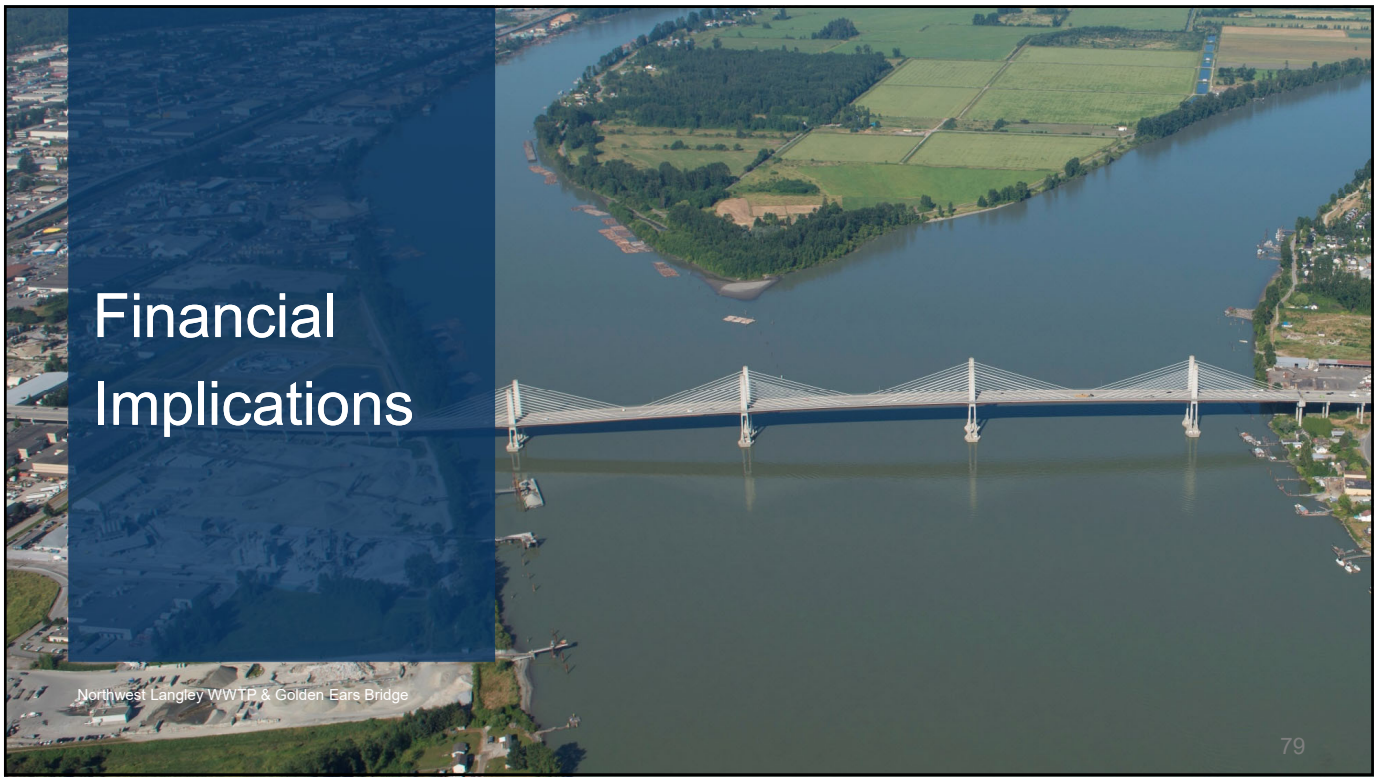
REPORTING AND UPDATES

Streamlined and accountable

	Past	Future
Reporting	Extensive biennial reports + interim annual reports	Simple annual report + online dashboards
Updates	10-year cycle with extensive engagement	Mid-plan amendments

78



79

THIS LWMP PRIORITIZES AFFORDABILITY

Implementing the LWMP will require an additional $5.3 million, on current annual operating budget of $680 million

No capital budget increase

80

ADDITIONAL ANNUAL OPERATING BUDGET

Environmental monitoring activities	$4,150,000
Inflow and infiltration	$650,000
Rainwater management	$215,000
All other strategies combined	$285,000
Total cost to implement LWMP	**$5,300,000**

SAVINGS THROUGH DEMAND REDUCTION

- Reducing I&I at the source costs **10 times less** than conveying and treating that rainwater
- I&I reduction will reduce costs for regional infrastructure **($ billions)**, while requiring municipal and private investment for fixing leaky pipes **($ millions)**
- Wet weather pricing reflects the “user pay” principle


Cloverdale Storage Tank

SAVINGS THROUGH DEMAND REDUCTION

Member I&I reduction programs cost $150,000 to $2,500,000 annually

Reducing I&I at the source will remove 17 sanitary sewer overflow storage tanks from the long range capital plan

This will save **$2 billion**

83

84

NEXT STEPS

Activity	Timeline
Liquid Waste Committee and GVS&DD Board receive draft LWMP and Phase 2 engagement report	Nov 13 (Committee) Nov 29 (Board)
Commence Phase 3 engagement	Jan 2025
Submit final LWMP to Liquid Waste Committee and GVS&DD Board	Jun 2025
Submit LWMP and Phase 3 Engagement Report to Province	Jul 2025

85

DISCUSSION AND POLL

Liquid Waste Management Plan Update

Do you support this LWMP?

86

87

To: Zero Waste Committee

From: Paul Henderson, General Manager, Solid Waste Services

Date: October 30, 2024 Meeting Date: November 7, 2024

Subject: **Solid Waste and Recycling Industry Advisory Committee 2024 Feedback Summary**

RECOMMENDATION

That the Zero Waste Committee receive for information the report dated October 30, 2024, titled "Solid Waste and Recycling Industry Advisory Committee 2024 Feedback Summary".

