

**METRO VANCOUVER REGIONAL DISTRICT  
WATER COMMITTEE**

**REGULAR MEETING**

**November 4, 2021  
9:00 a.m.**

**28<sup>th</sup> Floor Boardroom, 4515 Central Boulevard, Burnaby, British Columbia**

**A G E N D A<sup>1</sup>**

**1. ADOPTION OF THE AGENDA**

**1.1 November 4, 2021 Regular Meeting Agenda**

That the Water Committee adopt the agenda for its regular meeting scheduled for November 4, 2021 as circulated.

**2. ADOPTION OF THE MINUTES**

*pg. 4*

**2.1 October 14, 2021 Regular Meeting Minutes**

That the Water Committee adopt the minutes of its regular meeting held October 14, 2021 as circulated.

**3. DELEGATIONS**

**4. INVITED PRESENTATIONS**

**5. REPORTS FROM COMMITTEE OR STAFF**

**5.1 Water Services Asset Maintenance and Replacement Highlights**

*pg. 9*

That the Water Committee receive for information the report dated October 8, 2021, titled "Water Services Asset Maintenance and Replacement Highlights".

**5.2 Summer 2021 Water Supply Performance**

That the Water Committee receive for information the report dated October 19, 2021, titled "Summer 2021 Water Supply Performance".

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<sup>1</sup> Note: Recommendation is shown under each item, where applicable.

**5.3 Regional Water Conservation Campaign and Water Regulations Communications 2021 Results** *pg. 18*

That the Water Committee receive for information the report dated October 22, 2021, titled "Regional Water Conservation Campaign and Water Regulations Communications 2021 Results".

**5.4 Greater Vancouver Water District and Member Jurisdictions Water Use by Sector Report 1985 – 2019** *pg. 26*

That the GVWD receive for information the report titled "Greater Vancouver Water District (GVWD) and Member Jurisdictions Water Use by Sector Report 1985 – 2019".

**5.5 Watershed Fisheries Initiatives Annual Update** *pg. 100*

That the Water Committee receive for information the report dated October 22, 2021, titled "Watershed Fisheries Initiatives Annual Update".

**5.6 Manager's Report** *pg. 104*

That the Water Committee receive for information the report dated October 21, 2021, titled "Manager's Report".

**6. INFORMATION ITEMS**

**7. OTHER BUSINESS**

**8. BUSINESS ARISING FROM DELEGATIONS**

**9. RESOLUTION TO CLOSE MEETING**

*Note: The Committee must state by resolution the basis under section 90 of the Community Charter on which the meeting is being closed. If a member wishes to add an item, the basis must be included below.*

That the Water Committee close its regular meeting scheduled for November 4, 2021 pursuant to the *Community Charter* provisions, Section 90 (1) (e) as follows:

"90 (1) A part of the meeting may be closed to the public if the subject matter being considered relates to or is one or more of the following:

- (e) the acquisition, disposition or expropriation of land or improvements, if the board or committee considers that disclosure could reasonably be expected to harm the interests of the regional district."

**10. ADJOURNMENT/CONCLUSION**

That the Water Committee adjourn/conclude its regular meeting of November 4, 2021.

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Membership:

Brodie, Malcolm (C) – Richmond  
Elford, Doug (VC) – Surrey  
Asmundson, Brent – Coquitlam  
Baird, Ken - Tsawwassen First Nation  
Bell, Don - North Vancouver City

Bligh, Rebecca – Vancouver  
Clark, Carolina – Belcarra  
Dingwall, Bill - Pitt Meadows  
Guichon, Alicia - Delta

Keithley, Joe – Burnaby  
Martin, Gayle - Langley City  
Svendsen, Ryan - Maple Ridge  
Vagramov, Rob - Port Moody

**METRO VANCOUVER REGIONAL DISTRICT  
WATER COMMITTEE**

Minutes of the Regular Meeting of the Metro Vancouver Regional District (MVRD) Water Committee held at 9:05 a.m. on Thursday, October 14, 2021 in the 28<sup>th</sup> Floor Boardroom, 4730 Kingsway, Burnaby, British Columbia.

**MEMBERS PRESENT:**

Chair, Mayor Malcolm Brodie\*, Richmond  
Vice Chair, Councillor Doug Elford\*, Surrey  
Councillor Brent Asmundson\*, Coquitlam  
Councillor Don Bell\*, North Vancouver City  
Councillor Rebecca Bligh\*, Vancouver  
Councillor Carolina Clark\*, Belcarra  
Mayor Bill Dingwall\*, Pitt Meadows  
Councillor Joe Keithley\*, Burnaby  
Councillor Gayle Martin\*, Langley City  
Councillor Ryan Svendsen\*, Maple Ridge  
Mayor Rob Vagramov\*, Port Moody

**MEMBERS ABSENT:**

Chief Ken Baird, Tsawwassen  
Councillor Alicia Guichon, Delta

**STAFF PRESENT:**

Marilyn Towill, General Manager, Water Services  
Jerry W. Dobrovolny, Chief Administrative Officer  
Natalia Melnikov, Legislative Services Coordinator, Board and Information Services

**1. ADOPTION OF THE AGENDA**

**1.1 October 14, 2021 Regular Meeting Agenda**

**It was MOVED and SECONDED**

That the Water Committee adopt the agenda for its regular meeting scheduled for October 14, 2021 as circulated.

**CARRIED**

\*denotes electronic meeting participation as authorized by Section 3.6.2 of the *Procedure Bylaw*



**2. ADOPTION OF THE MINUTES**

**2.1 September 9, 2021 Regular Meeting Minutes**

**It was MOVED and SECONDED**

That the Water Committee adopt the minutes of its regular meeting held September 9, 2021 as circulated.

**CARRIED**

**3. DELEGATIONS**

No items presented.

**4. INVITED PRESENTATIONS**

No items presented.

**5. REPORTS FROM COMMITTEE OR STAFF**

**5.1 2022 - 2026 Financial Plan – Consolidated Overview**

Jerry W. Dobrovolny, Chief Administrative Officer and Dean Rear, Chief Financial Officer/General Manager Financial Services, provided an overview of the 2022 – 2026 Financial Plan highlighting the continuous improvement projects, cost distribution, and operating and capital plans.

Presentation material titled “2022 – 2026 Financial Plan Overview” is retained with the October 14, 2021 Water Committee agenda.

**It was MOVED and SECONDED**

That the Water Committee receive for information the October 14, 2021 verbal report from Jerry Dobrovolny, Chief Administrative Officer and Dean Rear, General Manager, Financial Services/Chief Financial Officer regarding the “2022-2026 Financial Plan Overview”.

**CARRIED**

**5.2 2022 – 2026 Financial Plan – Water Services**

Report dated October 7, 2021 from Marilyn Towill, General Manager, Water Services, presenting the Water Committee with the 2022 – 2026 Financial Plan for Water Services for the Committee’s consideration.

Presentation material titled “2022 – 2026 Financial Plan – Water Services” is retained with the October 14, 2021 Water Committee agenda.

**It was MOVED and SECONDED**

That the Water Committee endorse the 2022 – 2026 Financial Plan for Water Services as presented in the report dated October 7, 2021, titled “2022 – 2026 Financial Plan – Water Services”, and forward it to the Metro Vancouver Board Budget Workshop on October 20, 2021 for consideration.

**CARRIED**

**5.3 Water Services Capital Program Expenditure Update to August 31, 2021**

Report dated September 14, 2021 from Goran Oljaca, Director, Engineering and Construction, Water Services, providing the Water Committee with an update on the status of the Water Services capital program and financial performance for the 2021 fiscal year to August 31, 2021.

Presentation material titled “Capital Expenditure Summary Project Update as of August 31, 2021” is retained with the October 14, 2021 Water Committee agenda.

**It was MOVED and SECONDED**

That the Water Committee receive for information the report dated September 14, 2021, titled “Water Services Capital Program Expenditure Update to August 31, 2021”.

**CARRIED**

**5.4 Award of Contract Resulting from Request for Proposal (RFP) No. 20-287: Coquitlam Main No. 4 Tunnel – Preliminary Design, Detailed Design and Construction Consulting Engineering Services**

Report dated September 22, 2021 from Roy Moulder, Director, Purchasing and Risk Management, Financial Services, and Bob Cheng, Project Manager, Coquitlam Water Supply, Project Delivery, advising the Water Committee, Finance and Intergovernment Committee, and GVWD Board of the results of the Request for Proposal (RFP) No. 20-287: Coquitlam Main No. 4 Tunnel – Preliminary Design, Detailed Design and Construction Consulting Engineering Services, and recommending award of the contract for Phase A work in the amount of up to \$7,018,783 (exclusive of taxes) to Hatch Limited.

**It was MOVED and SECONDED**

That the GVWD Board:

- a) approve the award of a contract for Phase A work in an amount of up to \$7,018,783 (exclusive of taxes) to Hatch Limited resulting from Request for Proposal (RFP) No. 20-287: Coquitlam Main No. 4 Tunnel – Preliminary Design, Detailed Design and Construction Consulting Engineering Services, subject to final review by the Commissioner; and
- b) authorize the Commissioner and the Corporate Officer to execute the required documentation once the Commissioner is satisfied that the award should proceed.

**CARRIED**

**5.5 Drinking Water Conservation Plan 2022 Update**

Report dated September 24, 2021 from Lucas Pitts, Acting Director, Policy, Planning and Analysis, Water Services, seeking the GVWD Board's endorsement regarding the proposed changes to the Drinking Water Conservation Plan.

Presentation material titled "Drinking Water Conservation Plan 2022 Update" is retained with the October 14, 2021 Water Committee agenda.

**It was MOVED and SECONDED**

That the GVWD Board approve the revised *Drinking Water Conservation Plan*, as presented in the report dated September 24, 2021, titled "*Drinking Water Conservation Plan 2022 Update*", to take effect on November 1, 2021.

**CARRIED**

**5.6 Manager's Report**

Report dated October 6, 2021 from Marilyn Towill, General Manager, Water Services, providing the Water Committee with an update on the Building Information Modeling, the Long-Term Financial Plan, and the 2021 Work Plan.

**It was MOVED and SECONDED**

That the Water Committee receive for information the report dated October 6, 2021 titled "Manager's Report".

**CARRIED**

**6. INFORMATION ITEMS**

No items presented.

**7. OTHER BUSINESS**

No items presented.

**8. BUSINESS ARISING FROM DELEGATIONS**

No items presented.

**9. RESOLUTION TO CLOSE MEETING**

No items presented.

**10. ADJOURNMENT/CONCLUSION**

**It was MOVED and SECONDED**

That the Water Committee conclude its regular meeting of October 14, 2021.

**CARRIED**

(Time: 10:46 a.m.)

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Natalia Melnikov,  
Legislative Services Coordinator

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Malcolm Brodie, Chair

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To: Water Committee

From: Goran Oljaca, Director, Engineering and Construction, Water Services

Date: October 8, 2021 Meeting Date: November 4, 2021

Subject: **Water Services Asset Maintenance and Replacement Highlights**

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### **RECOMMENDATION**

That the Water Committee receive for information the report dated October 8, 2021 titled “Water Services Asset Maintenance and Replacement Highlights”.

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### **EXECUTIVE SUMMARY**

Metro Vancouver Water Services has an ongoing asset management program to assess, repair, upgrade and improve the regional water transmission system, as required. A sizeable portion of Metro Vancouver’s capital and operating programs focuses on asset maintenance and system upgrades.

Over the past several years, significant progress has been made with respect to this area of work and includes the replacement of aging water mains and water distribution equipment, system optimization and continued maintenance of infrastructure and equipment. The goal of this work is to identify and upgrade aged components within the water system that may pose a risk so that Metro Vancouver can continue to provide safe, clean drinking water to the region. Given the size and age of the Greater Vancouver Water District system, Metro Vancouver Water Services will have an increased focus on the asset management program in the coming years and decades.

### **PURPOSE**

To provide the Water Committee with information on Water Services’ continued efforts to upgrade and improve the water transmission system and eliminate the potential risks with legacy infrastructure.

### **BACKGROUND**

The Infrastructure Maintenance and Infrastructure Upgrade programs within Water Services Long Range Plan represent approximately 25% of the overall capital budget. These areas of the plan focus on the assessment, repair, upgrades and improvements to the water transmission system.

These programs are important to ensure Metro Vancouver can reliably continue to provide safe, clean drinking water to the region. Over the past few years, significant progress has been made in the following areas:

1. Water Main Replacement
2. Water Transmission Equipment Replacement
3. System Optimization, and
4. Continued System Maintenance.

## **WATER MAIN REPLACEMENT**

Greater Vancouver Water District (GVWD) has over 520 kilometers of large diameter water mains within the water distribution system with some of them in operation since the 1930's. Through inspection and assessments, staff identify water mains that are reaching the end of their useful lifespan and plans are made for replacement, where necessary. Over the past several years, Water Services staff have made significant progress related to the replacement of aging water mains, including the following:

South Delta Main No. 1 Replacement: This project includes the installation of approximately 5000 m of 900 mm diameter steel pipe to replace the aging South Delta Main No. 1 in the City of Delta. The construction of the new water main began in 2015 and the last phase was completed in July of 2020. The new water main is now in service. The project includes a new underground cross-over valve chamber that significantly enhances the flexibility and resiliency of the system supplying water to the residents of the City of Delta and the Tsawwassen First Nation.

Braid Street Main Replacement: This project includes the replacement of 2000 m of 600 mm diameter water main in the City of New Westminster, which was built in 1927. The construction of the new 600mm diameter ductile iron water main began in 2017 and was completed in July of 2020. The new water main is now in service with additional components planned for installation in spring of 2022.

## **WATER TRANSMISSION EQUIPMENT REPLACEMENT**

The water transmission system includes large diameter valves and other equipment used to regulate flows and pressures within the system and to redirect flows when necessary during planned and unplanned outages. Some of this equipment is aging or no longer meets current operational requirements. Highlights of recent progress related to the replacement of this equipment includes:

First Narrows Tunnel Isolation Chamber Improvements: In 2017, a full condition assessment was undertaken to assess the 90-year-old First Narrows Tunnel north shaft chamber and isolating valves and identified that all the valves within the chamber as well as two upstream isolation valves required replacement. Between December 2020 and May 2021, all of the valves were replaced, which required four separate operational shut downs of the First Narrows Tunnel and significant coordination with the City of Vancouver, District of North Vancouver and the Squamish First Nation. The valve upgrade project replaced the original single valve isolations within the chamber, which offers improved reliability and operational flexibility, a design which meets current best practices for water distribution systems and aligns with the Board Strategic Goal of maintaining Metro Vancouver's world-class water system.

Cleveland Dam – Lower Outlet HBV Rehabilitation: The Cleveland Dam is equipped with two Howell-Bunger valves (HBV) in the lower outlets, which are used to release water from the Capilano Reservoir to manage lake levels and meeting operating requirements. The valves were original equipment installed within the Cleveland Dam at the time of construction in the 1950's. A condition assessment in 2016 noted advanced deterioration of the valves and replacement or rehabilitation of the valves was recommended. Over the past two years, plans have been underway to replace the 1.3 m diameter valves beginning with the purchase of two new fixed cone valves. Between April and May

of 2021, the two new valves were installed and are now in service. Additional enhancements to reduce discharge water turbulence within the lower outlets are planned over the next few months.

### **SYSTEM OPTIMIZATION**

In order to monitor flow, pressure and water quality within the transmission system, GVWD owns and operates numerous flow meters, pressure gauges and residual chlorine analyzers. Due to the age of some of this equipment and expansion of the water supply network, Water Services staff have implemented replacement and optimization programs to replace and add monitoring equipment. Highlights of recent progress related to these programs include:

Water Meter Upgrade and Optimization Programs: The Water Meter Upgrade and Optimization Programs includes the installation of various instrumentation devices and meters to monitor flows and pressures within the water transmission system. When completed, these instruments will assist staff to monitor and optimize system performance, and eventually automate the network. System-wide, 143 locations for new meters and instrumentation have been identified under this program. The team has completed the installation and commissioning of the first 17 priority sites and are in the preliminary design of the next set of 24 new instruments.

Coquitlam Ozone Generators Replacement – Water from the Coquitlam Reservoir is pre-treated with ozone before it enters the Coquitlam UV Disinfection Plant. Ozone helps remove micro-organisms from the water, improves water quality and reduces disinfection by-products. Ozone also improves water clarity, which increases the efficiency of the subsequent ultraviolet disinfection process. The three Ozone Generator Reactors (OGRs) and their Power Supply Units (PSUs) were originally installed in 1999. The PSUs are currently being replaced and upon completion, will increase the ozone production capacity of the OGRs. The replacement is scheduled to be completed by late 2021.

Coquitlam pH/Alkalinity – As part of regional improvements, GVWD adjusted the pH of the water from the treatment plants to reduce corrosion levels throughout the region. In order to do this at the Coquitlam Water Treatment Plant, the existing CO<sub>2</sub> system was upgraded and commissioned earlier this year. This involved refurbishment of the CO<sub>2</sub> storage tank and installation of new injection equipment and piping, as well as system integration.

### **CONTINUED SYSTEM MAINTENANCE**

System Maintenance is an important component of the Water Services Department's Long Range Plan and addresses the need for replacement or refurbishment of existing infrastructure to ensure that it continues to perform as required to meet service objectives. The following projects have recently achieved major project milestones in addressing this goal, including:

Little Mountain and Kersland Reservoir Upgrades – The maintenance for these reservoirs included roof repairs and concrete sealing as well as joint replacement. Both of these reservoirs are located in Queen Elizabeth Park and the work involved close collaboration with the Vancouver Parks Board. Little Mountain Reservoir was completed this summer and Kersland reservoir will be completed over

the coming winter. This work is required to ensure that water quality is maintained throughout the lifespan of the reservoirs.

Capilano Energy Recovery Facility Corrosion Mitigation – The coating on some of the piping, valves, and other various equipment inside the Capilano Energy Recovery Facility’s Machine Hall room was recently replaced to mitigate surface corrosion. This work involved cleaning and removal of any existing corrosion, repassivation of stainless steel surfaces, and the application of a corrosion prevention coating.

**ALTERNATIVES**

This is an information report. No alternatives are presented.

**FINANCIAL IMPLICATIONS**

Cashflows and household impacts related asset management and capital investment in Water Services is encompassed in annual budget approval processes.

**CONCLUSION**

Metro Vancouver has a long history of providing safe, clean drinking water to the region, including an ongoing maintenance and upgrade program to assess, repair, upgrade and improve the water distribution system, as required. The identified upgrade and replacement work is included in the Infrastructure Maintenance and Infrastructure Upgrade Programs within the Water Services Long Range Plan. The work completed within the past few years and underway is significant and these upgrades ensure aged components within the water system that may pose a risk are identified and replaced, maintained or upgraded as required. Given the size and age of the Greater Vancouver Water District system, Metro Vancouver Water Services will have an increased focus on the asset management program in the future.

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To: Water Committee

From: Lucas Pitts, Acting Director, Policy, Planning and Analysis, Water Services  
Andrew de Boer, Acting Director, Operations and Maintenance, Water Services

Date: October 19, 2021 Meeting Date: November 4, 2021

Subject: **Summer 2021 Water Supply Performance**

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### **RECOMMENDATION**

That the Water Committee receive for information the report dated October 19, 2021, titled “Summer 2021 Water Supply Performance”.

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### **EXECUTIVE SUMMARY**

The water supply system performed well during summer 2021 despite unprecedented hot weather conditions and higher than normal water consumption. Metro Vancouver must continue to focus on conservation initiatives as any sustained decrease in per capita consumption will have positive impacts on both system planning and operation. A sustained reduction in water use will also allow for the deferral of a number of growth-related projects as current assessments indicate that the new infrastructure will only be needed on the current timelines if summertime demand for drinking water continues to increase.

### **PURPOSE**

To provide the Committee with a review of water use and water supply system performance during summer 2021.

### **BACKGROUND**

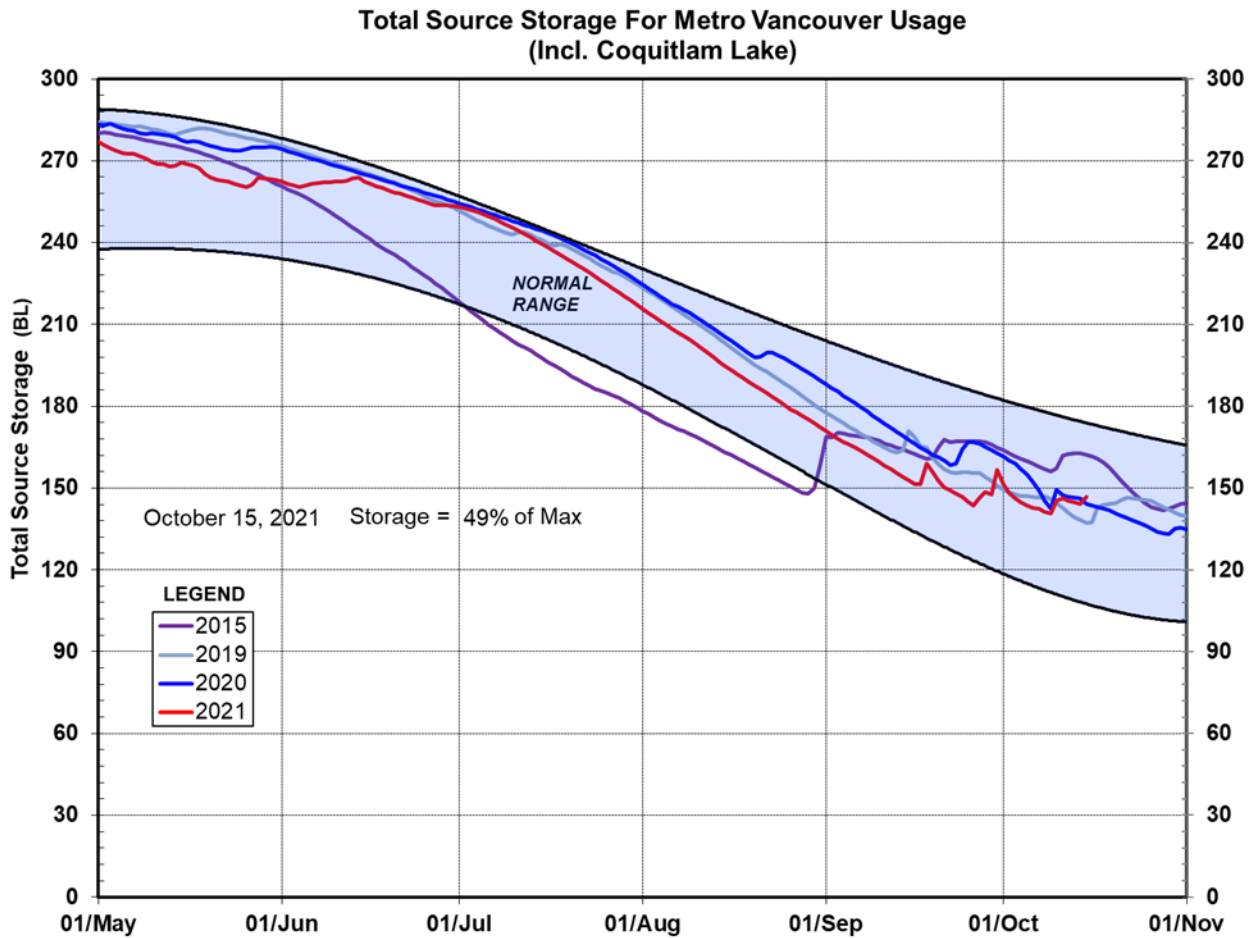
At the May 13, 2021 Water Committee and the May 29, 2021 GVWD Board meetings, the Committee and Board received a water supply forecast and water consumption update for the summer 2021. At the July 15, 2021 meeting, the Committee also received a water supply update in the Manager’s Report, including the status of available storage in the GVWD source reservoirs.