EXECUTIVE SUMMARY

The Solid Waste and Recycling Industry Advisory Committee (Industry Advisory Committee) provides a forum for industry contribution, discussion, and advice on management planning, operations, and policy issues related to solid waste and recycling services in Metro Vancouver, as well as the ongoing solid waste management plan update. Committee activities are reported out to the Zero Waste Committee on an annual basis.

Discussion topics in 2024 were developed in collaboration with the committee and Co-Chairs and focus on collecting input for the solid waste management plan and increasing opportunities for member input.

The generator levy was a key topic of discussion, with some committee members commenting that the levy increases costs and stifles competition and innovation, as it discourages the use of private disposal sites and prevents private entities from disposing of waste outside the region. Other committee members commented that the levy benefits recyclers as it incentivizes recycling over disposal, and has helped to fund recycling initiatives such as mattress recycling and education. Other discussion topics in 2024 included recycling capacity, product markets, and long-term disposal planning.

PURPOSE

To provide the Zero Waste Committee with key feedback from discussions of the Solid Waste and Recycling Industry Advisory Committee in 2024, including the generator levy and competition.

BACKGROUND

In July 2021 the Board received for information the terms of reference for the Industry Advisory Committee. The committee held its first meeting in January of 2022. The Industry Advisory Committee is an advisory body, providing advice and recommendations to Metro Vancouver staff and, through the Industry Advisory Committee Co-Chairs, to the Independent Consultation and Engagement Panel and the Zero Waste Committee. Director Craig Hodge serves as the Zero Waste Committee representative and Co-Chair of the Industry Advisory Committee. Under the terms of reference, the second Co-Chair is elected by the members of the Industry Advisory Committee. Lori Bryan, of the Waste Management Association of British Columbia, was re-elected as Co-Chair at the April 2024 meeting.

Industry Advisory Committee membership is self-selected through an annual open call for submissions, and membership carries a one-year term with a requirement to re-submit a statement of interest each year. In 2024, there are 32 members on the committee representing businesses and organizations across the waste and recycling industry. Staff report to the Zero Waste Committee on the activities of the Industry Advisory Committee on an annual basis.

INDUSTRY ADVISORY COMMITTEE FEEDBACK

Discussion Approach and Topics

At the January 2024 meeting, the Industry Advisory Committee participated in small group discussions to review the key topics members wanted to focus on in 2024 and to share ideas on best approaches for these conversations. Members discussed options to leverage committee expertise and delve deeper into key priority topics, resulting in recommendations for a renewed approach to addressing key topics of interest. Based on suggestions from members, the 2024 Industry Advisory Committee meetings have included:

- More small group discussions to delve deeper into key subject areas
- Fewer information-only reports
- A leaner work plan focused on topics related specifically to the solid waste management plan update

In collaboration with the committee and Co-Chairs, key topics for discussion were also developed for 2024 that focused on collecting input for the solid waste management plan update and increasing opportunities member input. Topics discussed in 2024 included:

Small group discussions:

- Construction and demolition waste management and capacity
- Generator levy and competition
- Idea Generation on potential actions and strategies for the updated solid waste management plan
- Long-term disposal planning and the solid waste capital budget
- Recycling and organics capacity and product markets

Plenary discussions and information reports:

- *Integrated Solid Waste and Resource Management Plan* 2022 Biennial Report
- Solid waste capital budget
- Source reduction incentive program development
- Weigh scale software system upgrade

The small group discussions have generated five separate feedback summaries that are considered input to the idea generation phase of the solid waste management plan update. Four of these summaries are included as Attachment 1 and published on the Industry Advisory Committee webpage. The fifth summary, with feedback on the solid waste management plan update idea generation phase of engagement, is being developed and will be posted to the webpage when complete.

Key Topic – Generator Levy and Competition

What is the Generator Levy?

Generator levy provisions have been included in the Greater Vancouver Sewerage and Drainage District Tipping Fee and Solid Waste Disposal Regulation Bylaw (Tipping Fee Bylaw) since 2018. Under the Tipping Fee Bylaw, the generator levy is included in tipping fees for all garbage delivered to Metro Vancouver and City of Vancouver solid waste facilities. For any garbage delivered to other facilities, the hauler is obligated to collect and remit the generator levy to Metro Vancouver. The generator levy is $64/metric tonne in 2024 and is included in garbage tipping fees collected at regional solid waste facilities.

The generator levy is a key contributor to Metro Vancouver's success in advancing waste reduction, recycling, greenhouse gas emission reduction, and a circular economy. The generator levy:

- Ensures all waste generators in the region contribute to funding the cost of the regional solid waste system
- Encourages waste reduction as disposal bans apply at regional solid waste facilities
- Ensures the same rules and fees apply to all waste haulers, leading to a competitive and innovative waste and recycling environment
- Enables regional investment in initiatives to further reduce waste and greenhouse gas emissions

Industry Advisory Committee Feedback on Generator Levy

The Industry Advisory Committee members met in October 2024 to discuss the Generator Levy and Competition – an area of considerable interest to members of the waste and recycling industry.

Previous feedback from haulers about the generator levy has included:

- Concerns about engagement processes
- Metro Vancouver's role as both a facility operator and a regulator creates a conflict of interest
- Creates uncertainty and inhibits private sector investment
- Stifles competition/innovation
- Increases costs to generators and haulers
- Lack of regulatory authority to implement generator levy
- Concerns with comparing tipping fee rates to the cost of public facilities in other cities, specifically Toronto where the system includes both public and private facilities. Information provided by committee members indicated that private facilities in Toronto have lower tipping fees than the City of Toronto facilities.