As per the Committee’s 2021 Work Plan, this report provides an overview of the performance of the regional water supply system during the summer of 2021.

### **2021 SUMMER WATER DEMANDS AND STORAGE LEVELS**

The Metro Vancouver region experienced higher than average snow pack this past winter. Record high temperatures in the second half of June contributed to a faster than normal snow melt, resulting in reservoir drawdown starting in early July. The Total Source Storage in May was approximately 5% below typical, as Capilano Reservoir was being operated at a lower level as the spillway gate was undergoing necessary maintenance work prior to being raised in order to store water. The source reservoirs were proactively managed to capture the incoming streamflow to ensure Seymour and Capilano Reservoirs reached their respective full pool elevations before June 1, 2021 and July 1, 2021.

Figure 1 – Total Source Storage for Metro Vancouver Usage (Incl. Coquitlam Lake)

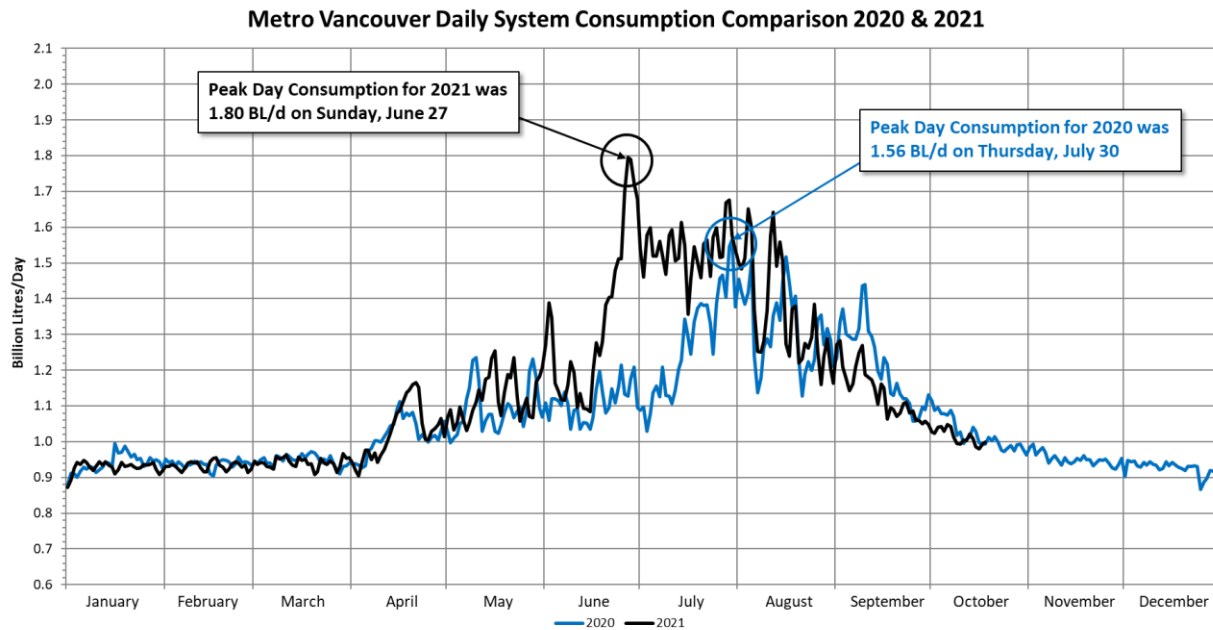


As shown on Figure 1, total source storage for Metro Vancouver usage began the summer in the normal range. Throughout summer and fall 2021, the total source storage levels were maintained within the normal range and Metro Vancouver remained in Stage 1 of the *Drinking Water Conservation Plan* (DWCP).

The heat wave in June and warm dry conditions during July resulted in higher than average water use across the region.

Overall system demands, river inflows and system storage were closely monitored and each of the three source reservoirs proactively managed to maintain a reliable water supply for the region.

Figure 2 – Metro Vancouver Daily System Consumption Comparison 2020 and 2021



As shown on Figure 2, the highest peak day consumption in summer 2021 of 1.80 billion litres/day was recorded on Sunday, June 27, 2021. An extreme heat wave affected the lower mainland from late June through mid-July and peaked on June 28 – 29, 2021. The above normal water use was sustained during this period. The 2021 peak day consumption was observed a few weeks earlier than what had been recorded in previous years. This compares to the highest peak day consumption in summer 2020 of 1.56 billion litres/day on Thursday, July 30, 2020. Sundays and Thursdays are both permissible days for lawn watering under Stage 1 of the DWCP, implemented every year on May 1<sup>st</sup>.

### Benefits of Water Conservation Measures

The current Stage 1 of the DWCP provides the opportunity for residents to water lawns two mornings per week and limits watering of trees, shrubs and flowers, if using a sprinkler, to mornings only, but on any day of the week. Metro Vancouver's *Region-wide Guide for Enforcement of the Drinking Water Conservation Plan* provides best practices related to enforcement through various methods.

To further help reduce seasonal water demands, Metro Vancouver has proposed updates to the DWCP which will decrease the allowable residential and non-residential lawn watering days from two days per week to one day per week during Stage 1. These updates are expected to be implemented for summer 2022.

Record high temperatures in late June resulted in higher than average water consumption that continued into July even when temperatures moderated. Metro Vancouver's key initiatives in 2021 included communication of the region-wide watering regulations and a regional communications

campaign - *We Love Water* - to increase awareness of Metro Vancouver's water system and the need for residential water conservation.

**Figure 3 – Comparison of 2021 and 2020 Hourly Water Use**

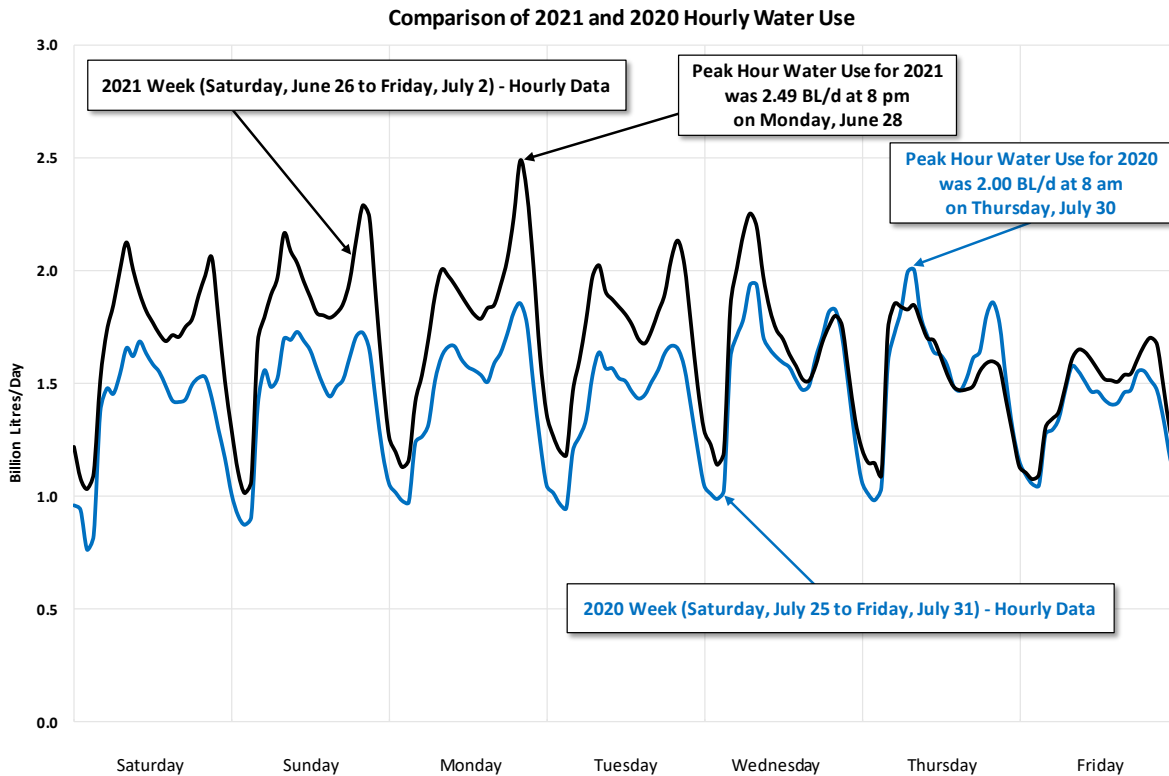


Figure 3 compares hourly water use during the week when peak day occurred in summer 2020 (Saturday, July 25 to Friday, July 31), to the week when peak day occurred in summer 2021 (Saturday, June 26 to Friday, July 2). Summer hourly water use patterns in 2020 and 2021 overall are similar and reflect higher morning peaks on Wednesdays and Thursdays, when lawn watering is permitted.

During the heat dome period (June 27 – 29, 2021), the peak hour occurred at 8 pm on Monday, a non-sprinkling day.

Water conservation campaigns implemented by Metro Vancouver and member jurisdictions continue to help reduce peak water use. Peak period water use is very dependent on summer weather conditions, being higher in years with periods of relatively hot, dry weather such as 2018, and 2021 and lower in years with more average temperatures and precipitation such as 2019 and 2020.

During the high summer demands this year the water supply system performed very well without significant stresses.

## **ALTERNATIVES**

This is an information report; no alternatives are presented.

## **FINANCIAL IMPLICATIONS**

Revenues from water sales to the end of September are 1.7% above budget.

## **CONCLUSION**

Total source storage for Metro Vancouver water usage began the summer in the normal range. As the summer progressed, reservoir inflows and source storage declined; however, the total water storage volume remained within the normal range. Water use in June and early July 2021 was above normal due to hot weather and dry conditions. Peak water use occurred in late June and was higher than levels seen in 2020.

Summer 2021 was the fourth summer the *Drinking Water Conservation Plan* (DWCP) restrictions were implemented, along with the Board endorsed best practices for local governments relating to DWCP education, compliance monitoring and enforcement. Similar to 2019 and 2020, water use on Mondays and Tuesdays was reduced, as lawn watering by residential users is no longer permitted on these days. These reductions were partially offset by higher usage on Thursdays. The timing of the peak water usage also shifted to later in the morning possibly due to more residents continuing to work from home as a result of COVID-19 restrictions. Implementation of the DWCP restrictions along with water conservation campaigns by Metro Vancouver and member jurisdictions are helping to reduce water use.

The water supply system performed without any significant stresses over the 2021 summer season. Water conservation will continue to be an important factor in determining future system needs. Sustained reductions in per capita water use over the coming years could potentially defer the large capital investments required to meet the needs of a growing region.

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To: Water Committee

From: Larina Lopez, Corporate Communications Division Manager, External Relations  
Amy Weiss, Project Communications Coordinator, External Relations

Date: October 22, 2021 Meeting Date: November 4, 2021

Subject: **Regional Water Conservation Campaign and Water Regulations Communications  
2021 Results**

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### **RECOMMENDATION**

That the Water Committee receive for information the report dated October 22, 2021, titled “Regional Water Conservation Campaign and Water Regulations Communications 2021 Results”.

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### **EXECUTIVE SUMMARY**

Metro Vancouver undertakes several communications initiatives annually to ensure water resources are used efficiently throughout the region. Key initiatives in 2021 included communication of the region-wide watering regulations and a regional communications campaign – *We Love Water* – to increase awareness of Metro Vancouver’s water system and the need for residential water conservation. The promotional strategy for both initiatives included broad reach through television, radio, print, and outdoor advertising, as well as targeted and weather-triggered digital tactics. In total, broadcast and digital promotions delivered over 36.6 million impressions with 35% more web visits than 2020 including 9,479 visits to the Lawn Watering Regulation web page, and over 599,000 social media views. Despite the campaign’s reach, water use was at a record high in 2021 during the ongoing hot and dry weather. In 2022 Metro Vancouver will re-examine water conservation communications to reflect the proposed changes to the Drinking Water Conservation Plan (DWCP). We will also communicate that regional decreases in per capita water use have plateaued and that sustained reductions in water demand through good water conservation habits throughout the region could help defer the need for additional water supply projects targeted to meet increased demand related to population growth.

### **PURPOSE**

To update the Committee on regional communications to support the 2021 watering regulations and regional water conservation campaign.

### **BACKGROUND**

Metro Vancouver undertakes several communications initiatives annually to help the public become aware of their role in ensuring water resources are conserved and efficiently used throughout the region. Communication of the region-wide watering regulations supports the DWCP, which helps manage the use of drinking water during periods of high demand and largely impacts the watering of lawns and landscapes. A regional communications campaign – *We Love Water* – increases awareness of Metro Vancouver’s water sources, system, and the need for residential water conservation, while providing residents with advice and tips for using less water around their homes.

The *We Love Water* conservation campaign started in 2016, and has been adjusted yearly to reflect ongoing research and evaluation. This year, the campaign focused on source awareness and outdoor conservation opportunities, which aligned with communication of the regional watering regulations and the resources available on the Grow Green website.

## **WATER CONSERVATION COMMUNICATIONS**

### **Communications Approach and Timing**

Metro Vancouver's water conservation communication works to expand public awareness of our water sources, the quality of Metro Vancouver's drinking water, and the importance of not wasting it. Promotion of the regional watering regulations and the *We Love Water* conservation campaign incorporate consistent branding, imagery, and messaging.

Metro Vancouver promoted the regional watering regulations in advance of the May 1 implementation date and continued until the regulations' October 15 end date. Metro Vancouver collaborated with members to determine the most effective messaging and methods for consistently communicating the regulations in 2021.

Metro Vancouver promoted the regional *We Love Water* conservation campaign from May 17 to September 5, 2021. Promotions were primarily directed towards single-family dwelling residents, because they are most likely to engage in the outdoor water uses that contribute to higher seasonal water demand. The campaign emphasized water source and system awareness through existing content and new content incorporating broader outdoor water conservation and education messaging during the drier summer months. By first educating residents about where their drinking water comes from, the people involved, and the amount of work it takes to reach their taps, the campaign was better equipped to encourage residents to reduce their outdoor water use.

### **Promotional Strategy**

Metro Vancouver generated awareness about the watering regulations, the regional water sources and system, and the importance of outdoor conservation through the following activities:

- Television commercials, conservation messaging, and sponsored weather updates on Global BC, as well as campaign content on the station's webpage and social media channels;
- Radio commercials and sponsored weather updates;
- Weather-triggered and static digital billboards on major traffic routes throughout Metro Vancouver;
- Targeted social media advertising;
- Organic social media including a new tactic using Instagram Stories, which featured a member of the Watershed Operations team promoting water source and conservation education through a watershed walking tour, a water source quiz, and a conservation quiz to test viewer's knowledge;
- YouTube video advertising, weather forecast-activated online banner advertising, and search engine advertising targeting users' interests (e.g., gardening, lawns, car washing) to encourage conservation;
- A media release prior to the May 1 activation date which received significant coverage; and

- A direct mail postcard on the regulations and water conservation, sent to all single-family and multi-family homes with lawns across the region.

Examples of communication materials and promotions to support the watering regulations and the *We Love Water* conservation campaign are included in the Attachment.

### **Metro Vancouver Member Engagement**

Metro Vancouver made communication materials available to all GVWD members for display and distribution through localized opportunities. Items included social media content and co-branded and translated assets like posters, rack cards, and newspapers advertising templates, as well as digital billboards and transit shelter advertising. Members used these materials consistently and widely, and broad participation amplified public awareness of both the watering regulations and the conservation campaign.

### **Evaluation**

The campaign was evaluated through various indicators and tracking methods described below.

#### **Website Traffic**

- The [welovewater.ca](http://welovewater.ca) website received 60,421 page views during the 3.5-month duration of the 2021 conservation campaign. This is over 35% higher than 2020 levels, and is attributed to better refined tactics and an unusually hot, dry summer.
- Metro Vancouver's lawn watering regulations [webpage](#) received an additional 9,479 page views during implementation of the regulations, from May 1 to October 15, 2021.

#### **Television and Radio**

- Global BC television and online channels featured the campaign in 811 spots, which were viewed 7.7 million times.
- PSAs ran on 14 additional television networks, targeted to the Metro Vancouver region. These spots aired a minimum of 1,456 times.
- The campaign spots featured on four radio stations, and were heard 8.8 million times.

#### **Digital Media**

- YouTube advertising was seen over 3 million times. Over fifty percent of the ads that could be skipped were viewed to completion, exceeding industry benchmarks.
- Social media (Facebook, Instagram, and Twitter) posts were viewed 3.8 million times, by over 599,000 Metro Vancouver residents.
- Online banner ads were viewed 1.4 million times, with weather-triggered advertising reaching residents when water conservation was most relevant.

#### **Print**

- A direct mail postcard detailing the watering regulations and other outdoor conservation opportunities was delivered to 534,000 single-family homes throughout the region.



### Out-of-Home

- Water conservation messaging featured on 10 digital billboards located on major traffic routes throughout Metro Vancouver.
- The billboard ads were seen 11.7 million times.

### Survey

- A short survey focused on public perception of brown lawns and lawn watering behaviours was conducted late October; results will be available in mid-November.

### Plans for Fall 2021 and 2022 Regional Communications\*

*\*Pending approval of changes to the DWCP. The campaign described below would be adjusted to reflect the decision made at the October 29<sup>th</sup> Board meeting.*

A small promotion campaign is planned for fall 2021, focused on helping residents create smart water habits year round that may help defer costly infrastructure upgrades and support the efficient use of drinking water. This campaign will also introduce the proposed DWCP changes if they are approved. Introducing these changes, including lawn watering being reduced to one day per week, while the dry hot summer is still fresh in their minds and in advance of the spring 2022 lawn watering regulations may help public sentiment and reception of the changes.

Communication of the 2022 watering regulations and the *We Love Water* conservation campaign will continue to use creative assets developed in previous years, with updates to language around permitted watering times if the DWCP changes are approved. Campaign communications will focus heavily on lawn watering and outdoor water conservation, as well as water source awareness and appreciation. Educating on the need for and the benefits of water conservation has always been the overarching objective of *We Love Water* campaign communications. In 2022, this will continue to be strengthened with the objective to build and instill an even stronger culture of water conservation throughout the region, thereby achieving sustained reductions in summer water demand and deferring the need for additional water supply projects.

### ALTERNATIVES

This is an information report. No alternatives are presented.

### FINANCIAL IMPLICATIONS

The 2021 budget for watering regulations communications and the regional water conservation campaign was \$270,000. These costs were included in the 2021 Water Services Communications Program Budget managed by the External Relations Department.

### CONCLUSION

Metro Vancouver communicated the watering regulations prior to the May 1 activation date via advertising across the region and media engagement, and through a range of items distributed to GVWD members for public education and enforcement. In its sixth year, the regional water conservation campaign entered market in mid-May, with an emphasis on water source and system education, before incorporating conservation messaging in the warmer and drier summer months.

Campaign advertising appeared in a variety of news media, on digital billboards throughout the region, via social media and digital platforms, and through opportunities secured by GVWD members.

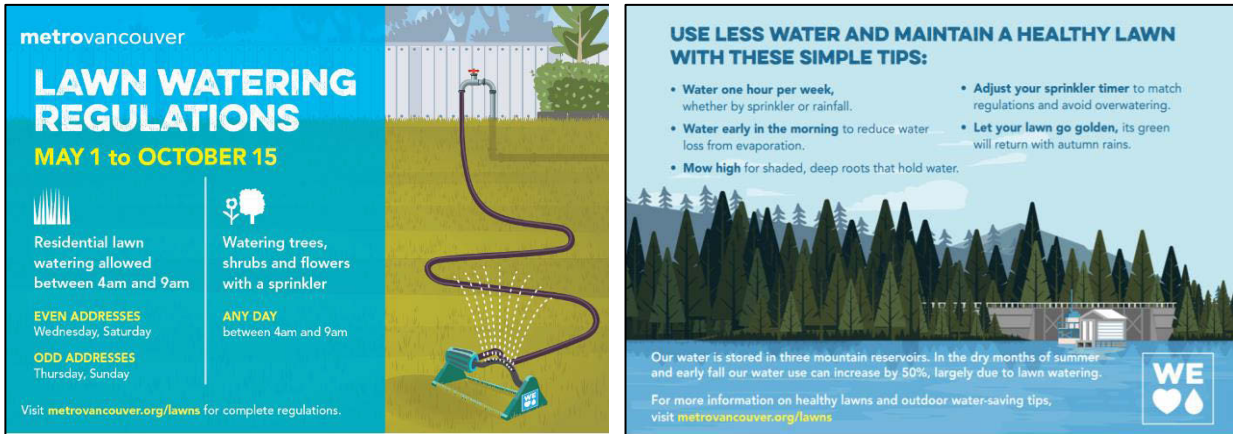
Beginning in fall 2021 and 2022, Metro Vancouver will focus the *We Love Water* campaign more heavily on lawn watering regulations communications and educating residents on the impact water conservation has on deferring costly infrastructure to help instill an even stronger regional culture of water conservation and the opportunity to achieve sustained reductions in water usage.

**Attachment**

2021 Water Conservation Communications Materials

47977147

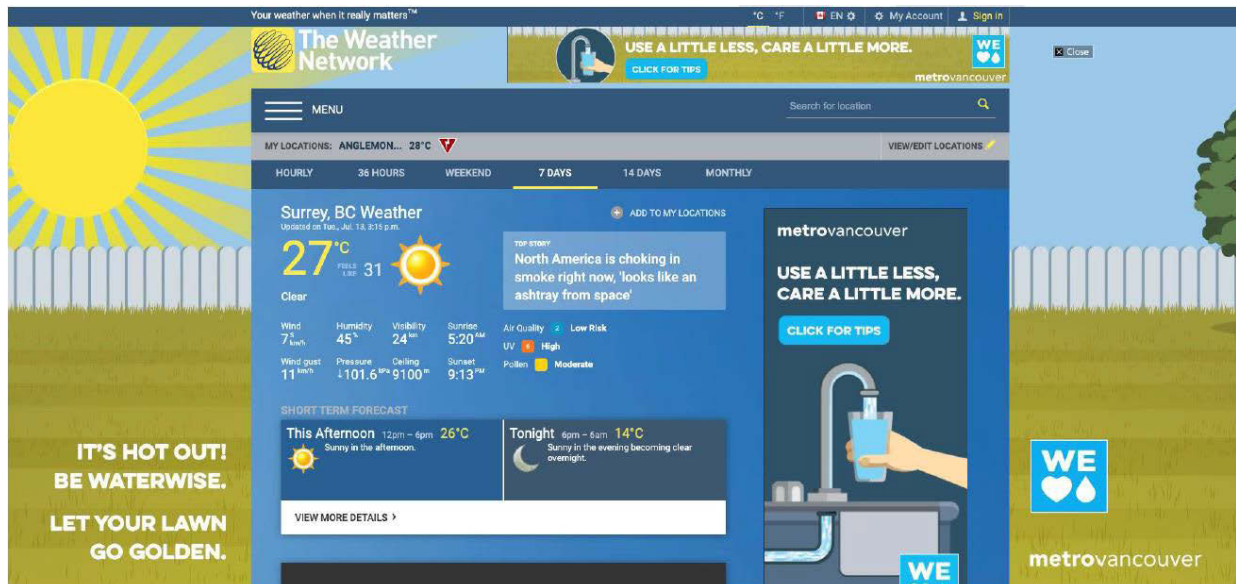
2021 Water Conservation Communication Material



Flyer mailed to 534,000 single-family homes, providing information about the watering regulations and maintaining a healthy lawn with less water.



Example of digital ads featured on Global television.



Example of Weather Network online banner takeover.



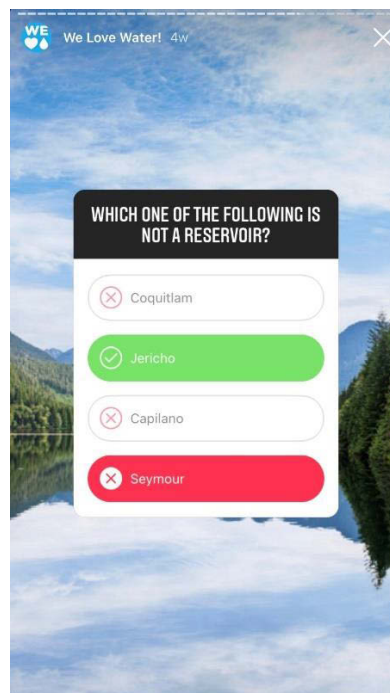
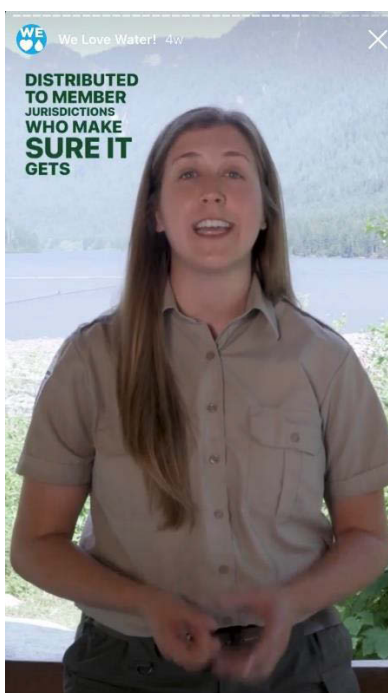
*Social media post encouraging conservation.*



*Digital billboard at Alex Fraser Bridge, one of seven on major traffic routes throughout region.*



*Digital banner ad promoting water source awareness.*



*Still-shots from the new Instagram Story videos featuring Dayna Timmons from the Watershed Operations team and one of eleven quiz questions.*



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---

To: Water Committee

From: Lucas Pitts, Director, Policy, Planning & Analysis (Acting), Water Services

Date: October 13, 2021 Meeting Date: November 4, 2021

Subject: **Greater Vancouver Water District and Member Jurisdictions Water Use by Sector Report 1985 – 2019**

---

### RECOMMENDATION

That the GVWD receive for information the report titled “Greater Vancouver Water District and Member Jurisdictions Water Use by Sector Report 1985 – 2019”.

---

### EXECUTIVE SUMMARY

This ninth edition of the Greater Vancouver Water District (GVWD) and Member Jurisdictions Water Use by Sector Report (the 2019 Report) presents water consumption statistics from 1985 to 2019 and supersedes all previous editions of the report.

The following summary points are detailed further in the attached 2019 Report:

1. In 2019, there were 163,080 metered accounts in the GVWD region, representing 36% of total serviced connections and about 50% of total water consumption.
2. The average annual unmetered flat rate was \$583/year for single-family and \$429/year for multi-family residences.
3. The 2019 average rate for metered connections was \$1.32/m<sup>3</sup>, while the calculated average unmetered residential flat rate is \$1.53/m<sup>3</sup>.
4. During 2019, the regional water consumption was 393 million m<sup>3</sup>, an average total water consumption of 425 litres per capita per day (LPCD). The average residential use was approximately 62% of total consumption or 264 LPCD.

### PURPOSE

The GVWD and Member Jurisdiction Water Use by Sector Report 1985 – 2019 (dated 2019) is the latest edition of a detailed report providing information on drinking water consumption patterns and trends in the region. It is presented as information to the Committee and will be distributed to member jurisdiction staff who are members of the Regional Engineers Advisory Water Sub-Committee (REAC WSC).

This report is to provide a planning tool for Metro Vancouver and member jurisdictions. The data collected in this report and analysis within it can be used to facilitate the planning, development, and implementation of water conservation and management programs.

### BACKGROUND

The *Water Demand by Sector Report* utilizes water metering billing data from individual properties to characterize and illustrate historical water use by sector in each jurisdiction and in the Metro Vancouver region.

The first edition of this report was completed in 1997 and a commitment was made by Metro Vancouver to update the work regularly. The last edition of this report was the eighth update and included data from 1985 to 2017. The 2019 Report supersedes all previous editions.

A request for municipal water billing data from 2018 to 2019 was sent to REAC WSC members in October 2020. The request included an instructional guideline, a data template and a questionnaire. Submissions were received from 90% of the member jurisdictions, between November 2020 and June 2021. Additional verification and data correction work was completed between March and July 2021.

The current 2019 Report analyzes consumer water rates, water consumption, consumption by sector, and consumption per capita for the region based on detailed metered water consumption data provided by nineteen member jurisdictions. Data sets were cleaned, verified where necessary, and analyzed with Metro Vancouver’s internal web-app. Regional results were generated and used to prepare the tables and charts included in this Report. Some critical data such as household breakdowns, numbers of unmetered single family, or unmetered multi-family connections per member jurisdiction are not readily available and staff are working to improve on the datasets in the coming years.

The 2019 Report is the ninth edition and was included in the Water Services 2021 work plan, aligning with the Board Strategic Plan themes of regional growth, environmental sustainability and system stewardship.

**ALTERNATIVES**

This is an information report. No alternatives are presented.

**FINANCIAL IMPLICATIONS**

This is an information report. No financial implications are presented.

**OTHER IMPLICATIONS**

The 2019 Report presents water consumption patterns that show potential for water conservation strategies aimed at member jurisdictions with low levels of metering. Consumption in the unmetered residential sector remains high and further research and analysis is required from a financial and equity perspective to understand local cost recovery, affordability, and the effectiveness of water conservation policies already in place. Table 1 on the following page provides some metrics for comparison of the 2019 results with the previous report.

**Table 1: Comparison of 2019 Results**

| Metric  | 2017 Reported | 2017 Corrected <sup>2</sup> | 2019 Reported |
|---|---------------|-----------------------------|---------------|
| Population (Total GVWD) <sup>1</sup>                                | 2,524,383     |                             | 2,645,640     |
| Total connections   | 501,987*      | 481,297                     | 453,155**     |
| Total Metered Connections   | 182,445*      | 159,477                     | 163,080 **    |
| Residential metered connections<br>(single family and multi-family) | 152,255*      | 134,039                     | 138,501**     |
| Residential consumption LPCD  | 263 LPCD      |                             | 264 LPCD**    |
| ICI <sup>3</sup> metered connections                                | 22,937        |                             | 23,017        |
| ICI consumption (m <sup>3</sup> / day)                              | 308,986       |                             | 284,602       |

1. Population obtained from estimates provided by members, adjusted for census years.

2. “2017 Corrected” – clarifications and corrected data provided by member jurisdictions after data anomalies were noted, further calculations performed by Metro Vancouver where required.

3. Industrial, Commercial & Institutional (ICI) sector, which includes Agriculture in the region. Excludes unknown accounts. 2017 had 10% of ICI connections classified as unknowns, i.e. without a BC Assessment Authority “Actual Use Code” assigned. 2019 had 7% of ICI connections classified as unknown accounts.

\* multi-family connections were counted in individual units, corrected to connection per building/ complex.

\*\* net loss in number of connections, increase in metered connections, increase in residential consumption.

## CONCLUSION

The 2019 Report has been prepared with contributions provided by 19 out of 21 members approached. Although there have been decreases in residential per capita consumption it has stabilized. The residential consumption is at 264 LPCD, and consumption from metered connections accounts for 50% of the total water consumption in the region.

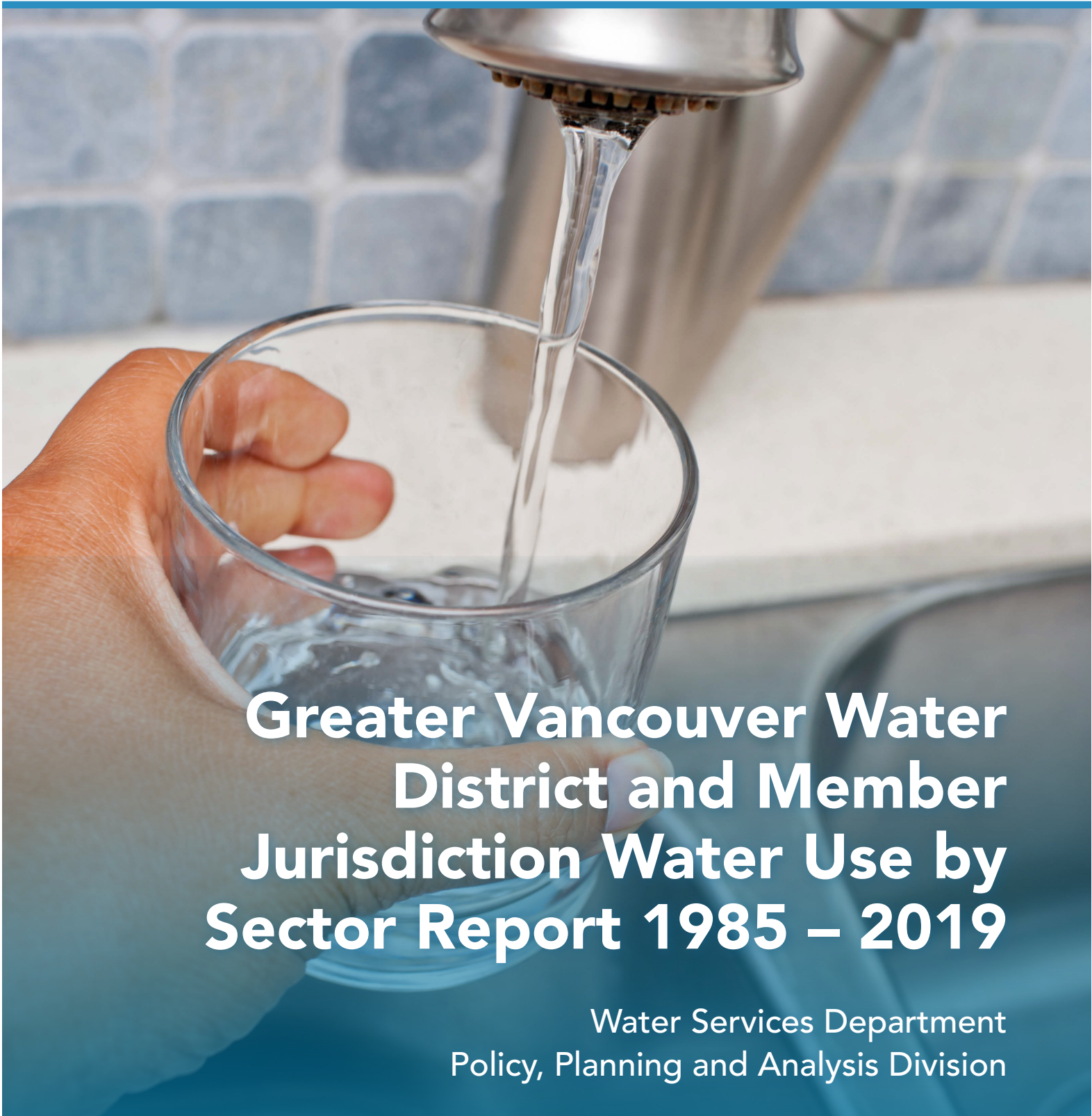
## Attachment

Greater Vancouver Water District and Member Jurisdiction Water Use by Sector Report 1985 – 2019 dated, November 1, 2021 (48404986)

## Reference

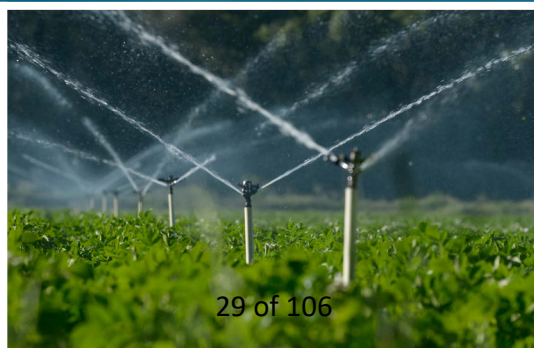
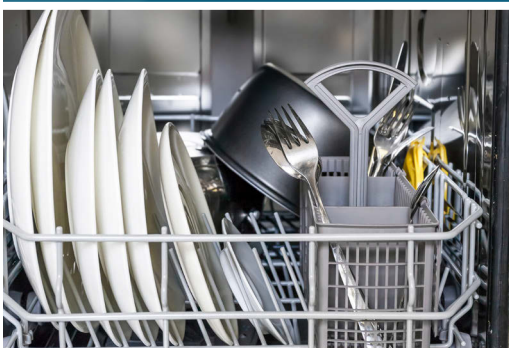
[Water Consumption Statistics 2019 Report](#)





# Greater Vancouver Water District and Member Jurisdiction Water Use by Sector Report 1985 – 2019

Water Services Department  
Policy, Planning and Analysis Division



## Executive Summary

This edition of the Greater Vancouver Water District (GVWD) and Member Jurisdictions Water Use by Sector Report appends water consumption statistics for 2018 and 2019 to the previously published information from 1985 to 2017. This report supersedes all previous editions of the report.

This report analyzes consumer water rates, water consumption, consumption by sector, and consumption per capita for the region, based on detailed metered water consumption data provided by nineteen member jurisdictions. The data includes all water supplied by the GVWD and select member jurisdictions but does not include water supplied by private sources or the populations serviced by these private sources.

The following summary points are based on the analysis of data in this report:

1) Metering Practices in the GVWD Region

As of 2019, there were 163,080 metered accounts in the GVWD region, representing approximately 36.0% of total serviced connections and about 50% of total water consumption.

2) Consumer Water Rates

Water rates charged by the member jurisdictions were summarized and compared to determine average rates in the region. As of 2019, the average unmetered flat rate for single-family residences in the region was \$583/year and \$429/year for unmetered multi-family residences. The 2019 average unit rate for metered connections in the region was \$1.32/m<sup>3</sup>. The average unmetered residential flat rate was higher at \$1.53/ m<sup>3</sup>.

3) Regional Water Consumption Trends

During 2019, the total GVWD and member jurisdiction supplied water consumption for the region was 393 million m<sup>3</sup>, representing an average total water consumption of 425 litres per capita per day (L/capita/day). The average residential use was approximately 62% of total consumption or 264 L/capita/day. The water use rates per capita have generally declined since 1985, although overall water consumption for the region has increased.

Unmetered consumption was approximately 49% of total water consumption during 2019 and assumed to mainly comprise unmetered residential consumption. Metered water consumption by sector included 23.5% for residential use, 13% for commercial, 6% institutional, 4% industrial, 1% agricultural, and 0.5% of other connections, as a percentage of total water consumption in the region. At least 1.5% of total metered regional consumption is from accounts with no assigned sector, and these are assumed to be primarily commercial, although this needs to be verified.

Water consumption for the ICI sector was divided further into 20 sub-categories. Of these, the Retail Shopping and Stores sector had the highest total drinking water consumption and the largest number of connections in 2019. However, on a per-connection basis, the Petroleum and Allied Industry sector had the largest consumption.

## Acknowledgements

Staff at the following member jurisdictions and organizations provided valuable assistance in compiling and interpreting member jurisdiction metering data and in reviewing some of the work of this report. Their contributions are gratefully acknowledged.

- Village of Anmore
- Village of Belcarra
- City of Burnaby
- City of Coquitlam
- City of Delta
- City of Langley
- Township of Langley
- City of Maple Ridge
- City of New Westminster
- City of North Vancouver
- District of North Vancouver
- City of Pitt Meadows
- City of Port Coquitlam
- City of Richmond
- City of Surrey
- Tsawwassen First Nation
- University Endowment Lands
- University Endowment Lands and University of British Columbia Utilities
- City of Vancouver
- District of West Vancouver

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## List of Acronyms

|      |   |
|------|---|
| AUC  | Actual Use Code   |
| BC   | British Columbia  |
| BCAA | British Columbia Assessment Authority   |
| BSC  | By-Sector Classification  |
| GVWD | Greater Vancouver Water District  |
| ICI  | Industrial, Commercial and Institutional ( <i>includes Agriculture in this Report</i> ) |
| MF   | Multi-Family  |
| SF   | Single Family   |
| SIC  | Standard Industrial Classification  |
| SQL  | Structured Query Language   |
| UBC  | University of British Columbia  |
| UEL  | University Endowment Lands  |

### Notes:

1. In this Report, the terms water consumption, water use, water demand, water and drinking water refer to the drinking water supplied by GVWD and certain member jurisdictions to the regional population, meeting regulated and mandated drinking water guidelines.
2. Metro Vancouver Water Services collects, stores and manages data provided by GVWD members to produce this report. The data management process has been vetted by Metro Vancouver's internal privacy program and a privacy impact assessment has been completed for the previous report cycle. Consent to use and analyse the data, and distribute aggregated data and results is implied and assumed.

## Conversions

100 cubic feet = 2.8316847 m<sup>3</sup> = 2831.6846590 Liters

1 m<sup>3</sup> = 1 000 Liters

## 1.0 INTRODUCTION

The Greater Vancouver Water District (GVWD) supplies drinking water to member jurisdictions, who in turn distribute water to individual households and businesses. The GVWD was formed in 1924 as a cooperative joint venture of member jurisdictions and has expanded over the years to include most of the jurisdictions within the Metropolitan Vancouver Region. As of 2019, the GVWD provides drinking water through its local member jurisdictions to approximately 2.57 million residents.

The *GVWD and Member Jurisdiction Water Use by Sector Report* (the Report) is produced from water consumption data provided by the member jurisdictions and reconciled with metered GVWD's water sales data. This report supersedes all previous editions of the Report.

The purpose of this Report is to:

1. Characterize and illustrate historical use of water in the region by member jurisdictions
2. Collect and compare water usage patterns and water management practices within the region
3. Facilitate planning and implementation of GVWD and member jurisdiction programs for water demand management

The GVWD supplies drinking water to most of the member jurisdictions in the region. However, the City of Delta, the Township of Langley, and the District of West Vancouver derive a sizable portion of their water supply from their own managed sources. . In addition, a small proportion of the population within the Village of Anmore, the Village of Belcarra, the Township of Langley, the District of North Vancouver, the City of Maple Ridge, the City of Surrey, and the District of West Vancouver uses water from private sources. This Report analyzes water use data of water supplied by the GVWD and member jurisdictions but does not include water supplied or the populations serviced by private sources.

## 2.0 METHODOLOGY

This Report is typically issued periodically to append recent drinking water consumption data to previously published historical data. This edition appends water consumption data for 2018 and 2019 to the previously published edition, which covered the study period of 1985 to 2017. Some data from the previous report have been corrected therefore, this Report supersedes all previous editions.

### 2.1. Data Management

Between 1985 – 1996, not all GVWD supplied member jurisdictions were able to submit data. For 1985, results outlined in this report were based on available data from only two member jurisdictions. The level of analysis was dependent on the data received from each member jurisdiction. Table 2.1 outlines the participating member jurisdictions and the corresponding year when the collection of consumption data commenced.



Table 2.1: Member jurisdiction participation in the Water Use by Sector Report

| Member jurisdiction  | Start of data collection |
|--|--------------------------|
| Village of Anmore  | 2013                     |
| Village of Belcarra  | 2013                     |
| City of Burnaby  | 1991                     |
| City of Coquitlam  | 1993                     |
| City of Delta  | 1996                     |
| City of Langley  | 1987                     |
| Township of Langley  | 1991                     |
| City of Maple Ridge  | 1988                     |
| City of New Westminister   | 1990                     |
| City of North Vancouver  | 1986                     |
| District of North Vancouver  | 1986                     |
| City of Pitt Meadows   | 1988                     |
| City of Port Coquitlam   | 1989                     |
| City of Port Moody <sup>1</sup>  | 1987                     |
| City of Richmond   | 1985                     |
| City of Surrey   | 1990                     |
| Tsawwassen First Nation  | 2018                     |
| University Endowment Lands and University of British Columbia Utilities <sup>1</sup> | 1986                     |
| City of Vancouver  | 1986                     |
| District of West Vancouver   | 1985                     |

<sup>1</sup>Metering data for the City of Port Moody and the University of British Columbia Utilities were not available for this study.

Before 2018, water consumption by Tsawwassen First Nation was included within the City of Delta. Similarly, before 2013, water consumption by the Village of Anmore was included with the water consumption data for the City of Port Moody and, water consumption by the Village of Belcarra was included with the District of North Vancouver.

The data for this Report is derived from drinking water billing records requested by GVWD from members that receive drinking water from the GVWD. The data is then processed and aggregated into municipal-level and regional level results. This Report provides detailed statistics for the use of water from 1985 to 2019. All consumption data are presented in units of cubic metres (m<sup>3</sup>).

### 2.1.1. Data Requests

For this Report, and similar to previous years each member jurisdiction was asked to provide the following data for 2018 and 2019:

- number of service connections, both metered and unmetered;
- sources of water and volume consumed from each member jurisdiction water source (specifically GVWD and all other non-GVWD sources);
- population served by non-GVWD sources;
- water and sewer rates (both flat rates and metered rates);
- an estimate of system losses;
- an estimate of the percentage of metered connections in eight major sectors;
- customer information for each metered connection, including property address and type of land use (classified by British Columbia Assessment Authority, Actual Use Codes); and
- customer water consumption for each metered connection, by billing period or by year.

In addition to individual consumption records, member jurisdictions were requested to provide the BC Assessment Authority Actual Use Codes (AUCs) standard classification for each property account to analyze water consumption by sector. Before 2005, Metro Vancouver staff assigned codes based on judgement using either the name of the customer or other attributes.