The committee members broke into small groups to discuss the generator levy. Members expressed both concerns and support for the generator levy, and suggested alternative regulatory approaches.

Some Industry Advisory Committee members shared concerns around the generator levy stating that it discourages the use of private sites, and stifles innovation and competition. Competition was a high concern and committee members commented that the levy provides Metro Vancouver with the advantage of being able to dispose of waste outside of the region at a lower rate than private businesses (as private businesses would pay the generator levy on top of any out-of-region disposal fees). Committee members expressed concern that Metro Vancouver both regulates and competes

with private entities. There was also a comment that the current Metro Vancouver tipping fees are not competitive compared to what private facilities could potentially offer.

Some Industry Advisory Committee members expressed support for the generator levy, noting the generator levy funds recycling initiatives and the maintenance and development of Metro Vancouver facilities, and helps to avoid taxation to fund the public system. Some members noted that while the generator levy is important to fund the current system, it could also be used to fund more waste reduction and technologies to improve source separation. Others noted that recycling businesses benefit when garbage tipping fees are set at a rate that incentivizes recycling.

Members also offered suggestions on alternative regulatory approaches. Some suggested that the cost of the generator levy could be charged upfront (at the point of sale or the beginning of the product life cycle) rather than at the time of disposal. It was suggested there could be a hybrid version of the current system where the private sector can receive waste, pay a discounted generator levy, and be required to accept the same materials as Metro Vancouver facilities. Some members noted their preference for less government intervention and involvement, stating that the private sector can be more nimble than the regional district or the province. Members suggested the need for province-wide standardization of regulatory requirements.

The full summary of the generator levy and competition discussion feedback is included as attachment 1.

Other Feedback
Below is brief summary of feedback received on other key discussion topics in 2024:

Construction and Demolition Waste Management and Capacity

- Limited processing capacity in the region is a challenge
    - Lack of space and land
- Economic considerations:
    - Slow development and market instability of viable end use markets stalling progress
    - More expensive to reuse than dispose
- Suggested solutions: assess C&D waste tipping fee pricing, incentives, funding for new technologies, review regulations for taking materials out of the region, develop deconstruction regulations and policies

Long-Term Disposal Planning and the Solid Waste Capital Budget

- Invest in upgrading existing solid waste facilities
- Focus investments on increasing waste processing capacity
- Private sector should be leading the way as infrastructure developers and managers (Surrey Biolfuel as example) – Metro Vancouver to be regulator only
- Lack of processing capacity is a major issue
- Suggestion for Metro Vancouver to sell all facilities and allow the private sector to purchase the facilities. Metro Vancouver will regulate, the private sector will manage and operate.

Recycling and Organics Capacity

- Blue bin programs, green waste programs, and community reuse networks are working well

- Too much contamination, education needs to be a priority
- Lack of available processors for materials
- Markets for recycled materials are not consistent or stable
- Need to prioritize EPR programs and compliance
- More legislation is needed for plastics
- Build confidence in the system by increasing transparency as to what happens to materials

The complete feedback summaries from each session are included in Attachment 2.

Transparency
All Industry Advisory Committee information is provided publically on the Metro Vancouver website, including the following:

- Solid Waste and Recycling Industry Advisory Terms of Reference
- Meeting agendas, minutes, presentations, meeting recordings (online meetings only), and feedback summaries
- Industry Advisory Committee members' existing or potential conflict statements
- Industry Advisory Committee membership list and biographies

The Industry Advisory Committee online meetings are held over Zoom and are publicly accessible for anyone to view through a livestream link on the committee webpage. In-person meetings are open to the public and anyone interested in observing a meeting can request an invitation via the website.

To allow Industry Advisory Committee members to provide additional feedback in advance of reporting to the Zero Waste Committee the draft text for this report was circulated to Industry Advisory Committee members. No additional feedback was received.

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

FINANCIAL IMPLICATIONS
Coordination of the Industry Advisory Committee is included in the current Solid Waste Services work plan and budget.

CONCLUSION
The purpose of the Industry Advisory Committee is to act as a forum through which industry representatives receive information and provide advice on management planning, operations, and policy issues related to solid waste and recycling services in the Metro Vancouver region, as well as the ongoing solid waste management plan update. The Industry Advisory Committee discussed five key topics in 2024: construction and demolition waste capacity, generator levy and competition, idea generation on potential actions and strategies for an updated solid waste management plan, long term disposal planning and the solid waste capital budget, and recycling and organics capacity and product markets.

Industry Advisory Committee members are keenly interested in the topic of the generator levy and competition, and the resulting discussion included both statements of concern and support, along

with suggestions for alternative regulatory approaches. Feedback from the Industry Advisory Committee on the key topics in 2024 is considered as input to the idea generation phase of engagement for the solid waste management plan update.

ATTACHMENTS

1. Small Group Discussions – Feedback Summaries
2. Industry Advisory Committee 2024 Work Plan

REFERENCES

1. Solid Waste and Recycling Industry Advisory Committee web page

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Solid Waste and Recycling Industry Advisory Committee
Key Topic Discussion Feedback Summary – May 14, 2024

At the May 14, 2024, Solid Waste and Recycling Industry Advisory Committee meeting, committee members provided input and feedback on construction and demolition waste management.

A summary of feedback received is presented below.

Discussion Question	Feedback
What are some of the current challenges for construction and demolition waste management?	**Existing Facility capacity** • Not enough capacity to process and reuse C&D materials within the region with existing facilities • A large portion of material that used to be recycled, now can't be recycled. Historically, C&D MRFs separated put wood and sent it to CANFOR and other locations as alternative fuel. The remaining material was disposed to landfill. Construction has increased resulting in increased waste, but at the same time end market and disposal capacity has decreased. **Siting for processing activities (reuse and recycling)** • Lack of space (land) due to high price of real estate • Diminishing disposal capacity (land use and siting challenges) **Demolition and construction site space and sorting challenges** • Limited space at construction sites for on-site sorting and separate containers and systems for fast and easy material sorting • On-site separation is not always happening properly – materials are sent to landfill because of lack of information, resources, or buy-in by construction industry **Economics of recycling and reuse don't work** • It costs more to recycle C&D materials than to dispose of them. • More affordable options within the region for source separation and disposal are needed • Reuse and recycling of C&D waste does not seem competitive when in many cases landfilling is a more readily available and affordable option even in the case of out-of-region landfills • Deconstruction and other solutions are expensive – the construction industry is already burdened with high costs

	Lack of End Markets and Disposal Capacity
	• Lack of infrastructure for moving towards a circular economy:
	  ○ Historically pulp and paper industry was taking the wood waste but more forest industry facilities have been closing down
	  ○ Government could allow for C&D waste to be used as a source for bioenergy or bio-materials by facilitating and funding the processes that promote circular economy in general
	• With no where to take material, we still see material going to unlicensed facilities creating environmental liabilities for all parties. There are risks to the companies who take materials as they could be required to pay for the clean-up and subject to fines from the Ministry of Environment and Climate Change Strategy
	• Declining market for fuel switching due to declining pulp and paper industry – also a lack of access to this market for C&D as it is mainly processing forest products
	• No stable market for recycled wood - Market saturation with an increase in C&D material in an ever-growing region with increasing C&D activity
	• Viability of end markets is not consistent
	• Lack of an established product market and demand
	  ○ Current example market is cement kilns which have a limited capacity
	• Invest in finding the end use markets cases for all types of C&D material

Discussion Question	**Feedback**
What could be improved?	**Pricing** ○ Metro Vancouver should raise the price of disposal for C&D waste or stop accepting it altogether ○ Metro Vancouver needs to re-assess tipping fees and see how it impacts where people choose to take C&D materials. The current tipping fee is lower than most private C&D processing facilities. ○ When Metro Vancouver started accepting C&D waste and wood at transfer stations at a lower price, other facilities that accept and recycle these materials were forced to lower prices to remain competitive ○ Prices need to be set at a rate that licensed operators can profit and have the certainty they need to invest in new technologies. A suggestion that $300 per tonne would be more required for the market to make a profit.

	Incentives ○ Incentives to encourage wood recycling and reuse of products in new builds ○ Make it easier for people on demolition sites to separate materials ○ Additional fees for purchasing new materials that are recyclable (EPR) ○ Fund alternative technologies – biocoal, fuel alternatives, etc. ○ Easing the regulations that facilitate the energy and fuel generation from C&D wood waste ○ There is not enough dis-incentive for developers and property owners to demolish a house; the moving of existing houses should be incentivized **Consistent regulatory framework** ○ There needs to be a regulatory framework that forces the sorting of C&D waste at the site of demolition ○ Policies for encouraging source-separation of the material ○ Enforcement can be improved at C&D processing facilities; fines should be levied at existing source separation facilities that are not following guidelines
Discussion Question	**Feedback**
What are some examples of different solutions?	• Metro Vancouver to stop accepting C&D waste and let the private industry manage these materials • Incentivize the private processing facilities within the region • Adopt a system of off-site or out of region materials processing opportunities for industry - allow for industry to take materials out of region for processing and then back in for disposal • Reduce the cost of entry to the market within the Metro Vancouver region with incentives and partnerships • Review current regulations for taking materials out of region • Advance and fund the technologies such as gasification that can convert the C&D wood waste into energy and fuel such as: ○ Electricity ○ Aviation fuel or hydrogen ○ Biomass/Biocoal • Develop deconstruction protocols and policy • Foster new markets for materials to be reused, repurposed, and diverted • Research successful jurisdictions

	Additional comments

	• Alternative technologies to manage C&D waste are 5-10 years away, and this issue is pressing now
	• The site in south Vancouver (Southern Star) requires urgent action – the site is over capacity.
	  ○ Issue: If Southern Star was to shut down it would cause challenges for the construction industry
	  ○ Likely will have a large clean-up bill and it is unclear who will be responsible

MEMBERS PRESENT:

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Glen Furtado, Cement Association of Canada
Harwant Deol, Super Save Group
Izzie Abrams, Waste Connections of Canada
James Collins, Tymac Launch Service Ltd.
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Pinky Vargas, Republic Services
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Shad Prasad, Cascade Recovery +
Stewart Young, GFL Environmental Inc.

Solid Waste and Recycling Industry Advisory Committee
Key Topic Discussion Feedback Summary - June 11, 2024

At the June 11, 2024, Solid Waste and Recycling Industry Advisory Committee meeting, the committee members provided input and feedback on recycling and organics capacity and product markets.

A summary of feedback received is presented below.