Since 2005, 22 new “By Sector Classification” (BSC) codes were developed to report industrial, commercial, and institutional (ICI) sectors, as shown in Table 2.2 below. Member jurisdictions were also given the option to classify accounts according to BSC codes, which provided flexibility for reporting data.

The data request included an instructional guideline (Appendix A) for submission requirements, a set of templates and a sample Structured Query Language (SQL) Query for Tempest (the billing software used most widely across the region).

### 2.1.2. Data Received

Prior to the 2005 report, member jurisdictions supplied data in hard copy or electronic format (ASCII text file, Excel spreadsheet or Access database) and then converted to the requisite format by Metro Vancouver staff. In most cases, billing summaries of metering data were provided. However, when billing summaries were not available, individual meter cards were obtained, and consumption figures were calculated by Metro Vancouver staff from the meter readings. If errors arose, the data was verified between each member jurisdiction and Metro Vancouver. Once the data for each member jurisdiction were entered into the database, all consumption values were converted to cubic metres. Sector codes and Standard Industrial Classification (SIC) codes were also assigned to each customer.

Since 2005, the member jurisdictions have provided summarized water consumption data, billing information, and AUC for each customer in an Excel spreadsheet template. For this Report, most members were able to follow the data requirements provided in the instruction guideline. The members provide de-identified billing records for metered accounts within their jurisdiction and additional municipal system information via a questionnaire.

Over 90% of member jurisdictions have responded for this 2019 Report, and Metro Vancouver welcomes the efforts of the Tsawwassen First Nation, who have provided their data for the first time.

### 2.1.3. Data Integrity, Quality and Processing

The data provided by member jurisdiction was reviewed to ensure that each account with consumption data was assigned a corresponding AUC or BSC code. Data analysis were performed using descriptive statistics and Microsoft Excel 2016 pivot tables where necessary to determine percentile distributions, the number of unique accounts, the proportion of duplicates and check for unique AUCs. Once the integrity levels were established, the cleaning and verification process included the following:

- Removing duplicate entries, and where duplicate entries comprised more than 5% of metered consumption, members were approached to clarify.
- Assigning a nominal “999” code to any to any account that does not have a corresponding AUC.
- Verifying missing and erroneous data with member jurisdictions.

In 2017, the Metro Vancouver intranet “Water Use by Sector” app was developed to securely store and manage data. For this report, the programmed AUC codes were updated using the latest BC Assessment Authority AUC list. New members providing data for the first time were added, and some adjustments were required to the program following the learnings from the previous report cycle.

Cleaned and verified data sets for questionnaire, billing, population and consumption were uploaded into the app in the required order. Some members required corrections to their data sets from previous years. Algorithms processed the data across the years (2013 – 2019) and across the region and converted the AUCs to BSCs, and then into eight sectors.

### 2.1.4. By Sector Categorization and Conversions

For this Report, it is assumed the residential sector had a higher level of accuracy in assigned AUC codes across the region. Water consumption data in the ICI sector present a unique challenge, where BSC classifications are applied to define water consumption.

There are differences in the assignment of AUCs between member jurisdictions and over the reporting period. For example, a bank may have the AUC ‘210 – bank’, which is classified as BSC ‘2-business or office’, or the more generic AUC ‘200 – stores and service –commercial’ classified as BSC ‘16-retail shopping and stores’. As well, some buildings may be classified by only one of their multiple uses, such as medical offices, stores, restaurants and offices. Therefore, the number of connections and corresponding consumption under each BSC category should be considered an estimate. Table 2.2 shows the BSC codes used to categorize and analyze the ICI sector data.

Table 2.2: By Sector Classification (BSC) codes

| Sector                       | By Sector Classification (BSC) code |
|------------------------------|-------------------------------------|
| Single-Family Residential    | 0                                   |
| Agriculture                  | 1                                   |
| Business & Offices           | 2                                   |
| Construction                 | 3                                   |
| Dairy and Meat Products      | 4                                   |
| Education                    | 5                                   |
| Forest Products              | 6                                   |
| General Food Products        | 7                                   |
| Grain and Vegetable Products | 8                                   |
| Hospitality                  | 9                                   |
| Industries                   | 10                                  |
| Medical and Health           | 11                                  |
| Petroleum and Allied         | 12                                  |
| Recreation                   | 13                                  |
| Religious and Cultural       | 14                                  |
| Restaurants                  | 15                                  |
| Retail Shopping and Stores   | 16                                  |
| Service Stations             | 17                                  |
| Transportation               | 18                                  |
| Warehouses                   | 19                                  |
| Utilities and Miscellaneous  | 20                                  |
| Multi-Family Residential     | 21                                  |

This Report presents most of the results and graphs for the following eight sector categorizations:

- |                              |                 |
|------------------------------|-----------------|
| 1) Single-Family Residential | 5) Industrial   |
| 2) Multi-Family Residential  | 6) Agricultural |
| 3) Commercial                | 7) Other        |
| 4) Institutional             | 8) Unknown      |

The sector “Other” represents transportation, communications, utilities, and other accounts where an appropriate sector could not be determined, although an AUC code is assigned and represent only minor consumption levels.

The eighth sector, “Unknown”, is assumed to represent commercial water use. These are accounts that appear as “NULL” or blank with no AUCs assigned in the billing records provided.

These “Unknown” accounts without a corresponding AUC code were given a nominal “999” code and processed into the eighth sector.

The conversion from 670 BC Assessment Authority Actual Use Codes (AUC), to 22 By Sector Codes (BSC), then to the eight general sector codes and code details are shown in Appendix B.

## 2.2. Data Analysis

Once the data was cleaned or adjusted as required, and where possible, verified by the member jurisdiction, it was uploaded onto the intranet web app by year and member jurisdiction. Inbuilt algorithms converted the AUC codes into the eight sector codes and produced regional results, which were then used for further analysis by Metro Vancouver staff. Statistics were compiled for consumption by sector and the composite results were formatted into tables and graphs featured in this Report.

The regional results were appended to information from previous editions,. Data from each member jurisdiction has been analyzed to produce the aggregated regional results covering the study period 1985 to 2019.

With the categorization of all consumption data into respective AUCs and BSCs codes, and the eight sector categories described above, consumption data was aggregated and consumption by sector was determined for each member jurisdiction, and where available, for each billing period. Using the member jurisdiction data, water consumption by sector in the region was generated and analyzed further, forming the basis for this Report.

### 2.2.1. Unmetered Consumption

Unmetered consumption is derived by subtracting the total metered consumption from the total volume of water billed by the GVWD. The total volume of water billed by the GVWD is derived from the *Water Consumption Statistics 2019* report, which reports on the volume supplied to members at designated supply points in the transmission system.

$$\text{Unmetered Consumption} = \text{Total Volume Billed by GVWD} - \text{Total Metered Consumption (from billing data provided by members)}$$

The difference between the totals was calculated and categorized as unmetered water consumption in each member jurisdiction and for the region. Unmetered consumption includes member jurisdiction system losses, unmetered residential consumption, a small proportion of unmetered ICI consumption, and unmetered consumption at member jurisdiction facilities and parks. Currently, almost half of the drinking water consumption in the GVWD region is not metered by the member jurisdiction.

### 2.2.2. System Losses

System losses includes leaks in member jurisdiction distribution systems, faulty meters, fire-fighting needs, flushing of water mains, and other unmetered uses of water in the distribution process. System losses do not refer to losses on private property or unmetered residential, commercial, industrial, institutional, agricultural or other end-use water consumption. Losses incurred during water treatment

and GVWD transmission are not included in the ‘system losses’ category and are not included in this report.

For member jurisdictions claiming to have universal metering (the City of Langley, and the District of West Vancouver), the difference between total volume of water billed by the GVWD and total metered consumption was attributed to system losses. For all other member jurisdictions, a self-reported estimate of annual system losses as a percentage of total consumption was provided by member jurisdiction staff. This estimate typically ranged between 10 to 15%, depending on the member jurisdiction and year. Where no estimates were provided, a 10% system loss was attributed for calculation and analysis.

### 2.2.3. Residential Consumption

The majority of residential consumption is not metered in the region. Since many member jurisdictions fully meter all ICI connections, total unmetered consumption minus system losses can be attributed to residential consumption. The following equation estimates the percentage of total consumption attributable to residential use for member jurisdictions with unmetered residential consumption:

$$\text{Residential Consumption} = \text{Unmetered Consumption} + \text{Metered Single-Family Consumption} + \text{Metered Multi-Family Consumption} - \text{System Losses (\%)} \times \text{Total Consumption}$$

Estimates for residential consumption were only calculated if unmetered non-residential water use was assumed to be negligible compared to unmetered residential water use, that is, all other sectors were close to 100% metered. The exceptions to this assumption was the City of Port Moody due to the unavailability of water consumption by sector data. The total volume of water consumption for the City of Port Moody was not included in the regional estimates for residential water consumption.

### 2.2.4. Regional Population

Population figures are from Metro Vancouver population estimates, based on Statistics Canada census figures. Member jurisdiction population figures were based on published census data for the census years of 1986, 1991, 1996, 2001, 2006, 2011, and 2016 with an undercount adjustment according to Statistics Canada figures. For the years in between census periods, the population was interpolated using a straight-line annual average. Estimates from 2002 to 2017 were supplemented with housing completion and demolitions data, and work continues to improve these data sets.

Population estimates for member jurisdictions and the region for the study period 1985 to 2019 are presented in Table 2.3. Where applicable, member jurisdictions provided estimates of the number of people serviced by private water sources. The population serviced by private sources was not included in the population totals or the consumption data in this report. Due to undercount adjustments, member jurisdiction population estimates from previous years may have been slightly adjusted compared to previous versions of this report. All population figures from previous years were updated to current population estimates and are expected to align with the population estimates in the *Water Consumption Statistics 2019* report, which is based on Census data and adjustments. This report supersedes all previous editions of the Water Use by Sector Report.

### **2.2.5. Per Capita Consumption Estimates**

Statistics for water consumption per capita are based on annual population estimates for each member jurisdiction. Two estimates of water use per capita are provided:

1. total water consumption per capita; and
2. estimated residential consumption per capita

### **2.3. Data Request – Next Report Cycle 1985 – 2022**

The questionnaire for the next iteration of this report will be updated to request additional information around water metering, details around single-family and multi-family housing and connections, and the ICI sector.

Since 2013, “Unknown” accounts represent an average of 3% of total metered consumption across the region. However, some member jurisdictions had “Unknown” accounts representing more than 15% of their total consumption, while most others show these accounts to represent 2% or less of total metered consumption. Members will be requested to improve this metric and ensure correct AUCs are assigned to these accounts.

Table 2.3: GVWD and member jurisdiction serviced populations 1985 – 2019

| Year  | GVWD and member jurisdiction serviced populations |          |         |                        |         |              |                               |                          |                 |                      |                                       |              |                |            |          |         |                         |                      |           |                             | TOTAL<br>GVWD <sup>3</sup> |
|-------|---|----------|---------|------------------------|---------|--------------|-------------------------------|--------------------------|-----------------|----------------------|---------------------------------------|--------------|----------------|------------|----------|---------|-------------------------|----------------------|-----------|-----------------------------|----------------------------|
|       | Anmore  | Belcarra | Burnaby | Coquitlam <sup>1</sup> | Delta   | Langley City | Langley Township <sup>1</sup> | Maple Ridge <sup>1</sup> | New Westminster | North Vancouver City | North Vancouver District <sup>1</sup> | Pitt Meadows | Port Coquitlam | Port Moody | Richmond | Surrey  | Tsawwassen First Nation | UEL/UBC <sup>2</sup> | Vancouver | West Vancouver <sup>1</sup> |                            |
| 1985  | N/A   | N/A      | 148,145 | 69,900                 | 81,379  | 16,809       | N/A                           | N/A                      | 40,987          | 36,790               | N/A                                   | 7,993        | 29,746         | 16,099     | 109,550  | 180,717 | N/A                     | 3,803                | 443,005   | 39,099                      | <b>1,384,172</b>           |
| 1986* | N/A   | N/A      | 149,879 | 71,543                 | 82,382  | 17,095       | N/A                           | N/A                      | 41,271          | 37,128               | 70,559                                | 8,348        | 30,061         | 16,266     | 112,018  | 187,588 | N/A                     | 3,853                | 446,438   | 39,232                      | <b>1,406,517</b>           |
| 1987  | N/A   | N/A      | 152,459 | 74,454                 | 84,234  | 17,727       | N/A                           | N/A                      | 41,949          | 37,637               | 71,901                                | 8,999        | 31,588         | 16,643     | 115,565  | 200,361 | N/A                     | 3,908                | 454,130   | 39,719                      | <b>1,449,129</b>           |
| 1988  | N/A   | N/A      | 155,040 | 77,364                 | 86,086  | 18,358       | N/A                           | 37,115                   | 42,627          | 38,147               | 73,244                                | 9,650        | 33,115         | 17,019     | 119,111  | 213,133 | N/A                     | 4,092                | 461,823   | 40,206                      | <b>1,491,871</b>           |
| 1989  | N/A   | N/A      | 157,621 | 80,275                 | 87,939  | 18,990       | N/A                           | 39,301                   | 43,305          | 38,656               | 74,586                                | 10,301       | 34,642         | 17,396     | 122,658  | 225,906 | N/A                     | 4,277                | 469,516   | 40,693                      | <b>1,534,612</b>           |
| 1990  | N/A   | N/A      | 160,201 | 83,186                 | 89,791  | 19,622       | N/A                           | 41,488                   | 43,983          | 39,166               | 75,928                                | 10,953       | 36,169         | 17,773     | 126,205  | 238,679 | N/A                     | 4,461                | 477,209   | 41,180                      | <b>1,577,353</b>           |
| 1991* | N/A   | N/A      | 162,782 | 86,096                 | 91,643  | 20,253       | 45,000                        | 43,675                   | 44,662          | 39,675               | 77,271                                | 11,604       | 37,696         | 18,149     | 129,752  | 251,452 | N/A                     | 4,646                | 484,902   | 41,667                      | <b>1,590,925</b>           |
| 1992  | N/A   | N/A      | 167,386 | 89,990                 | 92,806  | 20,873       | 50,000                        | 45,192                   | 45,962          | 40,407               | 78,596                                | 12,105       | 39,836         | 18,842     | 134,670  | 264,339 | N/A                     | 5,134                | 494,795   | 42,255                      | <b>1,643,189</b>           |
| 1993  | N/A   | N/A      | 171,991 | 93,885                 | 93,969  | 21,493       | 55,000                        | 46,709                   | 47,263          | 41,138               | 79,921                                | 12,607       | 41,977         | 19,535     | 139,588  | 277,226 | N/A                     | 5,622                | 504,688   | 42,842                      | <b>1,695,454</b>           |
| 1994  | N/A   | N/A      | 176,596 | 97,779                 | 95,131  | 22,114       | 60,000                        | 48,227                   | 48,564          | 41,870               | 81,246                                | 13,109       | 44,117         | 20,227     | 144,507  | 290,113 | N/A                     | 6,110                | 514,581   | 43,429                      | <b>1,747,719</b>           |
| 1995  | N/A   | N/A      | 181,200 | 101,673                | 96,294  | 22,734       | 62,000                        | 49,744                   | 49,865          | 42,602               | 82,571                                | 13,610       | 46,257         | 20,920     | 149,425  | 303,000 | N/A                     | 6,598                | 524,474   | 44,016                      | <b>1,796,983</b>           |
| 1996* | N/A   | N/A      | 185,805 | 105,567                | 97,457  | 23,354       | 63,000                        | 51,261                   | 51,166          | 43,333               | 83,896                                | 14,112       | 48,398         | 21,612     | 154,343  | 315,887 | N/A                     | 7,087                | 534,367   | 44,603                      | <b>1,845,248</b>           |
| 1997  | N/A   | N/A      | 189,002 | 107,944                | 97,839  | 23,603       | 63,000                        | 52,577                   | 52,306          | 43,956               | 84,435                                | 14,389       | 49,388         | 22,245     | 157,671  | 325,112 | N/A                     | 7,296                | 541,308   | 44,645                      | <b>1,876,715</b>           |
| 1998  | N/A   | N/A      | 192,199 | 110,320                | 98,220  | 23,852       | 64,000                        | 53,892                   | 53,445          | 44,578               | 84,975                                | 14,665       | 50,378         | 22,879     | 161,000  | 334,338 | N/A                     | 7,505                | 548,250   | 44,688                      | <b>1,909,183</b>           |
| 1999  | N/A   | N/A      | 195,396 | 112,697                | 98,602  | 24,100       | 64,000                        | 55,208                   | 54,585          | 45,201               | 85,514                                | 14,942       | 51,368         | 23,512     | 164,328  | 343,563 | N/A                     | 7,714                | 555,191   | 44,730                      | <b>1,940,651</b>           |
| 2000  | N/A   | N/A      | 198,593 | 115,074                | 98,984  | 24,349       | 64,000                        | 56,524                   | 55,724          | 45,823               | 85,954                                | 15,219       | 52,358         | 24,145     | 167,656  | 352,788 | N/A                     | 7,923                | 562,132   | 44,772                      | <b>1,972,018</b>           |
| 2001* | N/A   | N/A      | 201,790 | 117,451                | 99,365  | 24,598       | 67,000                        | 57,839                   | 56,864          | 46,446               | 86,493                                | 15,496       | 53,349         | 24,778     | 170,985  | 362,013 | N/A                     | 8,132                | 569,074   | 44,815                      | <b>2,006,486</b>           |
| 2002  | N/A   | N/A      | 202,532 | 117,934                | 99,406  | 24,751       | 74,185                        | 58,997                   | 57,131          | 46,455               | 86,582                                | 15,607       | 53,473         | 25,343     | 173,253  | 371,118 | N/A                     | 8,931                | 574,758   | 44,872                      | <b>2,035,328</b>           |
| 2003  | N/A   | N/A      | 203,273 | 118,417                | 99,447  | 24,905       | 74,556                        | 60,155                   | 57,397          | 46,465               | 86,671                                | 15,719       | 53,598         | 25,908     | 175,521  | 380,222 | N/A                     | 9,731                | 580,442   | 44,931                      | <b>2,057,356</b>           |
| 2004  | N/A   | N/A      | 204,326 | 118,981                | 99,433  | 24,903       | 76,327                        | 61,060                   | 58,053          | 46,646               | 86,703                                | 15,961       | 53,912         | 26,673     | 177,775  | 389,778 | N/A                     | 10,136               | 587,590   | 45,011                      | <b>2,083,269</b>           |
| 2005  | N/A   | N/A      | 206,407 | 119,389                | 99,411  | 24,902       | 78,081                        | 62,002                   | 58,792          | 47,253               | 86,789                                | 16,225       | 54,058         | 27,629     | 180,250  | 400,516 | N/A                     | 11,121               | 593,881   | 45,050                      | <b>2,111,756</b>           |
| 2006* | N/A   | N/A      | 210,507 | 119,607                | 99,388  | 24,899       | 74,266                        | 63,593                   | 60,533          | 47,501               | 86,904                                | 16,554       | 54,543         | 28,747     | 182,652  | 412,847 | N/A                     | 11,600               | 601,203   | 45,198                      | <b>2,140,543</b>           |
| 2007  | N/A   | N/A      | 214,965 | 120,075                | 99,833  | 25,161       | 75,889                        | 64,519                   | 61,599          | 47,664               | 87,062                                | 16,848       | 55,098         | 30,100     | 185,186  | 425,442 | N/A                     | 11,980               | 605,844   | 45,524                      | <b>2,172,789</b>           |
| 2008  | N/A   | N/A      | 218,499 | 122,059                | 100,020 | 25,272       | 78,656                        | 65,837                   | 64,144          | 48,270               | 87,249                                | 17,758       | 55,713         | 31,724     | 187,403  | 436,445 | N/A                     | 12,499               | 608,503   | 45,983                      | <b>2,206,034</b>           |
| 2009  | N/A   | N/A      | 223,488 | 124,725                | 100,513 | 25,390       | 80,106                        | 69,558                   | 65,205          | 48,850               | 87,633                                | 17,939       | 56,647         | 32,995     | 190,673  | 450,087 | N/A                     | 12,708               | 611,883   | 46,398                      | <b>2,244,797</b>           |
| 2010  | N/A   | N/A      | 225,342 | 127,183                | 101,232 | 25,543       | 83,122                        | 70,208                   | 66,717          | 49,367               | 87,994                                | 18,039       | 57,187         | 33,482     | 192,744  | 464,585 | N/A                     | 13,099               | 614,614   | 46,724                      | <b>2,277,184</b>           |
| 2011* | N/A   | N/A      | 227,704 | 128,997                | 101,870 | 25,585       | 83,741                        | 71,580                   | 67,302          | 49,521               | 88,150                                | 18,281       | 57,474         | 33,638     | 194,301  | 477,864 | N/A                     | 13,297               | 616,910   | 46,794                      | <b>2,303,007</b>           |
| 2012  | N/A   | N/A      | 229,339 | 131,889                | 102,620 | 25,911       | 87,784                        | 72,674                   | 67,967          | 50,148               | 88,925                                | 18,283       | 58,138         | 33,735     | 197,494  | 488,722 | N/A                     | 13,786               | 621,950   | 46,902                      | <b>2,336,266</b>           |
| 2013  | 2,060   | 700      | 231,100 | 134,000                | 102,400 | 26,000       | 111,500                       | 79,900                   | 69,000          | 51,600               | 88,200                                | 18,400       | 58,000         | 34,000     | 196,900  | 496,800 | N/A                     | 14,700               | 627,600   | 46,100                      | <b>2,388,960</b>           |
| 2014  | 2,060   | 700      | 233,000 | 136,700                | 103,000 | 26,100       | 114,200                       | 81,100                   | 70,000          | 52,500               | 88,700                                | 18,600       | 59,000         | 34,200     | 198,700  | 507,100 | N/A                     | 15,500               | 633,400   | 46,100                      | <b>2,420,660</b>           |
| 2015  | 2,060   | 700      | 234,700 | 139,400                | 103,400 | 26,300       | 117,000                       | 82,300                   | 71,000          | 53,400               | 89,000                                | 18,700       | 59,000         | 34,400     | 199,900  | 516,700 | N/A                     | 16,000               | 639,400   | 46,100                      | <b>2,449,460</b>           |
| 2016* | 2,178   | 700      | 237,500 | 142,500                | 104,100 | 26,400       | 120,100                       | 83,600                   | 72,000          | 54,500               | 89,900                                | 18,800       | 59,000         | 34,600     | 202,200  | 528,800 | N/A                     | 16,400               | 647,800   | 46,200                      | <b>2,487,278</b>           |
| 2017  | 2,183   | 700      | 240,000 | 145,000                | 105,000 | 27,000       | 123,000                       | 85,000                   | 74,000          | 56,000               | 90,700                                | 19,000       | 60,000         | 34,900     | 205,000  | 539,000 | N/A                     | 16,900               | 655,000   | 46,000                      | <b>2,524,383</b>           |
| 2018  | 2,289   | 440      | 250,257 | 152,289                | 107,715 | 27,715       | 127,700                       | 87,200                   | 78,202          | 57,669               | 92,380                                | 20,412       | 61,838         | 35,300     | 215,247  | 560,458 | 2,253                   | 18,300               | 675,856   | 28,335                      | <b>2,601,855</b>           |
| 2019  | 2,353   | 450      | 254,038 | 156,071                | 108,816 | 28,085       | 130,600                       | 87,800                   | 80,148          | 58,632               | 92,931                                | 20,854       | 62,015         | 35,800     | 220,178  | 574,043 | 2,858                   | 19,000               | 682,565   | 28,403                      | <b>2,645,640</b>           |

<sup>1</sup> Population on private wells excluded for the Village of Anmore, the Village of Belcarra, the City of Coquitlam (2002 – 2008), the Township of Langley, the City of Maple Ridge, the District of North Vancouver, and the District of West Vancouver.