Discussion Question	Feedback
What is currently working well?	**Recycling** • Increased availability of recycling options for different streams • In our region, there are options for recycling challenging products like polystyrene and soft plastics • Availability of recycling and waste centres help capture more recyclable materials • Better access for plastics and paper recycling compared to organics • Accessibility and convenience of recycling depots (one-stop shop approach) • Ability to collect materials (curbside blue bin, commercial/industrial); there is accessibility • Free furniture pick-up systems for residents (Facebook Marketplace, Craigslist) **Market dynamics, economic viability, and issues affecting profitability** • On the recycling side - open competitive market drives good competition
Discussion Question	**Feedback**

What could be improved? What should be prioritized?	**Behavioural challenges and related issues**
	• When contamination enters stream, the challenge is to separate materials and manage the contamination
	• Lack of understanding of and regulation on source-separation; people get confused
	• "Wish-cycling": people hope something can be recycled so they put it in recycling, which creates more problems in the system
	• Educate and reduce contaminated loads
	  ○ Can't trace back to specific trucks
	  ○ MV staff do not track down source of contamination

	○ Results in increased investment into reducing contamination in loads ▪ Impacts product quality, and ultimately market uptake • Challenges with receiving materials that people don't know what to do with, so they throw into the compactor, which creates a problem ○ There is a difference between what "can" vs. "what is" being recycled effectively at processing facilities **Regional capacity** • In-region vs. out-of-region processing ○ What is real carbon footprint of in-region vs. out-of-region compost (e.g. North shore traffic) ○ Fraser valley (e.g. Abbotsford, Chilliwack) closer to end user ○ In-region not necessarily better ○ There is a lack of facilities to deliver compostable materials for processing; challenging to meet the high threshold and limited local capacity • For organics, out-of-region transportation appears to be only solution (very costly) • Lack of available processors for materials (certain kinds of plastics, organics). • Lack of processing capacity for bulky items (furniture). • Encourage reuse and exchange of materials **Market dynamics, economic viability, and issues affecting profitability** • Need consistent end markets and market price, which is not the case for majority of plastics and other materials today. • Markets for these products/materials are difficult to find; difficult to know where to take these products ○ Makes it unprofitable/difficult to do, costly for ratepayer • Profitability of recycling – if loads are contaminated, then it doesn't work. Heavily contaminated bins can't be recovered and become waste • Products that work well – ones with proven markets – are designed for recyclability, flexible packaging (examples: PET Clear bottles) – issue with some products is that they look "boring" on the shelf; enhancing packaging design could help incentivize greater uptake on product recycling

	• Different types of bins at construction sites would be helpful for sorting at source, but usually there isn't the required footprint to facilitate
	
	Regulatory environment and policy
	• Prioritize extended producer responsibility (EPR) for compliance
	• Role of Metro Vancouver
	  ○ Ensuring regulator is not competitor
	  ○ Hearing of RFPs/RFQs for Metro Vancouver organics or C&D facilities causes more uncertainty for investment
	  ○ To create more capacity, improve service, add technology, reduce residuals to landfill, we need to create regulatory certainty of the market
	• Ensure level playing field (through regulation)
	• Federal plastics prohibition does not take into consideration some of the market complexities, for example, flexible plastics bags in BC had recycling options
	• More legislation is needed for compostable plastic materials; compostable plastics are difficult for plastics processors to recycle
	• Need to understand barriers to develop infrastructure
	• Regulatory environment
	  ○ Creating more capacity/improvements to current process/access to technology
	• More transparency needed on what happens to organic and recyclable materials after they are collected
	
	Siting challenges
	• Zoning and licencing make it difficult to site organics processing facilities.
	• Land use
	  ○ Difficult, costly, and competitive to develop land
	  ○ Metro Vancouver making land available could level the playing field
	  ○ Same issue as for Construction and Demolition
	  ○ Developing recycling requires land and cost
	• Environmental challenges to find sites for processing of organics
	• Cost of land to successfully increase processing capacity
	• Collection of materials from commercial/institutional and construction and demolition sectors. Lack of space for containers

	Collaboration, technology and innovation • Investment in AI/technology could improve quality of product
Discussion Question	**Feedback**

What are some examples of potential solutions?
Are there additional things we should be considering?
	Recycling
	• Identify materials that are effectively recycled, and focus on ensuring those are separated effectively
	• Focus on recyclables that have a viable market
	• Provide more information about what can/can't be recycled to get cleaner streams – more valuable material going toward recycling
	• Need capacity for pre-sorting prior to materials going to processing facility – need a system to take contamination out even after 'source separation' from residents and businesses, as contamination still exists
	  ○ Pricing needs to also reflect this extra step
	
	Behavioural challenges and related issues
	• Stop telling public to recycle something that can't be recycled effectively at the existing processing facilities with existing markets
	• Education is important; mostly needed on the commercial and multi-family side; residential is not as much an issue
	
	Market dynamics, economic viability, and issues affecting profitability
	• Metro Vancouver/member jurisdictions should have mandates to use compost material (e.g. wood chips) to drive end markets to allow recycling operations to flourish
	  ○ Don't own/operate, but drive end markets
	• Need stable environment to allow competition to occur at pricing that can allow a business to get an adequate return
	
	Regulatory environment and policy matters
	• More leadership from all levels of government is needed to provide more regulatory certainty
	• Focus efforts on behavioural change, instead of where processing occurs (in, or out, or region)
	• Improving quality of material and adopting innovation
	  ○ Consider AI solutions (e.g. for organics)
	  ▪ automatically notifies the correct address
	  ○ Include these things in RFPs/bylaws
	• Provide tax incentives for producers that incentivize design for recyclability

	• Create more capacity/improvements to current process/access to technology • There are still a lot of consumer products that are not recyclable that create contamination; need policy/requirements for products to ensure packaging is all recyclable • Appropriate mix of incentives and penalizations for producers who do no follow rules/regulations ("carrot and stick") **Collaboration, technology and innovation** • Metro Vancouver working with municipalities on licencing of organics processing facilities. Expedite process or other incentives. Partnerships to find beneficial uses • Better ways to separate clean wood from demolition loads that can be financially beneficial • Improve reporting from facilities and data tracking • Include recycled materials in procurement for new builds; there is a need to require an amount of recycled/reused materials • Develop a notification system for haulers who may be collecting from producers who are known to break rules

MEMBERS PRESENT:

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Edwin Berkhof, Evergen Infrastructure Corp.
Jeremy Crawford, Waste Control Services
Happy Deol, Super Save Group
Glen Furtado, Cement Association of Canada
Grant Hankins, Canada Minibins.com Ltd.
Josh JansenVandoorn, Anaconda Systems Ltd.
Gord Johnson, Northstar
Jamie Kaminski, HSR Zero Waste
Sean Kawakami, Convertus Canada Ltd.
Mike Lannin, Super Save Group
Patrick MacNeil, Wescan Disposal Ltd.
Achilles Mallari, Sierra Waste Services Ltd.
Matthew McAra, GFL Environmental Inc.
Ralph McRae, Revolution Infrastructure Inc.
David Millman, Waste Management of Canada Corp.
Maya Moucachen, Merlin Plastics
Dimitri Pantazopoulos, Waste Connections of Canada
Shad Prasad, Cascade Recovery +
Ken Schultze (Alternate for Fabio Scaldaferri), Pacific Mattress Recycling Inc.
Sandy Sigmund, Encorp Pacific Canada, Return-It
John Turner, BC Biocarbon Ltd.
Jasper Van de Wetering, Heidelberg Materials Canada Ltd.
Pinky Vargas, Republic Services
Stewart Young, GFL Environmental Inc.

Solid Waste and Recycling Industry Advisory Committee
Key Topic Discussion Feedback Summary – July 9, 2024

At the July 9, 2024 Solid Waste and Recycling Industry Advisory Committee meeting, committee members provided input and feedback on long term disposal planning and the solid waste capital budget.

A summary of feedback received is presented below.

Discussion Question	Feedback
What infrastructure is most important for Metro Vancouver to prioritize for public investment?	**Existing Facilities** • Invest in upgrading existing facilities, work with what we have – focus on recovery and sorting of materials • Invest in additional equipment – compactors • Prioritize getting recyclable materials out of the waste stream **Waste-to-Energy** • Look at the long-term capability of Waste-to-Energy Facility and the rationale of expanding with District Energy • Incineration is an alternative to landfill within the region when considering land availability and development costs. Understanding that there is opposition to incineration as well. **Landfill** • No further expansion of the landfill – opinion that the general public does not want that **Organics** • Need to look at other options to expand on organics disposal and processing site options. • Current challenges: There are a lot of organics in the region to deal with and this will only increase – a lot of organics are not being recycled due to lack of processing capacity and technology and high cost. **Incentives** • Encourage private investment in recycling • Develop sustainable end-use markets for recyclable materials Increase capacity and reduce or eliminate the need to ship waste out of the region by incentivizing development of new licensed private facilities

	New facilities • Need more construction and demolition waste disposal and recycling facilities • Re-use infrastructure and programs that stimulate end-use markets • Avoid any new public investment in developing infrastructure • Prioritize dedicated reuse infrastructure to help grow circular economy
Discussion Question	**Feedback**
How should the private sector be involved in infrastructure development for the region?	**Facility Ownership and Development** • Suggest Metro Vancouver sell all facilities and allow the private sector to purchase the facilities. Metro Vancouver will regulate, the private sector will manage and operate. • Allow the private sector to develop infrastructure: o Increase competitive space in the market (for industry) o Accelerated licensing timelines for new facilities and services • Align with regional/municipal goals while working with the private sector to develop infrastructure • Avoid public investment in infrastructure that can be replicated by private industry **Industry Leadership** • Private sector should be leading the way; providing capital and taking the risk – leading with innovation • Set up a percentage of fees to be collected for research and development (private sector to spearhead R&D) • Prioritize innovation to reduce waste **Public/Private Partnerships** • Need more collaboration in the future – can learn from New York City and London, UK. • Streamline procurement processes to lower overhead and decrease timelines • The private sector should be leading infrastructure development within a framework regulated by Metro Vancouver • Surrey Biofuel is an example of successful private investment in infrastructure development, working with government to deliver the service.
	Additional comments
	• Requirements of Bylaw 181 and the amended Tipping Fee Bylaw make infrastructure development more difficult for industry vs. Metro Vancouver

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Dayton Skei, EverGen
Jasper Van de Wetering, Heidelberg Materials Canada Ltd.
Pinky Vargas, Republic Services
Michael Zarbl, Major Appliance Recycling Roundtable

Solid Waste and Recycling Industry Advisory Committee
Key Topic Discussion Feedback Summary – September 10, 2024

At the September 10, 2024 Solid Waste and Recycling Industry Advisory Committee meeting, committee members provided input and feedback on the generator levy. A summary of feedback received is presented below.

This feedback will be considered as part of the idea generation phase of engagement on the solid waste management plan update, and will also be reported to the Zero Waste Committee.

Discussion Questions	Feedback

What are your thoughts on the generator levy?	• Understand the intent, but it seems overly complicated
	• Seems like a tax might work better rather than asking haulers to collect and remit
	• Recyclers benefit from a higher garbage tipping fee as it incentivizes recycling
	• Questions related to changing the current system, if we didn't have the generator levy:
	  • Who will take on the burden of social change initiatives, if not the public entity funding such initiatives (through generator levy)?
	  • Who will build recycling depots?
	• Generator levy is important to fund the system but should be funding work to create regulations that restrict materials from being disposed and invest in technology for source-separation.