<sup>2</sup> UEL/UBC population does not include UBC day time population.

<sup>3</sup> Regional population estimates that may include population on private wells used for 1985 – 1990 due to the lack of a complete set of submitted data. GVWD populations from 1991 – 2019 do not include population on private wells.

\* indicates a census year for which member jurisdiction population figures are based on published census figures with an undercount adjustment.



### 3.0 REGIONAL RESULTS

This section presents regional results of all water consumption data received for the years 1985 to 2019. The majority of results presented in this report are based on data submitted by the member jurisdictions. Particularly in the early years of the study, when member jurisdiction data was incomplete or unavailable, published results may not accurately reflect water consumption statistics in those member jurisdictions and the region. Table 3.1 presents a checklist of data received from each member jurisdiction organized by year.

Amalgamated data for the region was compiled based on the analysis of metering data provided by the member jurisdictions.

*Table 3.1: Data received by member jurisdiction during study period 1985 – 2019*

| Member jurisdiction      | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 |   |   |   |   |   |
|--------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|---|---|---|---|---|
| Anmore                   |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |   |   |   |   |   |
| Belcarra                 |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |   |   |   |   |   |
| Burnaby                  |      |      |      |      |      |      | ●    | ●    | ●    | ●    | ●    | ●    | ●    | ●    | ●    | ●    | ●    | ●    | ●    | ●    | ●    | ●    | ●    | ●    | ●    | ●    | ●    | ●    | ●    | ●    | ●    | ●    | ●    | ●    | ●    | ● | ● | ● | ● |   |
| Coquitlam                |      |      |      |      |      |      |      |      | ●    | ●    | ●    | ●    | ●    | ●    | ●    | ●    | ●    | ●    | ●    | ●    | ●    | ●    | ●    | ●    | ●    | ●    | ●    | ●    | ●    | ●    | ●    | ●    | ●    | ●    | ●    | ● | ● | ● | ● | ● |
| Delta                    |      |      |      |      |      |      |      |      |      |      |      | ●    | ●    | ●    | ●    | ●    | ●    | ●    | ●    | ●    | ●    | ●    | ●    | ●    | ●    | ●    | ●    | ●    | ●    | ●    | ●    | ●    | ●    | ●    | ●    | ● | ● | ● | ● | ● |
| Langley City             |      |      | ○    | ○    | ○    |      | ○    | ○    | ○    | ○    | ●    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○ | ○ | ○ | ○ | ○ |
| Langley Township         | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○ | ○ | ○ | ○ | ○ |
| Maple Ridge              |      |      | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○ | ○ | ○ | ○ | ○ |
| New Westminster          |      |      |      |      |      | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○ | ○ | ○ | ○ | ○ |
| North Vancouver City     | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○ | ○ | ○ | ○ | ○ |
| North Vancouver District | ●    | ●    | ●    | ●    | ●    | ●    | ●    | ●    | ●    | ●    | ●    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○ | ○ | ○ | ○ | ○ |
| Pitt Meadows             |      |      | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○ | ○ | ○ | ○ | ○ |
| Port Coquitlam           |      |      |      |      | ●    | ●    | ●    | ●    | ●    | ●    | ●    | ●    | ●    | ●    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○ | ○ | ○ | ○ | ○ |
| Port Moody               |      |      | ●    | ●    | ●    | ●    | ●    | ●    | ●    | ●    | ●    | ○    | ○    |      |      | ●    | ●    | ●    | ●    | ●    | ●    | ●    | ●    | ●    | ●    | ●    | ●    | ●    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○ | ○ | ○ | ○ |   |
| Richmond                 | ●    | ●    | ●    | ●    | ●    | ●    | ●    | ●    | ●    | ●    | ●    | ●    | ●    | ●    | ●    | ●    | ●    | ●    | ●    | ●    | ●    | ●    | ●    | ●    | ●    | ●    | ●    | ●    | ●    | ●    | ●    | ●    | ●    | ●    | ●    | ● | ● | ● | ● |   |
| Tsawwassen First Nation  |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |   |   | ● | ● |   |
| Surrey                   |      |      |      |      |      | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○ | ○ | ○ | ○ | ○ |
| UEL/UBC <sup>1</sup>     |      | ●    | ●    | ●    | ●    | ●    | ●    | ●    | ●    | ●    | ●    | ●    | ●    | ●    | ●    | ●    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○ | ○ | ○ | ○ |   |
| Vancouver                | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○ | ○ | ○ | ○ | ○ |
| West Vancouver           | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○    | ○ | ○ | ○ | ○ | ○ |

Legend: ● - data provided    ○ - partial data provided    □ - no data provided

<sup>1</sup>University Endowment Lands (UEL) metering data was only provided by UBC Utilities for properties on UBC grounds for the years 2002 – 2012.

### 3.1. Drinking Water Sources

The GVWD treats and delivers drinking water from the Capilano, Seymour, and Coquitlam watersheds and is the sole drinking water provider for most of the member jurisdictions in the region. However, three member jurisdictions also derive water from non-GVWD sources to supplement the supply of drinking water by the GVWD. During 2019, approximately 2%, 39%, and 40% of water consumed was derived from non-GVWD sources in the City of Delta, the Township of Langley, and the District of West Vancouver, respectively. Furthermore, a small percentage of the population is serviced by private water sources in the Township of Langley, the District of North Vancouver, the City of Maple Ridge, the City of Surrey and the District of West Vancouver.

This report presents consumption statistics for all water supplied by the GVWD and member jurisdictions. Water supplied by private sources and the populations serviced by private sources are not included in the calculation or results presented in this report.

### 3.2. Metering Practices in the GVWD Region

Metering practices and the extent of metering vary by sector and member jurisdiction. An estimate of the sectors metered in each member jurisdiction in 2019 is summarized in Table 3.2. Members provide these estimates in questionnaire template, and are not reflective of the data analysis completed on metered water consumption.

Table 3.2: Member jurisdiction metering estimates in 2019

| Member jurisdiction       | Estimated percentage of metered connections by sector in 2019 |              |            |               |            |              |
|---------------------------|---|--------------|------------|---------------|------------|--------------|
|                           | Single-Family   | Multi-Family | Commercial | Institutional | Industrial | Agricultural |
| Anmore                    | 96% - 100%  | N/A          | N/A        | 96% - 100%    | N/A        | N/A          |
| Belcarra <sup>1</sup>     | 96% - 100%  | N/A          | N/A        | N/A           | N/A        | N/A          |
| Burnaby                   | 0% - 5%   | 0% - 5%      | 96% - 100% | 96% - 100%    | 96% - 100% | 96% - 100%   |
| Coquitlam                 | 0% - 5%   | 0% - 5%      | 96% - 100% | 96% - 100%    | 96% - 100% | 96% - 100%   |
| Delta                     | 6% - 35%  | 36% - 65%    | 96% - 100% | 66% - 95%     | 96% - 100% | 96% - 100%   |
| Langley City              | 96% - 100%  | 96% - 100%   | 96% - 100% | 96% - 100%    | 96% - 100% | 96% - 100%   |
| Langley Township          | 0% - 5%   | 0% - 5%      | 96% - 100% | 96% - 100%    | 96% - 100% | 96% - 100%   |
| Maple Ridge               | 0% - 5%   | 66% - 95%    | 96% - 100% | 96% - 100%    | 96% - 100% | 66% - 95%    |
| New Westminster           | 0% - 5%   | 96% - 100%   | 96% - 100% | 96% - 100%    | 96% - 100% | N/A          |
| North Vancouver City      | 0% - 5%   | 6% - 35%     | 96% - 100% | 96% - 100%    | 96% - 100% | N/A          |
| North Vancouver District  | 0% - 5%   | 36% - 65%    | 66% - 95%  | 96% - 100%    | 96% - 100% | N/A          |
| Pitt Meadows <sup>1</sup> | 0% - 5%   | 0% - 5%      | 96% - 100% | 96% - 100%    | 96% - 100% | 96% - 100%   |
| Port Coquitlam            | 0% - 5%   | 0% - 5%      | 96% - 100% | 96% - 100%    | 96% - 100% | 96% - 100%   |
| Port Moody                | 0% - 5%   | 36% - 65%    | 36% - 65%  | 66% - 95%     | 66% - 95%  | N/A          |
| Richmond                  | 96% - 100%  | 36% - 65%    | 96% - 100% | 96% - 100%    | 96% - 100% | 96% - 100%   |
| Tsawwassen First Nation   | 36% - 65%   | 36% - 65%    | 96% - 100% | 96% - 100%    | N/A        | N/A          |
| Surrey <sup>2</sup>       | 66% - 95%   | 36% - 65%    | 96% - 100% | 96% - 100%    | 96% - 100% | 96% - 100%   |
| UEL/UBC                   | 96% - 100%  | 96% - 100%   | 96% - 100% | 96% - 100%    | N/A        | N/A          |
| Vancouver                 | 6% - 35%  | 96% - 100%   | 96% - 100% | 96% - 100%    | 96% - 100% | 96% - 100%   |
| West Vancouver            | 96% - 100%  | 96% - 100%   | 96% - 100% | 96% - 100%    | N/A        | N/A          |

<sup>1</sup> Single-family residential homes in the Village of Belcarra are mostly metered but still charged a flat rate (not based on consumption).

<sup>2</sup> All multi-family residential (townhouses and apartments) in the City of Pitt Meadows are metered but charged a flat rate (not based on consumption); <sup>2</sup>The City of Surrey provides water to agricultural properties for the purpose of domestic use only.

N/A – not applicable; there are no connections of this sector type identified.

Table 3.3 shows the total number of unmetered and metered connections in the region over the 1985 to 2019 study period.

Figure 3.2 and Table 3.4 provide the number of unmetered and metered connections as a percentage of total serviced connections. Note, if a property has several separately metered connections and assigned a different account number by the member jurisdiction, then each connection is counted individually.

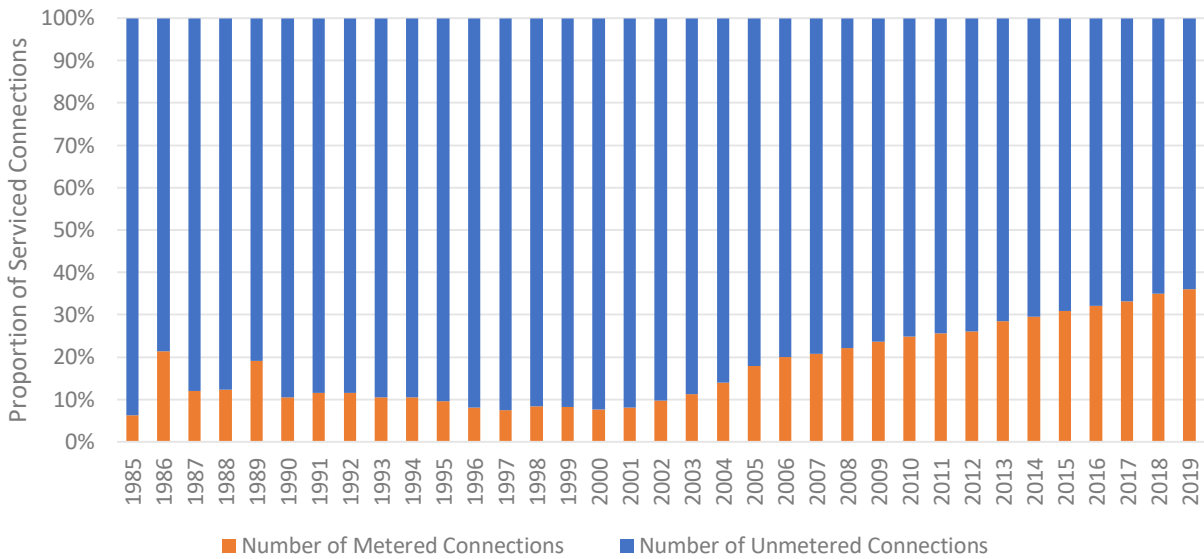


Figure 3.1: Proportion of metered and unmetered connections in the GVWD region

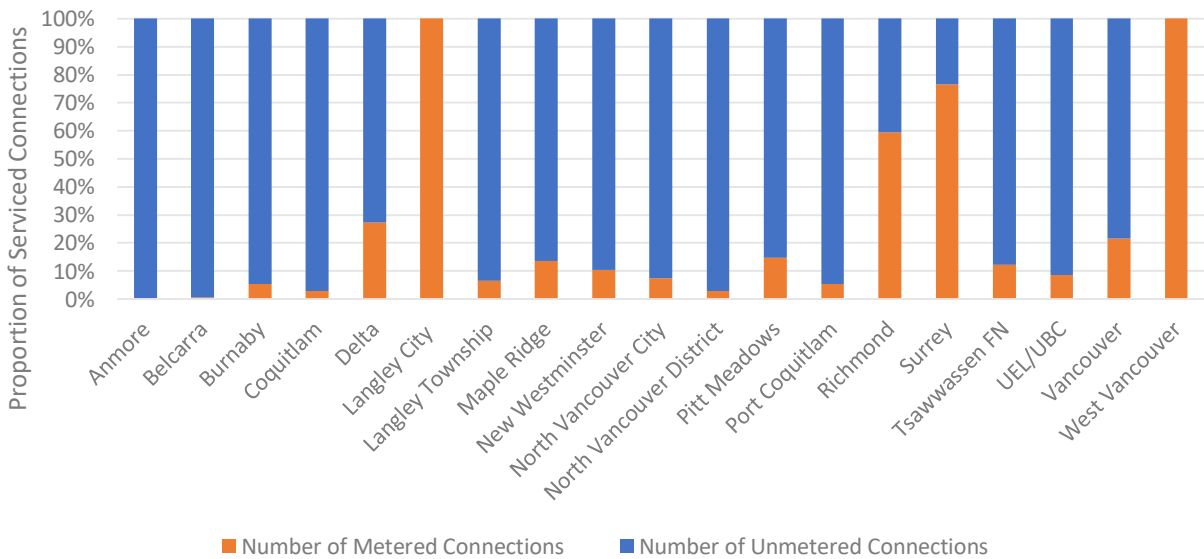


Figure 3.2: Proportion of metered and unmetered connections in 2019, by member jurisdiction

Table 3.3: Total number of unmetered and metered serviced connections in the GVWD

| Year | Total Number of Serviced Connections | Number of Unmetered Connections | Number of Metered Connections | Breakdown of Metered Connections |              |            |               |            |              |                    |                      |
|------|--------------------------------------|---------------------------------|-------------------------------|----------------------------------|--------------|------------|---------------|------------|--------------|--------------------|----------------------|
|      |                                      |                                 |                               | Single-Family                    | Multi-Family | Commercial | Institutional | Industrial | Agricultural | Other <sup>1</sup> | Unknown <sup>2</sup> |
| 1985 | 34,206                               | 32,473                          | 2,173                         | 47                               | 69           | 1,344      | 121           | 246        | 164          | 182                | 0                    |
| 1986 | 58,806                               | 56,158                          | 15,211                        | 487                              | 4,931        | 7,573      | 1,077         | 395        | 169          | 579                | 0                    |
| 1987 | 156,213                              | 141,353                         | 19,159                        | 3,721                            | 5,146        | 7,973      | 1,137         | 447        | 172          | 563                | 0                    |
| 1988 | 158,811                              | 143,653                         | 20,169                        | 3,938                            | 5,271        | 8,278      | 1,163         | 485        | 454          | 580                | 0                    |
| 1989 | 91,979                               | 88,504                          | 20,911                        | 4,002                            | 5,339        | 8,739      | 1,202         | 520        | 471          | 638                | 0                    |
| 1990 | 189,819                              | 173,456                         | 20,483                        | 638                              | 5,567        | 10,419     | 1,616         | 711        | 577          | 955                | 0                    |
| 1991 | 221,865                              | 203,468                         | 26,649                        | 4,280                            | 5,814        | 12,104     | 1,780         | 843        | 630          | 1,198              | 0                    |
| 1992 | 224,486                              | 205,885                         | 27,046                        | 4,339                            | 5,875        | 12,337     | 1,834         | 893        | 667          | 1,101              | 0                    |
| 1993 | 260,548                              | 240,953                         | 28,152                        | 4,472                            | 5,977        | 12,965     | 1,981         | 1,021      | 646          | 1,090              | 0                    |
| 1994 | 265,287                              | 245,153                         | 28,796                        | 4,801                            | 6,099        | 13,149     | 2,038         | 1,054      | 575          | 1,080              | 0                    |
| 1995 | 304,279                              | 277,913                         | 29,566                        | 5,081                            | 6,184        | 13,482     | 2,079         | 1,102      | 574          | 1,064              | 0                    |
| 1996 | 374,273                              | 350,728                         | 30,977                        | 5,206                            | 6,205        | 13,948     | 2,180         | 1,371      | 695          | 1,372              | 0                    |
| 1997 | 416,777                              | 390,851                         | 31,867                        | 5,525                            | 6,302        | 14,158     | 2,297         | 1,397      | 720          | 1,468              | 0                    |
| 1998 | 396,884                              | 369,492                         | 33,548                        | 7,225                            | 6,781        | 14,201     | 2,019         | 1,509      | 831          | 982                | 0                    |
| 1999 | 415,036                              | 386,381                         | 34,954                        | 7,277                            | 6,853        | 14,689     | 2,131         | 1,704      | 918          | 1,382              | 0                    |
| 2000 | 425,451                              | 394,457                         | 32,587                        | 7,367                            | 6,549        | 13,625     | 2,084         | 1,594      | 936          | 837                | 0                    |
| 2001 | 428,769                              | 395,946                         | 34,559                        | 8,933                            | 6,628        | 13,805     | 2,154         | 1,620      | 978          | 849                | 0                    |
| 2002 | 443,374                              | 399,879                         | 43,495                        | 11,710                           | 11,028       | 15,879     | 2,150         | 1,287      | 962          | 479                | 0                    |
| 2003 | 455,663                              | 404,108                         | 51,555                        | 19,433                           | 11,196       | 16,009     | 2,214         | 1,300      | 995          | 408                | 0                    |
| 2004 | 463,948                              | 398,907                         | 65,041                        | 32,353                           | 11,502       | 16,160     | 2,249         | 1,300      | 1,079        | 398                | 0                    |
| 2005 | 462,908                              | 380,111                         | 82,797                        | 49,280                           | 12,057       | 16,317     | 2,304         | 1,316      | 1,111        | 412                | 0                    |
| 2006 | 465,599                              | 372,554                         | 93,035                        | 58,368                           | 12,523       | 17,013     | 2,533         | 1,134      | 1,069        | 395                | 0                    |
| 2007 | 469,570                              | 371,940                         | 97,613                        | 62,455                           | 12,837       | 17,039     | 2,554         | 1,136      | 1,125        | 467                | 0                    |
| 2008 | 475,512                              | 369,029                         | 105,024                       | 68,983                           | 13,676       | 16,881     | 2,551         | 1,145      | 1,503        | 285                | 0                    |
| 2009 | 469,978                              | 358,563                         | 111,415                       | 74,962                           | 13,951       | 17,298     | 2,528         | 787        | 1,644        | 245                | 0                    |
| 2010 | 474,123                              | 356,293                         | 117,830                       | 80,837                           | 14,413       | 17,278     | 2,555         | 796        | 1,695        | 256                | 0                    |
| 2011 | 476,998                              | 354,579                         | 122,419                       | 85,156                           | 14,667       | 17,246     | 2,588         | 780        | 1,725        | 257                | 0                    |
| 2012 | 486,001                              | 359,361                         | 126,640                       | 88,770                           | 15,073       | 17,293     | 2,702         | 800        | 1,743        | 259                | 0                    |
| 2013 | 473,940                              | 338,710                         | 135,230                       | 94,744                           | 16,773       | 17,024     | 2,893         | 836        | 1,954        | 296                | 710                  |
| 2014 | 476,764                              | 335,652                         | 141,112                       | 100,302                          | 16,968       | 17,032     | 2,929         | 840        | 2,012        | 300                | 729                  |
| 2015 | 477,868                              | 330,403                         | 147,465                       | 106,331                          | 17,245       | 17,034     | 2,960         | 848        | 2,014        | 309                | 724                  |
| 2016 | 486,283                              | 325,333                         | 153,856                       | 112,284                          | 17,675       | 17,066     | 2,945         | 849        | 2,008        | 311                | 718                  |
| 2017 | 481,297                              | 321,820                         | 159,477                       | 116,730                          | 17,309       | 16,777     | 2,954         | 827        | 2,047        | 323                | 2,510                |
| 2018 | 451,787                              | 293,661                         | 158,126                       | 119,234                          | 16,182       | 15,195     | 2,884         | 809        | 1,964        | 508                | 1,761                |
| 2019 | 453,155                              | 290,075                         | 163,080                       | 122,359                          | 16,142       | 16,605     | 3,033         | 818        | 1,967        | 400                | 1,755                |

Note: Metered data from 1985 – 1993 was not received from all serviced member jurisdictions; results do not reflect the accurate number of serviced properties in the region during that period. <sup>1</sup> "Other" consists of miscellaneous connections for which the appropriate sector could not be determined, transportation and utilities. <sup>2</sup> "Unknown" refers to connections for which no BC Assessment Authority Actual Use Code (AUC) was provided.