What does it accomplish?	• Prevents the flow of waste outside the region by making it more costly to dispose of waste outside of Metro Vancouver • Discourages use of less costly private sites • Generator levy is important as it helps to fund recycling initiatives such as mattress recycling, education, and behaviour change campaigns • Generator levy helps to raise capital funds for the maintenance and development of Metro Vancouver facilities • Generator levy helps to pay for the recycling and waste system in Metro Vancouver, but it also stifles innovation and competition • Captures loss of revenue if waste is transferred out of the region • The generator levy is required to avoid taxation to fund the public system • Re-use programs are an example of solutions that address gaps in the system, which accompany the current approach led by Metro Vancouver and can be funded by the generator levy

Discussion Question	Feedback

What challenges do you see with the generator levy and how could these be addressed?	• Metro Vancouver has the advantage of being able to send waste out of the region at a lower rate than private businesses (as private businesses would pay the generator levy on top)
	• Generator levy's main focus is transferring waste to regional facilities (landfill/waste-to-energy). Instead, prefer to see money go into longer-term processing solutions (e.g. pre-sorting and pulling out some recyclables, equipment, processing capacity)
	• Recycling rates are set by the market and it fluctuates a lot; not a lot of money to be made so private companies may not be able to invest.
	• Neighbouring jurisdictions don't have the same rules so haulers from outside the region can avoid the levy (Metro Vancouver staff note: haulers from outside of the region picking up garbage within Metro Vancouver are obligated to pay the generator levy the same as local haulers).
	• No proof of stated benefits that the generator levy increases waste reduction, increases efficiency, and reduces GHG's.
	• People are not clear on what the levy is, and how it works exactly. A presentation on how it works would be helpful.
	  • Increase transparency on where materials go after being received at Metro Vancouver facilities.
	  • What about residuals from recycling facilities? Is that a loophole?
	  • Explain the provision that prevents the generator levy from being collected twice for the same waste (for example when a private facility sends waste to Metro Vancouver facility)
	• Metro Vancouver's comparisons to other jurisdictions are not applicable. For example, private facility rates in Toronto are much lower than the rates charged at City of Toronto facilities.

Discussion Question	**Feedback**
How does the generator levy affect competition?	• No compelling evidence supporting that the current approach is creating innovation. • Creates higher business costs across operations and supply chains. • The current price of $145 is not competitive (for private facilities). Metro Vancouver has funds and existing infrastructure, and being both regulator and competitor, it's not fair competition.

	• Comment that Metro Vancouver will not license any private facility to receive municipal waste in the region. • Currently haulers end up winning contracts based on proximity to facilities as opposed to other factors • Ensures that only Metro Vancouver can take waste out of the region, which has negatively impacted smaller waste businesses.
Discussion Question	**Feedback**

What alternative regulatory approaches could be considered for Metro Vancouver?	• Fees collected at solid waste facilities need to go up to encourage more recycling
	• Cost of the generator levy should be charged upfront (at the point of sale or the beginning of the product life cycle) rather than at the time of disposal; so the payment amount is still based on the level of consumption, but it's at the front end instead of the disposal end.
	  • For example: Everyone pays half a cent for items bought – including visitors – so it's not all borne by the residents since visitors create a lot of waste.
	• Distribute the costs more evenly throughout the system
	• Incentivize with lower disposal fees on items that are highly recyclable
	• Put in a mechanism to report tonnage for private transfer stations and use that to fund the public regulatory system
	• Politically, it would be better to have a higher levy so those costs are baked into the services provided to municipalities
	• Look and what Singapore, Taiwan, and other high-density populations where there's a lot of waste generation potential. Are there takeaways we can adopt?
	• Less government intervention/input; the private sector can be more nimble than the regional district or the province.
	• Standardize requirements through provincial regulation – need legislation passed to establish a broader approach to long term waste management
	• Look at how we're spending the money now, to help analyze how effectively the funds are being used; is there a way we can manage the money from generator levy better to increase value from our efforts?
	  • Example: San Francisco's disposal rate high because they apply a levy on waste, take money back from the levy and apply the surplus to subsidize recycling
	• Suggest Metro Vancouver put regional facilities up for auction and focus on regulating and compliance. Let private industry manage facilities and provide services.
	• Suggest a hybrid version where private sector can accept waste, pay a discounted generator levy to acknowledge their

	investment in infrastructure, and must accept the same materials as Metro Vancouver sites
Additional Comments	**Feedback**
	• Consistent political lobbying is needed within the industry • Our priority must be to remove recyclables from the waste. Focus on creating and enforcing restrictions and regulations that support resource recovery. • Government/Metro Vancouver does not have private sector expertise to effectively innovate and develop infrastructure. • Invest in and fund more diversion technologies and projects.

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SERVICES AND SOLUTIONS FOR A LIVABLE REGION

SOLID WASTE AND RECYCLING INDUSTRY ADVISORY COMMITTEE
2024 WORK PLAN

October 8, 2024

Quarter 1	**Status or Scheduled Month**	**Approach**
Call for Submissions for 2024 IAC Membership	Complete	Plenary
Concrete and Asphalt Recycling Review – Draft Study Scope	Complete	Plenary
Integrated Solid Waste and Resource Plan Biennial Report	Complete	Plenary
Residuals Management Options Review – Draft Study Scope	Complete	Plenary
Quarter 2	**Status or Scheduled Month**	**Approach**
Construction and Demolition Waste Management and Capacity	Complete	Small group
Co-Chair Election (Nominations in March)	Complete	Plenary
Prioritize timeline for solid waste management plan development	Complete	Plenary
Recycling capacity and product markets (including organics)	Complete	Small group
Solid Waste Management Plan Update – Idea Generation: Issue/Opportunity Report Review	Complete	Small group
Solid Waste Management Plan Update – Vision and Guiding Principles Report Back	Complete	Small group
Quarter 3	**Status or Scheduled Month**	**Approach**
Metro Vancouver Capital Budget	Complete	Small group
Vancouver Landfill/Long-term disposal planning (including contingency disposal)	Complete	Small group
Public Education – role of public and private entities	Pending	TBD
Generator Levy and Competition	Complete	Small group
Circular Economy and Share/Reuse/Repair ideas	Pending	Small group
Quarter 4	**Status or Scheduled Month**	**Approach**
Recycling Statistics/Metrics	Pending	Plenary
Solid Waste Management Plan Update – Idea Generation	Complete	Small group / workshop

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SERVICES AND SOLUTIONS FOR A LIVABLE REGION

To: Zero Waste Committee

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

Date: October 29, 2024 Meeting Date: November 7, 2024

Subject: **Construction and Demolition Waste Reduction Forum**

RECOMMENDATION

That the Zero Waste Committee receive for information the report dated October 29, 2024, titled "Construction and Demolition Waste Reduction Forum".