Table 3.4: Percentage of unmetered and metered serviced connections in the GVWD, as a percentage of all serviced connections

| Year | Total Number of Serviced Connections | Number of Unmetered Connections | Number of Metered Connections | Breakdown of Metered Connections |              |            |               |            |              |                    |                      |
|------|--------------------------------------|---------------------------------|-------------------------------|----------------------------------|--------------|------------|---------------|------------|--------------|--------------------|----------------------|
|      |                                      |                                 |                               | Single-Family                    | Multi-Family | Commercial | Institutional | Industrial | Agricultural | Other <sup>1</sup> | Unknown <sup>2</sup> |
| 1985 | 100.0%                               | 94.9%                           | 6.4%                          | 0.1%                             | 0.2%         | 3.9%       | 0.4%          | 0.7%       | 0.5%         | 0.5%               | 0.0%                 |
| 1986 | 100.0%                               | 95.5%                           | 25.9%                         | 0.8%                             | 8.4%         | 12.9%      | 1.8%          | 0.7%       | 0.3%         | 1.0%               | 0.0%                 |
| 1987 | 100.0%                               | 90.5%                           | 12.3%                         | 2.4%                             | 3.3%         | 5.1%       | 0.7%          | 0.3%       | 0.1%         | 0.4%               | 0.0%                 |
| 1988 | 100.0%                               | 90.5%                           | 12.7%                         | 2.5%                             | 3.3%         | 5.2%       | 0.7%          | 0.3%       | 0.3%         | 0.4%               | 0.0%                 |
| 1989 | 100.0%                               | 96.2%                           | 22.7%                         | 4.4%                             | 5.8%         | 9.5%       | 1.3%          | 0.6%       | 0.5%         | 0.7%               | 0.0%                 |
| 1990 | 100.0%                               | 91.4%                           | 10.8%                         | 0.3%                             | 2.9%         | 5.5%       | 0.9%          | 0.4%       | 0.3%         | 0.5%               | 0.0%                 |
| 1991 | 100.0%                               | 91.7%                           | 12.0%                         | 1.9%                             | 2.6%         | 5.5%       | 0.8%          | 0.4%       | 0.3%         | 0.5%               | 0.0%                 |
| 1992 | 100.0%                               | 91.7%                           | 12.0%                         | 1.9%                             | 2.6%         | 5.5%       | 0.8%          | 0.4%       | 0.3%         | 0.5%               | 0.0%                 |
| 1993 | 100.0%                               | 92.5%                           | 10.8%                         | 1.7%                             | 2.3%         | 5.0%       | 0.8%          | 0.4%       | 0.2%         | 0.4%               | 0.0%                 |
| 1994 | 100.0%                               | 92.4%                           | 10.9%                         | 1.8%                             | 2.3%         | 5.0%       | 0.8%          | 0.4%       | 0.2%         | 0.4%               | 0.0%                 |
| 1995 | 100.0%                               | 91.3%                           | 9.7%                          | 1.7%                             | 2.0%         | 4.4%       | 0.7%          | 0.4%       | 0.2%         | 0.3%               | 0.0%                 |
| 1996 | 100.0%                               | 93.7%                           | 8.3%                          | 1.4%                             | 1.7%         | 3.7%       | 0.6%          | 0.4%       | 0.2%         | 0.4%               | 0.0%                 |
| 1997 | 100.0%                               | 93.8%                           | 7.6%                          | 1.3%                             | 1.5%         | 3.4%       | 0.6%          | 0.3%       | 0.2%         | 0.4%               | 0.0%                 |
| 1998 | 100.0%                               | 93.1%                           | 8.5%                          | 1.8%                             | 1.7%         | 3.6%       | 0.5%          | 0.4%       | 0.2%         | 0.2%               | 0.0%                 |
| 1999 | 100.0%                               | 93.1%                           | 8.4%                          | 1.8%                             | 1.7%         | 3.5%       | 0.5%          | 0.4%       | 0.2%         | 0.3%               | 0.0%                 |
| 2000 | 100.0%                               | 92.7%                           | 7.7%                          | 1.7%                             | 1.5%         | 3.2%       | 0.5%          | 0.4%       | 0.2%         | 0.2%               | 0.0%                 |
| 2001 | 100.0%                               | 92.3%                           | 8.1%                          | 2.1%                             | 1.5%         | 3.2%       | 0.5%          | 0.4%       | 0.2%         | 0.2%               | 0.0%                 |
| 2002 | 100.0%                               | 90.2%                           | 9.8%                          | 2.6%                             | 2.5%         | 3.6%       | 0.5%          | 0.3%       | 0.2%         | 0.1%               | 0.0%                 |
| 2003 | 100.0%                               | 88.7%                           | 11.3%                         | 4.3%                             | 2.5%         | 3.5%       | 0.5%          | 0.3%       | 0.2%         | 0.1%               | 0.0%                 |
| 2004 | 100.0%                               | 86.0%                           | 14.0%                         | 7.0%                             | 2.5%         | 3.5%       | 0.5%          | 0.3%       | 0.2%         | 0.1%               | 0.0%                 |
| 2005 | 100.0%                               | 82.1%                           | 17.9%                         | 10.6%                            | 2.6%         | 3.5%       | 0.5%          | 0.3%       | 0.2%         | 0.1%               | 0.0%                 |
| 2006 | 100.0%                               | 80.0%                           | 20.0%                         | 12.5%                            | 2.7%         | 3.7%       | 0.5%          | 0.2%       | 0.2%         | 0.1%               | 0.0%                 |
| 2007 | 100.0%                               | 79.2%                           | 20.8%                         | 13.3%                            | 2.7%         | 3.6%       | 0.5%          | 0.2%       | 0.2%         | 0.1%               | 0.0%                 |
| 2008 | 100.0%                               | 77.6%                           | 22.1%                         | 14.5%                            | 2.9%         | 3.6%       | 0.5%          | 0.2%       | 0.3%         | 0.1%               | 0.0%                 |
| 2009 | 100.0%                               | 76.3%                           | 23.7%                         | 16.0%                            | 3.0%         | 3.7%       | 0.5%          | 0.2%       | 0.3%         | 0.1%               | 0.0%                 |
| 2010 | 100.0%                               | 75.1%                           | 24.9%                         | 17.0%                            | 3.0%         | 3.6%       | 0.5%          | 0.2%       | 0.4%         | 0.1%               | 0.0%                 |
| 2011 | 100.0%                               | 74.3%                           | 25.7%                         | 17.9%                            | 3.1%         | 3.6%       | 0.5%          | 0.2%       | 0.4%         | 0.1%               | 0.0%                 |
| 2012 | 100.0%                               | 73.9%                           | 26.1%                         | 18.3%                            | 3.1%         | 3.6%       | 0.6%          | 0.2%       | 0.4%         | 0.1%               | 0.0%                 |
| 2013 | 100.0%                               | 71.5%                           | 28.5%                         | 20.0%                            | 3.5%         | 3.6%       | 0.6%          | 0.2%       | 0.4%         | 0.1%               | 0.1%                 |
| 2014 | 100.0%                               | 70.4%                           | 29.6%                         | 21.0%                            | 3.6%         | 3.6%       | 0.6%          | 0.2%       | 0.4%         | 0.1%               | 0.2%                 |
| 2015 | 100.0%                               | 69.1%                           | 30.9%                         | 22.3%                            | 3.6%         | 3.6%       | 0.6%          | 0.2%       | 0.4%         | 0.1%               | 0.2%                 |
| 2016 | 100.0%                               | 66.9%                           | 31.6%                         | 23.1%                            | 3.6%         | 3.5%       | 0.6%          | 0.2%       | 0.4%         | 0.1%               | 0.1%                 |
| 2017 | 100.0%                               | 66.9%                           | 33.1%                         | 24.3%                            | 3.6%         | 3.5%       | 0.6%          | 0.2%       | 0.4%         | 0.1%               | 0.5%                 |
| 2018 | 100.0%                               | 65.0%                           | 35.0%                         | 26.4%                            | 3.6%         | 3.4%       | 0.6%          | 0.2%       | 0.4%         | 0.1%               | 0.4%                 |
| 2019 | 100.0%                               | 64.0%                           | 36.0%                         | 27.0%                            | 3.6%         | 3.7%       | 0.7%          | 0.2%       | 0.4%         | 0.1%               | 0.4%                 |

Note: Metered data from 1985 – 1993 was not received from all serviced member jurisdictions; results do not reflect the accurate number of serviced properties in the region during that period. <sup>1</sup>

"Other" consists of miscellaneous connections for which the appropriate sector could not be determined, transportation and utilities. <sup>2</sup> "Unknown" refers to connections for which no BC Assessment Authority Actual Use Code (AUC) was provided.

### 3.2.1. Residential Metering

As reported in Table 3.5, most single-family residential connections in the region are unmetered as of 2019. The exceptions are single-family homes in the City of Langley, the City of Richmond, and the District of West Vancouver; the three-member jurisdictions in the region that have 100% metering of the single-family sector.

Current metering programs in the City of Surrey and the City of Vancouver will eventually increase water metering for single-family residences. The City of Surrey and the City of Vancouver have policies and by-laws that mandate the installation of meters with the construction of new homes or with major renovations to existing homes.

Most member jurisdictions have a portion of their multi-family residential connections metered. Multi-family residential refers to legal apartment buildings, townhouses, duplexes, condominiums, and other structures that provide more than one self-contained dwelling unit. All multi-family connections are metered in the City of Langley, the City of New Westminister, University Endowment Lands, the City of Vancouver and the District of West Vancouver. As with the metering of multi-family connections, there has been an increase in the metering of single-family connections in the region.

Figure 3.3 shows the by-sector distribution of metered connections in the region. Improved data sets will provide a better understanding of this change in the next report cycle.

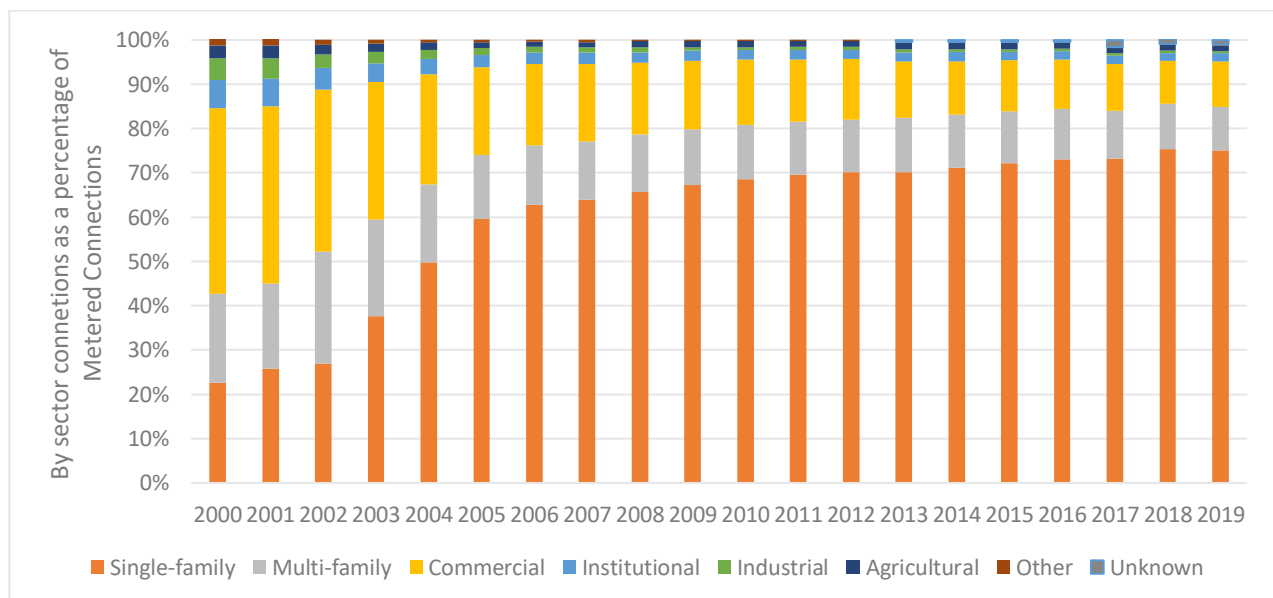


Figure 3.3: By sector distribution of metered connections in the region, 2000 - 2019

### 3.2.2. Industrial, Commercial, Institutional and Agricultural Metering

Industrial, commercial, institutional and agricultural (ICI) connections in the region are mostly metered. Common exceptions to ICI connections' metering include properties owned and operated by member

jurisdictions, such as parks, cemeteries, yards and public washrooms. As of 2019, ICI connections in most member jurisdictions are fully metered. The number of connections in the ICI sector has largely remained constant, as shown in Figure 3.4, although the number of 'Unknown' connections (with no assigned AUC) has increased since 2013. Since the average consumption per connection in the Commercial and Unknown sectors are within 10% of each other, for this report, it is assumed that Unknown connections are largely within the commercial sector as a subset of the ICI sector.

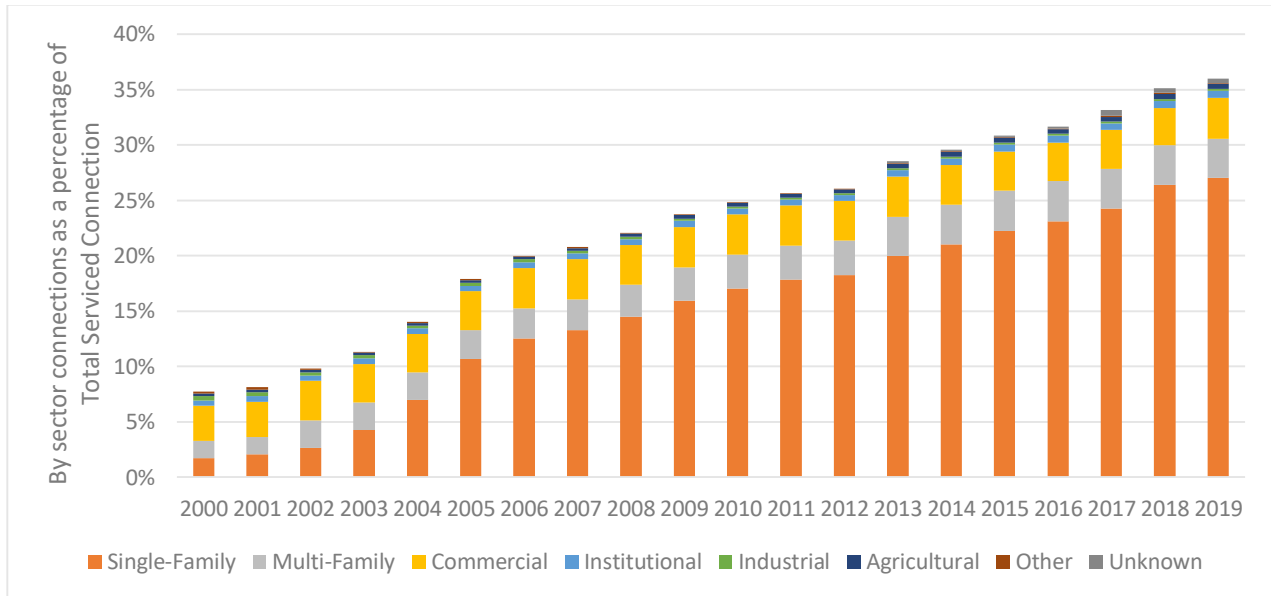


Figure 3.4: By sector distribution of connections, as a percentage of all connections in the region, 2000 to 2019

\*Results from 1985 - 1999 not shown due to insufficient data.

### 3.3. Consumer Water Rates in the GVWD Region

This section summarizes the rates charged for water services throughout the region.

#### 3.3.1. Flat Rates (Unmetered)

Unmetered single- and multi-family residential connections are typically charged a flat-rate fee that is dependent on member jurisdiction, based on the type of connection and/or the number of dwelling units on the property.

Figure 3.5 and Table 3.5 provide flat rate fees for single-family connections in each member jurisdiction. Flat rate fees for multi-family connections are shown in Figure 3.6 and Table 3.6. Note that the City of Langley does not charge a flat rate for water connections claiming to have achieved universal metering.

As of 2019, the average flat rate in the region for single-family homes was \$583/year and for multi-family homes was \$429/year.

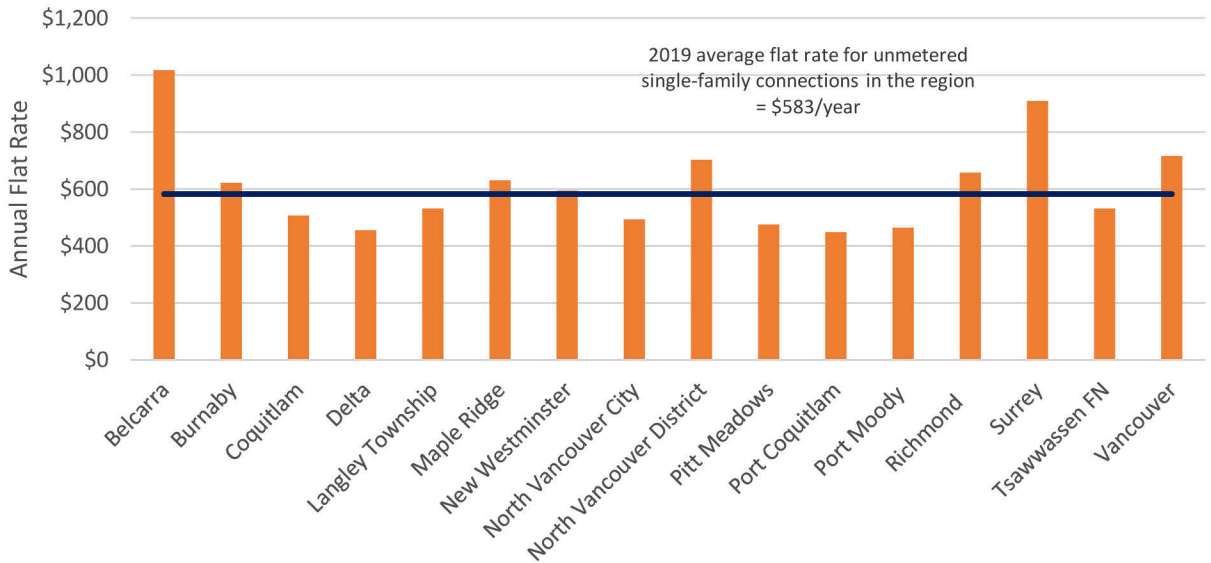


Figure 3.5: Single-family flat rates for unmetered connections in 2019

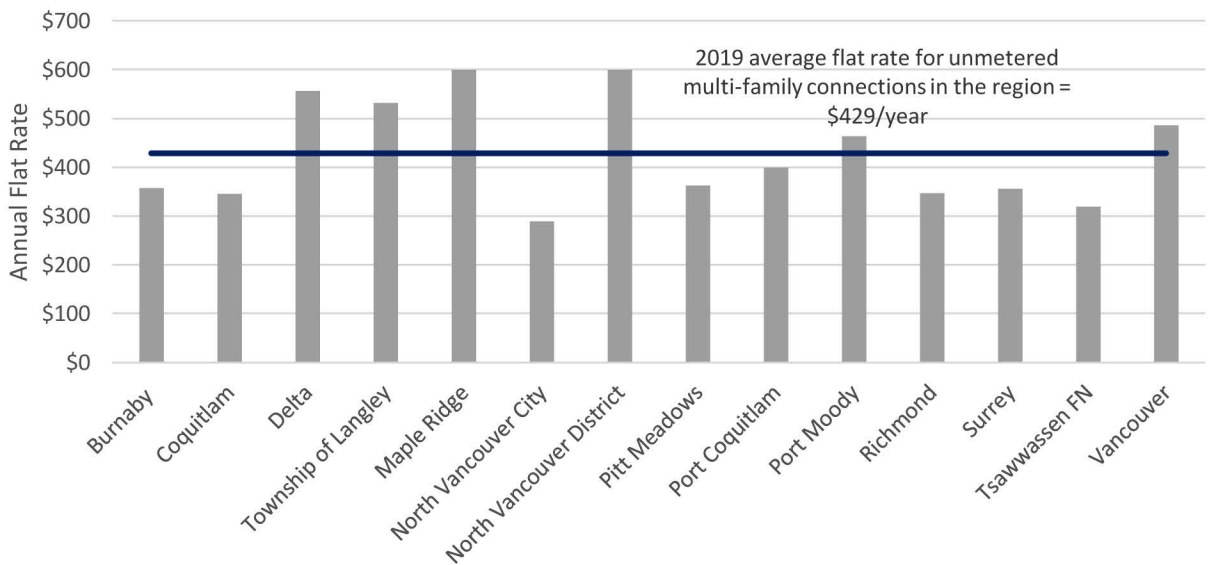


Figure 3.6: Multi-family flat rates for unmetered connections in 2019

Note for Figures 3.5 and 3.6: the City of Langley, the City of New Westminster (multi-family only), the University Endowment Lands and UBC, and the District of West Vancouver are universally metered and do not charge flat rates for these connections.

### 3.3.2. Metered Rates

Rate structures for metered consumption in the region include declining block rate, inclining block rate, seasonal and constant rate structures. In recent years, many member jurisdictions have adopted a constant rate structure. Most member jurisdictions do not vary pricing according to a user type (e.g. residential, commercial, industrial, etc.), except the District of West Vancouver.



Figure 3.7 and Table 3.7 provide metered rates by member jurisdiction in the GVWD region. The average metered rate in the region was \$1.466/m<sup>3</sup> during 2019.

In addition to the metered rates, some member jurisdictions have a minimum charge for consumption up to a specified volume, some member jurisdictions charge an additional fee based on the size of metered connection, and some charge a base fee plus the metered rate for each unit volume consumed.

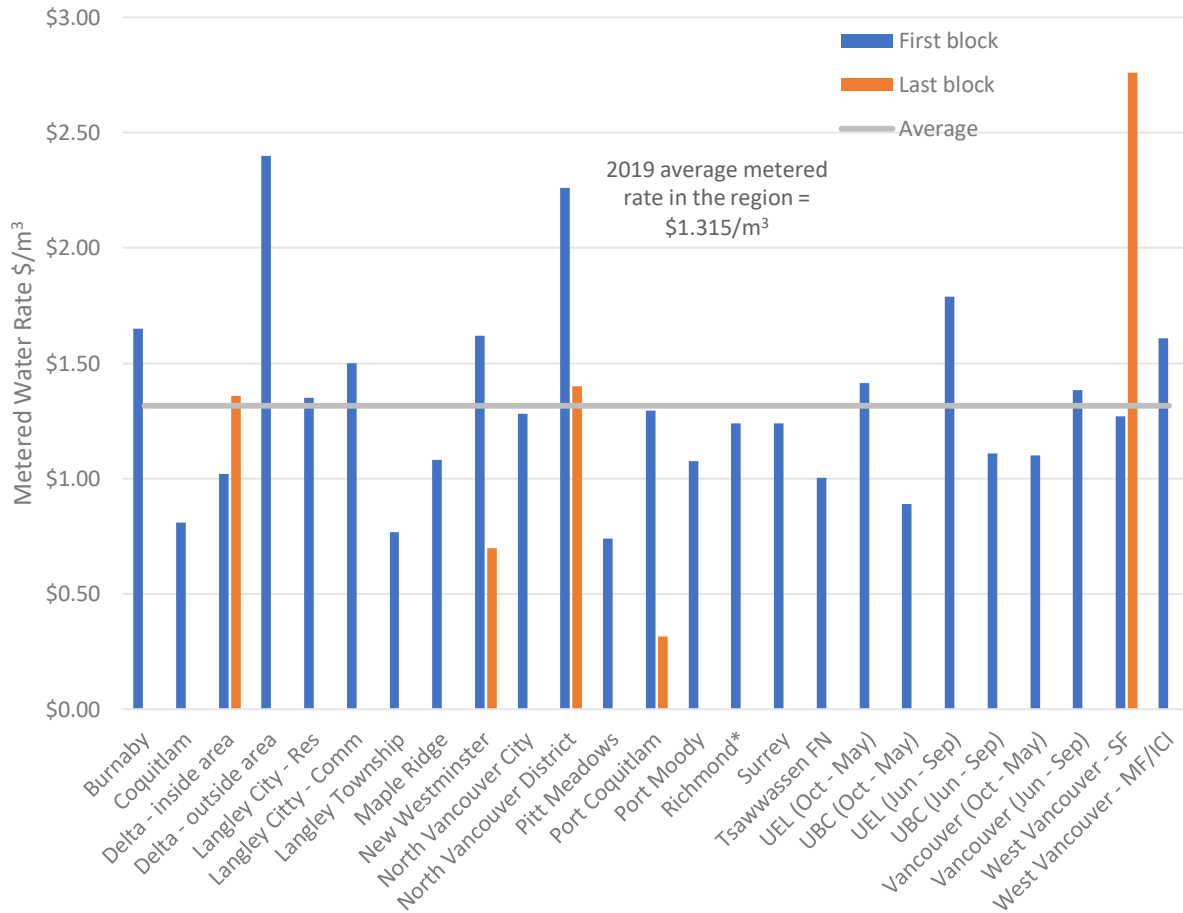


Figure 3.7: Metered rates in 2019

\*The City of Richmond discounts rates by 10% if paid on time.

Table 3.5: Flat rates for single-family residential connections, by member jurisdiction (\$/year)

| Year | Belcarra   | Burnaby  | Coquitlam | Delta    | Langley Township | Maple Ridge | New Westminster | North Vancouver City | North Vancouver District | Pitt Meadows | Port Coquitlam | Port Moody | Richmond <sup>1</sup> | Surrey   | Tsawwassen First Nation | Vancouver | West Vancouver Min <sup>2</sup> | West Vancouver Max <sup>2</sup> |
|------|------------|----------|-----------|----------|------------------|-------------|-----------------|----------------------|--------------------------|--------------|----------------|------------|-----------------------|----------|-------------------------|-----------|---------------------------------|---------------------------------|
| 1985 | N/A        | \$42.00  | \$68.00   | N/A      | \$45.00          | N/A         | N/A             | N/A                  | N/A                      | \$36.00      | N/A            | N/A        | \$87.56               | N/A      | N/A                     | N/A       | \$105.00                        | \$120.00                        |
| 1986 | N/A        | \$44.10  | \$68.00   | N/A      | \$45.00          | \$42.00     | N/A             | \$55.00              | N/A                      | \$36.00      | N/A            | N/A        | \$87.56               | N/A      | N/A                     | \$77.00   | \$109.00                        | \$125.00                        |
| 1987 | N/A        | \$48.50  | \$68.00   | N/A      | \$45.00          | \$47.00     | N/A             | \$57.00              | \$79.44                  | \$36.00      | N/A            | N/A        | \$87.56               | N/A      | N/A                     | \$84.00   | \$118.00                        | \$135.00                        |
| 1988 | N/A        | \$53.35  | \$72.75   | N/A      | \$45.00          | \$54.00     | N/A             | \$59.00              | \$91.11                  | \$36.00      | N/A            | N/A        | \$87.56               | \$88.00  | N/A                     | \$96.00   | \$123.00                        | \$141.00                        |
| 1989 | N/A        | \$58.70  | \$77.75   | N/A      | \$80.00          | \$54.00     | N/A             | \$80.00              | \$105.00                 | \$36.00      | N/A            | N/A        | \$87.56               | \$93.50  | N/A                     | \$100.00  | \$129.00                        | \$148.00                        |
| 1990 | N/A        | \$61.65  | \$83.25   | N/A      | \$86.40          | \$54.00     | N/A             | \$88.00              | \$133.89                 | \$36.00      | N/A            | \$73.56    | \$96.94               | \$93.50  | N/A                     | \$107.00  | \$138.00                        | \$158.00                        |
| 1991 | N/A        | \$77.00  | \$88.00   | N/A      | \$95.05          | \$54.00     | \$58.00         | N/A                  | \$147.28                 | \$40.00      | \$96.00        | \$83.00    | \$110.39              | \$104.50 | N/A                     | \$116.00  | \$144.00                        | \$164.00                        |
| 1992 | N/A        | \$92.50  | \$92.00   | N/A      | \$98.85          | \$67.00     | \$69.60         | \$100.00             | \$156.11                 | \$70.00      | \$120.00       | \$92.00    | \$133.33              | \$115.50 | N/A                     | \$135.00  | \$152.00                        | \$173.00                        |
| 1993 | N/A        | \$111.00 | \$108.00  | N/A      | \$102.80         | \$74.00     | \$107.00        | \$110.00             | \$176.40                 | \$61.00      | \$144.00       | \$103.50   | \$143.33              | \$123.20 | N/A                     | \$148.00  | \$169.00                        | \$192.00                        |
| 1994 | N/A        | \$111.00 | \$124.00  | N/A      | \$106.91         | \$84.00     | \$117.80        | \$115.50             | \$188.88                 | \$105.00     | \$163.80       | \$121.50   | \$155.56              | \$132.00 | N/A                     | \$161.00  | \$163.00                        | \$185.00                        |
| 1995 | N/A        | \$128.00 | \$141.00  | N/A      | \$115.46         | \$94.00     | \$141.40        | \$133.00             | \$217.32                 | \$114.00     | \$175.80       | \$135.50   | \$172.22              | \$141.90 | N/A                     | \$177.00  | \$163.00                        | \$185.00                        |
| 1996 | N/A        | \$140.79 | \$152.00  | N/A      | \$125.00         | \$109.00    | \$155.60        | \$136.00             | \$238.89                 | \$125.00     | \$184.80       | \$145.50   | \$172.22              | \$154.77 | N/A                     | \$195.00  | \$180.00                        | \$205.00                        |
| 1997 | N/A        | \$156.26 | \$161.00  | N/A      | \$130.00         | \$119.00    | \$171.15        | \$146.00             | \$255.56                 | \$144.00     | \$199.80       | \$160.00   | \$177.78              | \$192.50 | N/A                     | \$218.00  | \$215.56                        | N/A                             |
| 1998 | N/A        | \$171.11 | \$163.00  | N/A      | \$135.00         | \$129.00    | \$176.30        | \$150.00             | \$272.22                 | \$153.00     | \$178.40       | \$168.00   | \$187.00              | \$196.90 | N/A                     | \$231.00  | N/A                             | N/A                             |
| 1999 | N/A        | \$183.09 | \$169.00  | N/A      | \$140.00         | \$143.00    | \$176.30        | \$155.00             | \$272.22                 | \$158.00     | \$178.40       | \$176.00   | \$195.40              | \$205.40 | N/A                     | \$244.00  | N/A                             | N/A                             |
| 2000 | N/A        | \$180.02 | \$175.00  | N/A      | \$140.00         | \$158.00    | \$176.30        | \$160.00             | \$232.00                 | \$162.00     | \$179.42       | \$176.00   | \$212.05              | \$212.00 | N/A                     | \$256.00  | \$251.00                        | \$286.00                        |
| 2001 | N/A        | \$189.03 | \$175.00  | N/A      | \$143.01         | \$171.00    | \$176.30        | \$165.00             | \$237.00                 | \$168.00     | \$179.42       | \$177.00   | \$225.62              | \$212.00 | N/A                     | \$261.00  | \$264.00                        | \$300.00                        |
| 2002 | N/A        | \$209.92 | \$175.00  | \$125.00 | \$145.88         | \$221.00    | \$176.30        | \$170.00             | \$242.00                 | \$181.00     | \$179.42       | \$182.00   | \$255.65              | \$238.70 | N/A                     | \$264.00  | \$277.00                        | \$315.00                        |
| 2003 | N/A        | \$222.52 | \$189.00  | \$132.00 | \$145.88         | \$230.00    | \$179.83        | \$176.00             | \$258.00                 | \$208.00     | \$197.28       | \$182.00   | \$273.64              | \$238.70 | N/A                     | \$271.00  | \$296.00                        | \$337.00                        |
| 2004 | N/A        | \$235.87 | \$205.00  | \$145.00 | \$145.88         | \$239.00    | \$192.42        | \$183.00             | \$276.00                 | \$225.00     | \$214.72       | \$192.00   | \$304.85              | \$238.70 | N/A                     | \$287.00  | \$317.00                        | \$361.00                        |
| 2005 | N/A        | \$257.69 | \$225.00  | \$158.00 | \$148.43         | \$253.60    | \$205.70        | \$190.00             | \$292.00                 | \$245.00     | \$230.25       | \$214.00   | \$328.02              | \$251.00 | N/A                     | \$306.00  | \$339.00                        | \$386.00                        |
| 2006 | N/A        | \$281.53 | \$257.00  | \$183.00 | \$268.46         | \$268.80    | \$215.94        | \$197.00             | \$307.00                 | \$270.00     | \$244.00       | \$227.00   | \$372.37              | \$329.00 | N/A                     | \$329.00  | \$403.33                        | \$458.88                        |
| 2007 | N/A        | \$307.57 | \$287.00  | \$214.00 | \$288.60         | \$293.00    | \$249.62        | \$207.00             | \$325.00                 | \$299.00     | \$260.98       | \$265.00   | \$426.36              | \$415.00 | N/A                     | \$349.00  | N/A                             | N/A                             |
| 2008 | N/A        | \$341.40 | \$304.00  | \$225.00 | \$302.16         | \$319.40    | \$274.80        | \$215.00             | \$345.00                 | \$334.00     | \$274.03       | \$281.00   | \$451.52              | \$473.00 | N/A                     | \$361.00  | N/A                             | N/A                             |
| 2009 | N/A        | \$382.37 | \$328.00  | \$263.00 | \$317.26         | \$348.10    | \$324.57        | \$221.00             | \$369.00                 | \$338.00     | \$306.50       | \$302.00   | \$501.64              | \$526.00 | N/A                     | \$379.00  | N/A                             | N/A                             |
| 2010 | N/A        | \$435.90 | \$359.00  | \$300.00 | \$348.19         | \$379.50    | \$349.24        | \$248.00             | \$415.00                 | \$362.00     | \$334.00       | \$322.00   | \$525.23              | \$600.00 | N/A                     | \$417.00  | N/A                             | N/A                             |
| 2011 | N/A        | \$483.85 | \$384.00  | \$340.00 | \$382.83         | \$413.65    | \$387.66        | \$283.00             | \$509.00                 | \$395.00     | \$368.00       | \$347.00   | \$580.19              | \$637.00 | N/A                     | \$467.00  | N/A                             | N/A                             |
| 2012 | N/A        | \$512.88 | \$407.00  | \$370.00 | \$420.92         | \$450.90    | \$410.54        | \$331.00             | \$550.00                 | \$409.00     | \$393.00       | \$356.00   | \$621.51              | \$650.88 | N/A                     | \$513.00  | N/A                             | N/A                             |
| 2013 | \$236.00   | \$543.65 | \$423.00  | \$478.00 | \$433.34         | \$475.70    | \$424.91        | \$351.00             | \$594.00                 | \$419.00     | \$417.00       | \$356.00   | \$642.16              | \$677.00 | N/A                     | \$528.00  | N/A                             | N/A                             |
| 2014 | \$246.00   | \$573.55 | \$436.00  | \$491.00 | \$458.12         | \$501.85    | \$450.40        | \$380.00             | \$618.00                 | \$438.00     | \$427.00       | \$357.00   | \$654.66              | \$738.00 | N/A                     | \$546.00  | N/A                             | N/A                             |
| 2015 | \$250.00   | \$590.76 | \$457.00  | \$493.00 | \$481.76         | \$529.45    | \$477.42        | \$400.00             | \$630.00                 | \$438.00     | \$427.00       | \$371.00   | \$661.30              | \$779.00 | N/A                     | \$568.00  | N/A                             | N/A                             |
| 2016 | \$254.00   | \$602.58 | \$475.00  | \$500.00 | \$493.32         | \$553.30    | \$503.68        | \$440.00             | \$643.00                 | \$431.00     | \$427.00       | \$403.00   | \$667.72              | \$810.00 | N/A                     | \$616.00  | N/A                             | N/A                             |
| 2017 | \$262.00   | \$608.60 | \$475.00  | \$512.00 | \$500.97         | \$578.20    | \$523.85        | \$454.00             | \$656.00                 | \$442.00     | \$430.63       | \$403.00   | \$684.02              | \$839.00 | N/A                     | \$616.00  | N/A                             | N/A                             |
| 2018 | \$878.00   | \$608.60 | \$475.00  | \$440.00 | \$507.23         | \$604.20    | \$555.30        | \$468.00             | \$679.00                 | \$453.00     | \$430.63       | \$432.00   | \$624.30              | \$869.00 | \$502.00                | \$653.00  | N/A                             | N/A                             |
| 2019 | \$1,018.00 | \$620.77 | \$507.00  | \$456.00 | \$532.09         | \$631.40    | \$594.15        | \$494.00             | \$703.50                 | \$476.00     | \$448.05       | \$463.00   | \$657.51              | \$909.00 | \$531.00                | \$716.00  | N/A                             | N/A                             |

<sup>1</sup>The City of Richmond discounts rates by 10% if paid on time. <sup>2</sup> Universal metering was implemented in the District of West Vancouver in 2007; previously, single-family rates varied based on lot size.

N/A – information not available or not applicable

Table 3.6: Flat rates for multi-family residential connections, by member jurisdiction (\$/unit/year)

| Year | Burnaby <sup>1</sup> |          | Coquitlam | Delta    | Langley Township | Maple Ridge | North Vancouver City | North Vancouver District | Pitt Meadows <sup>1</sup> |          | Port Coquitlam |          | Port Moody | Richmond <sup>1,2</sup> |          | Surrey   | Tsawwassen First Nation | Vancouver <sup>1</sup> |          | West Vancouver |
|------|----------------------|----------|-----------|----------|------------------|-------------|----------------------|--------------------------|---------------------------|----------|----------------|----------|------------|-------------------------|----------|----------|-------------------------|------------------------|----------|----------------|
|      | Min                  | Max      |           |          |                  |             |                      |                          | Min                       | Max      | Min            | Max      |            | Min                     | Max      |          |                         | Min                    | Max      |                |
| 1985 | \$24.00              | \$31.50  | \$68.00   | N/A      | \$45.00          | N/A         | N/A                  | N/A                      | \$27.00                   | \$36.00  | N/A            | N/A      | N/A        | \$54.83                 | \$87.56  | N/A      | N/A                     | N/A                    | N/A      | \$92.00        |
| 1986 | \$25.20              | \$33.10  | \$68.00   | N/A      | \$45.00          | \$42.00     | \$46.50              | N/A                      | \$27.00                   | \$36.00  | N/A            | N/A      | N/A        | \$54.83                 | \$87.56  | N/A      | N/A                     | \$27.50                | \$52.25  | \$96.00        |
| 1987 | \$27.70              | \$36.40  | \$68.00   | N/A      | \$45.00          | \$47.00     | \$48.00              | \$67.78                  | \$27.00                   | \$36.00  | N/A            | N/A      | N/A        | \$54.83                 | \$87.56  | N/A      | N/A                     | \$30.00                | \$57.00  | \$103.00       |
| 1988 | \$30.50              | \$40.05  | \$72.75   | N/A      | \$45.00          | \$54.00     | \$49.50              | \$77.78                  | \$27.00                   | \$36.00  | N/A            | N/A      | N/A        | \$54.83                 | \$87.56  | \$88.00  | N/A                     | \$34.00                | \$65.25  | \$108.00       |
| 1989 | \$33.55              | \$44.05  | \$77.75   | N/A      | \$80.00          | \$54.00     | \$70.00              | \$89.44                  | \$27.00                   | \$36.00  | N/A            | N/A      | N/A        | \$54.83                 | \$87.56  | \$93.50  | N/A                     | \$36.00                | \$68.00  | \$113.00       |
| 1990 | \$35.25              | \$46.25  | \$83.25   | N/A      | \$86.40          | \$54.00     | \$77.00              | \$114.17                 | \$27.00                   | \$36.00  | N/A            | \$73.56  | \$60.72    | \$96.94                 | \$93.50  | N/A      | N/A                     | \$38.50                | \$72.75  | \$121.00       |
| 1991 | \$44.00              | \$57.80  | \$88.00   | N/A      | \$95.05          | \$54.00     | N/A                  | \$125.56                 | \$31.00                   | \$40.00  | \$96.00        | \$83.00  | \$69.15    | \$110.39                | \$104.50 | N/A      | N/A                     | \$41.75                | \$79.00  | \$126.00       |
| 1992 | \$52.80              | \$69.40  | \$92.00   | N/A      | \$98.85          | \$67.00     | \$87.00              | \$133.33                 | \$54.00                   | \$70.00  | \$120.00       | \$92.00  | \$83.33    | \$133.33                | \$115.50 | N/A      | N/A                     | \$46.00                | \$92.00  | \$133.00       |
| 1993 | \$63.50              | \$83.50  | \$108.00  | N/A      | \$102.80         | \$74.00     | \$96.00              | \$150.66                 | \$61.00                   | \$79.50  | \$144.00       | \$103.50 | \$90.00    | \$143.33                | \$123.20 | N/A      | N/A                     | \$52.00                | \$100.00 | \$148.00       |
| 1994 | \$63.50              | \$83.50  | \$124.00  | N/A      | \$106.91         | \$84.00     | \$101.00             | \$161.11                 | \$80.50                   | \$105.00 | \$163.80       | \$121.50 | \$100.00   | \$155.56                | \$132.00 | N/A      | N/A                     | \$57.00                | \$109.00 | \$143.00       |
| 1995 | \$73.50              | \$96.70  | \$141.00  | N/A      | \$115.46         | \$94.00     | \$116.00             | \$185.27                 | \$87.00                   | \$114.00 | \$175.80       | \$135.50 | \$111.11   | \$172.22                | \$141.90 | N/A      | N/A                     | \$63.00                | \$120.00 | \$143.00       |
| 1996 | \$80.83              | \$105.59 | \$152.00  | \$167.50 | \$125.00         | \$109.00    | \$118.00             | \$203.75                 | \$95.00                   | \$125.00 | \$184.80       | \$145.50 | \$111.11   | \$172.22                | \$154.77 | N/A      | N/A                     | \$69.00                | \$132.00 | \$158.00       |
| 1997 | \$89.74              | \$117.18 | \$161.00  | \$184.00 | \$130.00         | \$119.00    | \$126.00             | \$217.78                 | \$110.00                  | \$144.00 | \$190.20       | \$199.80 | \$160.00   | \$115.56                | \$177.78 | \$192.50 | N/A                     | \$78.00                | \$148.00 | \$195.56       |
| 1998 | \$98.26              | \$128.31 | \$163.00  | \$200.00 | \$135.00         | \$129.00    | N/A                  | \$232.23                 | \$117.00                  | \$153.00 | \$171.04       | \$178.40 | \$168.00   | \$159.50                | \$187.00 | \$196.90 | N/A                     | \$83.00                | \$157.00 | N/A            |
| 1999 | \$105.14             | \$137.29 | \$169.00  | \$196.00 | \$140.00         | \$143.00    | N/A                  | \$232.23                 | \$121.00                  | \$158.00 | \$171.04       | \$178.40 | \$176.00   | \$159.50                | \$181.40 | \$205.40 | N/A                     | \$88.00                | N/A      | N/A            |
| 2000 | \$103.38             | \$134.99 | \$175.00  | \$201.00 | \$140.00         | \$158.00    | \$138.00             | \$198.00                 | \$124.00                  | \$162.00 | \$172.06       | \$179.42 | \$176.00   | \$145.28                | \$183.32 | \$200.00 | N/A                     | \$92.00                | \$174.00 | \$220.00       |
| 2001 | \$108.55             | \$141.75 | \$175.00  | \$208.00 | \$143.01         | \$171.00    | \$142.00             | \$202.00                 | \$128.00                  | \$168.00 | \$172.06       | \$179.42 | \$177.00   | \$140.00                | \$192.11 | \$200.00 | N/A                     | \$94.00                | \$177.50 | \$231.00       |
| 2002 | \$120.54             | \$157.42 | \$175.00  | \$225.00 | \$145.88         | \$210.00    | \$147.00             | \$206.00                 | \$138.00                  | \$181.00 | \$172.06       | \$178.03 | \$182.00   | \$138.23                | \$214.93 | \$220.00 | N/A                     | \$94.00                | \$179.00 | \$243.00       |
| 2003 | \$127.77             | \$166.87 | \$189.00  | \$232.00 | \$145.88         | \$218.40    | \$153.00             | \$220.00                 | \$159.00                  | \$208.00 | \$189.15       | \$194.54 | \$182.00   | \$148.40                | \$229.93 | \$220.00 | N/A                     | \$95.00                | \$183.00 | \$260.00       |
| 2004 | \$135.44             | \$176.88 | \$205.00  | \$245.00 | \$145.88         | \$227.14    | \$159.00             | \$235.00                 | \$172.00                  | \$225.00 | \$205.84       | \$211.76 | \$192.00   | \$165.18                | \$256.33 | \$220.00 | N/A                     | \$101.00               | \$194.00 | \$278.00       |
| 2005 | \$147.97             | \$193.24 | \$225.00  | \$258.00 | \$148.43         | \$240.80    | \$165.00             | \$249.00                 | \$187.00                  | \$245.00 | \$220.76       | \$227.08 | \$214.00   | \$177.73                | \$275.81 | \$214.00 | N/A                     | \$108.00               | \$207.00 | \$297.00       |
| 2006 | \$161.66             | \$211.11 | \$257.00  | \$283.00 | \$268.46         | \$255.25    | \$171.00             | \$262.00                 | \$206.00                  | \$270.00 | \$233.98       | \$240.68 | \$227.00   | \$196.43                | \$304.83 | \$214.00 | N/A                     | \$117.00               | \$223.00 | \$353.33       |
| 2007 | \$176.61             | \$230.64 | \$287.00  | \$314.00 | \$288.60         | \$278.20    | \$176.00             | \$277.00                 | \$228.00                  | \$299.00 | \$250.22       | \$257.39 | \$265.00   | \$224.91                | \$349.03 | \$214.00 | N/A                     | \$124.00               | \$236.00 | N/A            |
| 2008 | \$196.04             | \$256.01 | \$304.00  | \$325.00 | \$302.16         | \$303.20    | \$178.00             | \$294.00                 | \$255.00                  | \$334.00 | \$262.73       | \$270.26 | \$281.00   | \$238.18                | \$369.62 | \$214.00 | N/A                     | \$128.00               | \$244.00 | N/A            |
| 2009 | \$219.56             | \$286.73 | \$328.00  | \$363.00 | \$317.26         | \$330.50    | \$181.00             | \$314.00                 | \$258.00                  | \$338.00 | \$272.86       | \$287.28 | \$302.00   | \$264.62                | \$410.65 | N/A      | N/A                     | \$134.00               | \$256.00 | N/A            |
| 2010 | \$250.30             | \$326.87 | \$359.00  | \$400.00 | \$348.19         | \$360.25    | \$183.00             | \$353.00                 | \$276.00                  | \$362.00 | \$297.00       | \$313.00 | \$322.00   | \$277.06                | \$429.96 | N/A      | N/A                     | N/A                    | \$282.00 | N/A            |
| 2011 | \$277.83             | \$362.83 | \$384.00  | \$440.00 | \$382.83         | \$392.65    | \$187.00             | \$433.00                 | \$301.00                  | \$395.00 | \$328.00       | \$345.00 | \$347.00   | \$306.05                | \$474.95 | N/A      | N/A                     | N/A                    | \$316.00 | N/A            |
| 2012 | \$294.50             | \$384.60 | \$407.00  | \$470.00 | \$420.92         | \$428.00    | \$193.00             | \$468.00                 | \$312.00                  | \$409.00 | \$351.00       | \$369.00 | \$356.00   | \$327.85                | \$508.77 | N/A      | N/A                     | N/A                    | \$347.00 | N/A            |
| 2013 | \$312.17             | \$407.68 | \$423.00  | \$478.00 | \$433.34         | \$451.55    | \$205.00             | \$506.00                 | \$320.00                  | \$419.00 | \$371.00       | \$391.00 | \$356.00   | \$338.74                | \$525.68 | \$269.00 | N/A                     | N/A                    | \$358.00 | N/A            |
| 2014 | \$329.34             | \$430.10 | \$436.00  | \$491.00 | \$458.12         | \$476.40    | \$223.00             | \$526.00                 | \$334.00                  | \$438.00 | \$380.00       | \$400.00 | \$357.00   | \$345.33                | \$535.91 | \$281.00 | N/A                     | N/A                    | \$371.00 | N/A            |
| 2015 | \$339.22             | \$443.00 | \$420.00  | \$493.00 | \$481.76         | \$502.60    | \$234.00             | \$537.00                 | \$334.00                  | \$438.00 | \$380.00       | \$400.00 | \$371.00   | \$348.83                | \$541.34 | \$287.00 | N/A                     | N/A                    | \$385.00 | N/A            |
| 2016 | \$346.00             | \$451.94 | \$399.00  | \$500.00 | \$493.32         | \$525.20    | \$257.00             | \$548.00                 | \$329.00                  | \$431.00 | \$380.00       | \$400.00 | \$403.00   | \$352.21                | \$546.59 | \$322.00 | N/A                     | N/A                    | \$417.00 | N/A            |
| 2017 | \$349.46             | \$456.45 | \$399.00  | \$512.00 | \$500.97         | \$548.85    | \$266.00             | \$559.00                 | \$337.00                  | \$442.00 | \$383.23       | \$403.40 | \$403.00   | \$360.81                | \$559.93 | \$332.00 | N/A                     | N/A                    | \$417.00 | N/A            |
| 2018 | \$349.46             | \$361.00 | \$540.00  | \$507.23 | \$573.55         | \$274.00    | \$578.50             | \$345.00                 | \$383.23                  | \$432.00 | \$329.31       | \$342.00 | \$301.00   | \$442.00                | N/A      | N/A      | N/A                     | \$442.00               | N/A      | N/A            |
| 2019 | \$356.45             | \$345.00 | \$556.00  | \$532.09 | \$599.35         | \$289.00    | \$599.25             | \$362.00                 | \$398.74                  | \$463.00 | \$346.83       | \$356.00 | \$319.00   | \$485.00                | N/A      | N/A      | N/A                     | \$485.00               | N/A      | N/A            |