EXECUTIVE SUMMARY

Metro Vancouver regularly collaborates with member jurisdictions, industry, non-profits, and academia on programs and initiatives to encourage waste reduction in the construction and demolition sector. Metro Vancouver has initiated work to collaboratively plan and deliver a Construction and Demolition Waste Reduction Forum – a one-day event aimed at facilitating information sharing and discussions on strategies and policy incentives to reduce and prevent construction and demolition waste, such as interventions like house moving and deconstruction. The event would bring together member jurisdictions, and potentially other local governments outside of the region, with industry members invited to provide insights on demolition alternatives such as house moving and deconstruction. Metro Vancouver would provide financial and staff support for the forum, including contracting with Light House (a local non-profit organization focused on advancing circular practices in the built environment) to deliver the event. The work is supported by the Research and Knowledge Initiative (RKI) federal grant secured by Light House and partner organizations.

In parallel, Metro Vancouver and its member jurisdictions continue to actively work on reducing construction and demolition waste in the region.

PURPOSE

To update the Zero Waste Committee on a Construction and Demolition Waste Reduction Forum, and provide an overview of Metro Vancouver and member jurisdictions' ongoing work to reduce construction and demolition waste in the region.

BACKGROUND

This report provides information on a proposed Construction and Demolition Waste Reduction Forum involving non-profit, private and public sector participants, to enhance collaborative efforts to promote housing relocation, and construction and demolition material prevention and reuse in the region.

CONSTRUCTION AND DEMOLITION WASTE REDUCTION IN METRO VANCOUVER

Waste from the construction and demolition sector represents about one-third of waste sent to disposal in Metro Vancouver (338,955 tonnes per year in 2022). Wood waste represents 48% of the total disposed construction and demolition waste in the region and comes from various sources, including the demolition of 3,000 single-family homes in the Metro Vancouver region per year. With the transition of single-family lots to multi-unit lots, demolitions are expected to continue to increase in the region. At the same time, limited markets for recovered reusable materials and processing facilities create an urgent need for alternatives to disposal for construction waste. The Construction and Demolition Waste Reduction Forum aims to bring together local governments and industry representatives to share best practices and identify policy approaches to encourage alternatives to demolition, including house relocation, and deconstruction, and salvage of building materials in the region.

Construction and Demolition Waste Reduction Forum

The Construction and Demolition Waste Reduction Forum, planned for the Spring of 2025, is intended to convene a diverse group of participants, including solid waste and planning staff from local governments to explore and advance solutions for construction and demolition waste prevention. Participants may also include local government elected officials that have indicated interest in advancing this work within their municipalities, and representatives from jurisdictions outside of Metro Vancouver experiencing similar challenges. The forum will include presentations from industry and government representatives highlighting best practices both within the Metro Vancouver region and adjacent communities.

Metro Vancouver will facilitate engagement with local governments prior to the forum to confirm interest and define the scope of work, and will contract Light House to deliver the workshop and facilitate discussions on strategies such as house relocation, adaptive reuse, and deconstruction, focusing on how these approaches can be effectively integrated into municipal policies.

Light House is a local non-profit organization focused on advancing circular practices in the built environment. They work with the entire value chain of individuals and companies involved with the built environment and have significant experience consulting with the construction sector with a focus on ensuring the highest and best use of building materials. Light House and partner organizations also secured the Research and Knowledge Initiative (RKI) federal grant to organize and host the event.

Construction and Demolition Waste Reduction Regional Initiatives

The forum builds on Metro Vancouver's recent and ongoing initiatives to reduce waste and improve recovery of materials from the construction and demolition sector, including:

- The update and promotion of the Construction and Demolition Waste Reduction and Recycling Toolkit to provide a centralized source of information to help contractors, designers and homeowners reduce waste, and increase awareness of alternatives to demolition.
- Working with a house moving company to provide temporary storage at the Coquitlam Landfill for relocated houses that would otherwise be demolished.

- Working with member municipalities to identify priority initiatives and supporting pilot projects and studies.
- Working with Environment and Climate Change Canada and the Circular Economy Leadership Coalition to identify priority actions at the federal level.
- Regularly conducting waste composition studies to better understand the types and quantities of material disposed in the region and what could be recovered.
- Looking for new ideas from stakeholders to further reduce construction and demolition waste, as a key sector to focus on for the update of the solid waste management plan.
- Supporting UBC scholars in advancing research on construction waste.

ALTERNATIVES

This is an information report. No Alternatives are presented.

FINANCIAL IMPLICATIONS

A contribution from Metro Vancouver not exceeding $60,000 for the Construction and Demolition Waste Reduction Forum is estimated, accommodated within the annual budget/financial plan of the Solid Waste Services department. The work is supported by the Research and Knowledge Initiative (RKI) federal grant secured by Light House and partner organizations.

CONCLUSION

The construction and demolition sector is a key focus area of the solid waste management plan update to advance towards the region's waste reduction goals and various initiatives are underway to increase recovery of building materials and reduce waste from construction activities. This report describes Metro Vancouver's support of a Construction and Demolition Waste Reduction Forum to facilitate information sharing, enhance collaborative efforts to reduce construction waste, and encourage alternatives to demolition.

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