<sup>1</sup>Min and max charges shown for member jurisdictions with rates dependent on type of dwelling (e.g. apartments, townhouses, strata units, duplexes if applicable). <sup>2</sup>The City of Richmond discounts rates by 10% if paid on time. N/A – information not available or not applicable

Table 3.7: Metered rates, by member jurisdiction (\$/m<sup>3</sup>)

| Year | Burnaby |         |        | Coquitlam |         |        | Delta   |         |         | Langley City |         |         |             | Langley Township |         |         | Maple Ridge |         |         | New Westminster |         |         | North Vancouver City |         |         | North Vancouver District |         |        |
|------|---------|---------|--------|-----------|---------|--------|---------|---------|---------|--------------|---------|---------|-------------|------------------|---------|---------|-------------|---------|---------|-----------------|---------|---------|----------------------|---------|---------|--------------------------|---------|--------|
|      | First   | Last    | Blocks | First     | Last    | Blocks | First   | Last    | Blocks  | First        | Last    | Blocks  | Residential | First            | Last    | Blocks  | First       | Last    | Blocks  | First           | Last    | Blocks  | First                | Last    | Blocks  | First                    | Last    | Blocks |
| 1985 | \$0.127 | \$0.053 | 5      | \$0.300   | \$0.080 | 5      | N/A     | N/A     | N/A     | N/A          | N/A     | N/A     | N/A         | \$0.066          | \$0.044 | 3       | N/A         | N/A     | N/A     | N/A             | N/A     | N/A     | N/A                  | N/A     | N/A     | \$0.166                  | \$0.071 | 6      |
| 1986 | \$0.134 | \$0.056 | 5      | \$0.300   | \$0.080 | 5      | N/A     | N/A     | N/A     | N/A          | N/A     | N/A     | N/A         | \$0.066          | \$0.044 | 3       | \$0.105     | \$0.069 | 5       | N/A             | N/A     | N/A     | \$0.160              | \$0.070 | 4       | \$0.173                  | \$0.074 | 6      |
| 1987 | \$0.147 | \$0.062 | 5      | \$0.300   | \$0.080 | 5      | N/A     | N/A     | N/A     | N/A          | N/A     | N/A     | N/A         | \$0.066          | \$0.044 | 3       | \$0.121     | \$0.079 | 5       | N/A             | N/A     | N/A     | \$0.160              | \$0.070 | 4       | \$0.194                  | \$0.081 | 6      |
| 1988 | \$0.162 | \$0.069 | 5      | \$0.320   | \$0.090 | 5      | N/A     | N/A     | N/A     | N/A          | N/A     | N/A     | N/A         | \$0.066          | \$0.044 | 3       | \$0.139     | \$0.091 | 5       | N/A             | N/A     | N/A     | \$0.170              | \$0.070 | 4       | \$0.222                  | \$0.091 | 6      |
| 1989 | \$0.179 | \$0.076 | 5      | \$0.350   | \$0.100 | 5      | N/A     | N/A     | N/A     | N/A          | N/A     | N/A     | N/A         | \$0.083          | \$0.055 | 3       | \$0.139     | \$0.091 | 5       | N/A             | N/A     | N/A     | \$0.221              | \$0.094 | 4       | \$0.258                  | \$0.106 | 6      |
| 1990 | \$0.188 | \$0.088 | 4      | \$0.370   | \$0.100 | 5      | N/A     | N/A     | N/A     | N/A          | N/A     | N/A     | N/A         | \$0.083          | \$0.069 | 2       | \$0.139     | \$0.091 | 5       | N/A             | N/A     | N/A     | \$0.243              | \$0.104 | 4       | \$0.395                  | \$0.162 | 6      |
| 1991 | \$0.235 | \$0.130 | 4      | \$0.380   | \$0.180 | 5      | N/A     | N/A     | N/A     | \$0.304      | \$0.172 | 6       | \$0.167     | \$0.083          | 1       | \$0.139 | \$0.091     | 5       | \$0.182 | \$0.078         | 4       | N/A     | N/A                  | N/A     | \$0.224 |                          | 1       |        |
| 1992 | \$0.282 | \$0.179 | 4      | \$0.380   | \$0.210 | 5      | N/A     | N/A     | N/A     | \$0.305      | \$0.198 | 6       | \$0.185     | \$0.086          | 1       | \$0.172 | \$0.113     | 5       | \$0.227 | \$0.097         | 4       | \$0.272 | \$0.113              | 4       | \$0.238 |                          | 1       |        |
| 1993 | \$0.338 | \$0.242 | 2      | \$0.380   | \$0.210 | 5      | N/A     | N/A     | N/A     | \$0.367      | \$0.209 | 6       | \$0.194     | \$0.089          | 1       | \$0.190 | \$0.125     | 5       | \$0.279 | \$0.119         | 4       | \$0.299 | \$0.125              | 4       | \$0.268 |                          | 1       |        |
| 1994 | \$0.338 | \$0.266 | 2      | \$0.400   | \$0.230 | 5      | N/A     | N/A     | N/A     | \$0.409      | \$0.251 | 5       | \$0.363     | \$0.093          | 1       | \$0.216 | \$0.142     | 5       | \$0.308 | \$0.131         | 4       | \$0.314 | \$0.131              | 4       | \$0.287 |                          | 1       |        |
| 1995 | \$0.392 | \$0.329 | 2      | \$0.450   | \$0.170 | 5      | \$0.410 | 1       | N/A     | \$0.876      | \$0.361 | 3       | \$0.363     | \$0.116          | 1       | \$0.235 | \$0.155     | 5       | \$0.369 | \$0.158         | 4       | \$0.362 | \$0.211              | 3       | \$0.339 |                          | 1       |        |
| 1996 | \$0.431 | \$0.362 | 2      | \$0.480   | \$0.170 | 5      | \$0.450 | 1       | N/A     | \$0.400      | 1       | \$0.363 | \$0.146     | 1                | \$0.273 | \$0.180 | 5           | \$0.406 | \$0.173 | 4               | \$0.369 | \$0.243 | 3                    | \$0.427 |         | 1                        |         |        |
| 1997 | \$0.478 | \$0.402 | 2      | \$0.500   | \$0.180 | 5      | \$0.500 | 1       | N/A     | \$0.411      | 1       | \$0.370 | \$0.218     | 1                | \$0.298 | \$0.196 | 5           | \$0.447 | \$0.191 | 4               | \$0.395 | \$0.277 | 3                    | \$0.456 |         | 1                        |         |        |
| 1998 | \$0.454 |         | 1      | \$0.510   | \$0.180 | 5      | \$0.544 | 1       | \$0.870 | \$0.444      | 1       | \$0.400 | \$0.295     | 1                | \$0.323 | \$0.212 | 5           | \$0.460 | \$0.196 | 4               | \$0.396 | \$0.313 | 2                    | \$0.484 |         | 1                        |         |        |
| 1999 | \$0.486 |         | 1      | \$0.530   | \$0.180 | 5      | \$0.558 | 1       | \$0.890 | \$0.611      | 1       | \$0.550 | \$0.317     | 1                | \$0.350 | \$0.281 | 3           | \$0.474 | \$0.202 | 4               | \$0.356 | 1       |                      | \$0.484 |         | 1                        |         |        |
| 2000 | \$0.478 |         | 1      | \$0.550   | \$0.190 | 5      | \$0.572 | 1       | \$0.910 | \$0.700      | 1       | \$0.630 | \$0.317     | 1                | \$0.350 | 1       | \$0.488     | \$0.208 | 4       | \$0.367         | 1       |         | \$0.459              |         | 1       |                          |         |        |
| 2001 | \$0.502 |         | 1      | \$0.550   | \$0.190 | 5      | \$0.592 | 1       | \$0.940 | \$0.770      | 1       | \$0.630 | \$0.323     | 1                | \$0.379 | 1       | \$0.502     | \$0.215 | 4       | \$0.378         | 1       |         | \$0.470              |         | 1       |                          |         |        |
| 2002 | \$0.557 |         | 1      | \$0.551   | \$0.187 | 5      | \$0.640 | 1       | \$1.020 | \$0.740      | 1       | \$0.740 | \$0.330     | 1                | \$0.380 | 1       | \$0.516     | \$0.222 | 4       | \$0.390         | 1       |         | \$0.480              |         | 1       |                          |         |        |
| 2003 | \$0.590 |         | 1      | \$0.598   | \$0.203 | 5      | \$0.660 | 1       | \$1.050 | \$0.740      | 1       | \$0.740 | \$0.330     | 1                | \$0.395 | 1       | \$0.526     | \$0.226 | 4       | \$0.405         | 1       |         | \$0.512              |         | 1       |                          |         |        |
| 2004 | \$0.625 |         | 1      | \$0.649   | \$0.229 | 5      | \$0.700 | 1       | \$1.100 | \$0.740      | 1       | \$0.740 | \$0.330     | 1                | \$0.410 | 1       | \$0.562     | \$0.240 | 4       | \$0.421         | 1       |         | \$0.547              |         | 1       |                          |         |        |
| 2005 | \$0.683 |         | 1      | \$0.713   | \$0.264 | 5      | \$0.650 | \$0.740 | 2       | \$1.160      | \$0.760 | 1       | \$0.760     | \$0.335          | 1       | \$0.435 | 1           | \$0.600 | \$0.258 | 4               | \$0.438 | 1       |                      | \$0.579 |         | 1                        |         |        |
| 2006 | \$0.746 |         | 1      | \$0.780   | \$0.300 | 5      | \$0.650 | \$0.810 | 2       | \$1.270      | \$0.770 | 1       | \$0.770     | \$0.386          | 1       | \$0.461 | 1           | \$0.647 | \$0.280 | 4               | \$0.453 | 1       |                      | \$0.610 |         | 1                        |         |        |
| 2007 | \$0.815 |         | 1      | \$0.810   | \$0.370 | 5      | \$0.650 | \$0.900 | 2       | \$1.410      | \$0.790 | 1       | \$0.790     | \$0.415          | 1       | \$0.503 | 1           | \$0.766 | \$0.332 | 4               | \$0.489 | 1       |                      | \$0.643 |         | 1                        |         |        |
| 2008 | \$0.905 |         | 1      | \$0.830   | \$0.440 | 5      | \$0.650 | \$0.910 | 2       | \$1.420      | \$0.810 | 1       | \$0.810     | \$0.436          | 1       | \$0.548 | 1           | \$0.841 | \$0.364 | 4               | \$0.528 | 1       |                      | \$0.682 |         | 1                        |         |        |
| 2009 | \$1.014 |         | 1      | \$0.758   | \$0.527 | 5      | \$0.690 | \$0.960 | 2       | \$1.510      | \$0.810 | 1       | \$0.810     | \$0.458          | 1       | \$0.597 | 1           | \$0.946 | \$0.410 | 4               | \$0.576 | 1       |                      | \$0.728 |         | 1                        |         |        |
| 2010 | \$1.156 |         | 1      | \$0.748   | \$0.633 | 5      | \$0.710 | \$0.980 | 2       | \$1.550      | \$0.890 | 1       | \$0.890     | \$0.503          | 1       | \$0.651 | 1           | \$1.017 | \$0.441 | 4               | \$0.645 | 1       |                      | \$0.819 |         | 1                        |         |        |
| 2011 | \$1.283 |         | 1      | \$0.698   |         | 1      | \$0.780 | \$1.080 | 2       | \$1.720      | \$0.970 | 1       | \$0.970     | \$0.553          | 1       | \$0.709 | 1           | \$1.130 | \$0.491 | 4               | \$0.731 | 1       |                      | \$1.007 |         | 1                        |         |        |
| 2012 | \$1.360 |         | 1      | \$0.735   |         | 1      | \$0.830 | \$1.160 | 2       | \$1.900      | \$1.030 | 1       | \$1.030     | \$0.608          | 1       | \$0.773 | 1           | \$1.197 | \$0.519 | 4               | \$0.860 | 1       |                      | \$1.088 |         | 1                        |         |        |
| 2013 | \$1.442 |         | 1      | \$0.764   |         | 1      | \$0.85  | \$1.18  | 2       | \$1.96       | \$1.07  | 1       | \$1.07      | \$0.626          | 1       | \$0.816 | 1           | \$1.240 | \$0.537 | 4               | \$0.911 | 1       |                      | \$1.180 |         | 1                        |         |        |
| 2014 | \$1.522 |         | 1      | \$0.787   |         | 1      | \$0.88  | \$1.22  | 2       | \$2.03       | \$1.12  | 1       | \$1.12      | \$0.662          | 1       | \$0.861 | 1           | \$1.314 | \$0.569 | 4               | \$0.989 | 1       |                      | \$1.220 |         | 1                        |         |        |
| 2015 | \$1.568 |         | 1      | \$0.795   |         | 1      | \$0.89  | \$1.23  | 2       | \$2.06       | \$1.14  | 1       | \$1.14      | \$0.696          | 1       | \$0.908 | 1           | \$1.391 | \$0.604 | 4               | \$1.038 | 1       |                      | \$1.250 |         | 1                        |         |        |
| 2016 | \$1.600 |         | 1      | \$0.795   |         | 1      | \$0.91  | \$1.25  | 2       | \$2.11       | \$1.16  | 1       | \$1.16      | \$0.713          | 1       | \$0.949 | 1           | \$1.469 | \$0.636 | 4               | \$1.142 | 1       |                      | \$1.280 |         | 1                        |         |        |
| 2017 | \$1.616 |         | 1      | \$0.795   |         | 1      | \$0.94  | \$1.29  | 2       | \$2.18       | \$1.16  | 1       | \$1.16      | \$0.724          | 1       | \$0.992 | 1           | \$1.529 | \$0.660 | 4               | \$1.179 | 1       |                      | \$1.307 |         | 1                        |         |        |
| 2018 | \$1.616 |         | 1      | \$0.795   |         | 1      | \$0.94  | \$1.29  | 2       | \$2.30       | \$1.46  | 1       | \$1.31      | \$0.733          | 1       | \$1.036 | 1           | \$1.529 | \$0.660 | 4               | \$1.215 | 1       | \$2.18               | \$1.35  | 2       |                          |         |        |
| 2019 | \$1.650 |         | 1      | \$0.810   |         | 1      | \$0.99  | \$1.36  | 2       | \$2.40       | \$1.50  | 1       | \$1.35      | \$0.769          | 1       | \$1.083 | 1           | \$1.621 | \$0.699 | 4               | \$1.282 | 1       | \$2.26               | \$1.40  | 2       |                          |         |        |

Continues next page

Table 3.7 (cont'd): Metered rates by, member jurisdiction (\$/m<sup>3</sup>)

| Year | Pitt Meadows <sup>1</sup> |         |         | Port Coquitlam |         |         | Port Moody |          |         | Richmond <sup>2</sup> |         |         | Surrey  |         |        | Residential | Tsawwassen First Nation |         |           | UEL/UBC <sup>3</sup> |         |         | Vancouver |                |                | West Vancouver |         |         |               |                  |
|------|---------------------------|---------|---------|----------------|---------|---------|------------|----------|---------|-----------------------|---------|---------|---------|---------|--------|-------------|-------------------------|---------|-----------|----------------------|---------|---------|-----------|----------------|----------------|----------------|---------|---------|---------------|------------------|
|      | First                     | Last    | Blocks  | First          | Last    | Blocks  | First      | Last     | Blocks  | First                 | Last    | Blocks  | First   | Last    | Blocks |             | First/Last              | Blocks  | Oct – May | Jun – Sep            | First   | Last    | Blocks    | Oct 1 – May 31 | Jun 1 – Sep 30 | First          | Last    | Blocks  | Constant Rate | MF Constant Rate |
| 1985 | \$0.088                   | \$0.053 | 5       | N/A            | N/A     | N/A     | N/A        | N/A      | N/A     | \$0.284               | \$0.120 | 6       | N/A     | N/A     | N/A    | N/A         |                         |         | N/A       | N/A                  | N/A     | 4       | N/A       | N/A            | \$0.360        | \$0.160        | 4       | N/A     | N/A           |                  |
| 1986 | \$0.088                   | \$0.053 | 5       | N/A            | N/A     | N/A     | N/A        | N/A      | N/A     | \$0.284               | \$0.120 | 6       | N/A     | N/A     | N/A    | N/A         |                         |         | N/A       | N/A                  | \$0.173 | \$0.097 | 4         | N/A            | N/A            | \$0.370        | \$0.170 | 4       | N/A           | N/A              |
| 1987 | \$0.088                   | \$0.053 | 5       | N/A            | N/A     | N/A     | N/A        | N/A      | N/A     | \$0.284               | \$0.120 | 6       | N/A     | N/A     | N/A    | N/A         |                         |         | N/A       | N/A                  | \$0.188 | \$0.106 | 4         | N/A            | N/A            | \$0.400        | \$0.180 | 4       | N/A           | N/A              |
| 1988 | \$0.088                   | \$0.053 | 5       | N/A            | N/A     | N/A     | N/A        | N/A      | N/A     | \$0.284               | \$0.120 | 6       | \$0.265 | \$0.099 | 10     | N/A         |                         |         | N/A       | N/A                  | \$0.215 | \$0.121 | 4         | N/A            | N/A            | \$0.420        | \$0.190 | 4       | N/A           | N/A              |
| 1989 | \$0.088                   | \$0.053 | 5       | N/A            | N/A     | N/A     | N/A        | N/A      | N/A     | \$0.284               | \$0.120 | 6       | \$0.265 | \$0.099 | 10     | N/A         |                         |         | N/A       | N/A                  | \$0.224 | \$0.126 | 4         | N/A            | N/A            | \$0.440        | \$0.200 | 4       | N/A           | N/A              |
| 1990 | \$0.088                   | \$0.053 | 5       | N/A            | N/A     | N/A     | \$0.193    | \$0.121  | 8       | \$0.325               | \$0.133 | 6       | \$0.282 | \$0.106 | 10     | N/A         |                         |         | N/A       | N/A                  | \$0.240 | \$0.135 | 4         | N/A            | N/A            | \$0.470        | \$0.210 | 4       | N/A           | N/A              |
| 1991 | \$0.088                   | \$0.053 | 5       | \$0.307        | \$0.152 | 3       | \$0.207    | \$0.136  | 8       | \$0.370               | \$0.152 | 6       | \$0.318 | \$0.120 | 10     | N/A         |                         |         | N/A       | N/A                  | \$0.260 | \$0.146 | 4         | N/A            | N/A            | \$0.490        | \$0.370 | 3       | N/A           | N/A              |
| 1992 | \$0.154                   | \$0.092 | 5       | \$0.385        | \$0.191 | 3       | \$0.232    | \$0.150  | 8       | \$0.383               | \$0.183 | 5       | \$0.350 | \$0.134 | 10     | N/A         |                         |         | N/A       | N/A                  | \$0.280 | \$0.188 | 4         | N/A            | N/A            | \$0.500        | \$0.410 | 2       | N/A           | N/A              |
| 1993 | \$0.174                   | \$0.106 | 5       | \$0.463        | \$0.230 | 3       | \$0.275    | \$0.179  | 8       | \$0.390               | \$0.200 | 6       | \$0.374 | \$0.145 | 10     | N/A         |                         |         | N/A       | N/A                  | \$0.286 | \$0.223 | 4         | N/A            | N/A            | \$0.270        | \$0.340 | 2       | N/A           | N/A              |
| 1994 | \$0.220                   | \$0.139 | 5       | \$0.526        | \$0.261 | 3       | \$0.286    | \$0.186  | 8       | \$0.370               | \$0.250 | 5       | \$0.400 | \$0.159 | 6      | N/A         |                         |         | N/A       | N/A                  | \$0.293 | \$0.261 | 4         | N/A            | N/A            | \$0.300        | \$0.380 | 2       | N/A           | N/A              |
| 1995 | \$0.152                   | 1       | \$0.565 | \$0.283        | 3       | \$0.311 | \$0.211    | 8        | \$0.370 | \$0.310               | 4       | \$0.470 | \$0.180 | 4       | N/A    |             |                         | \$0.496 | \$0.186   | \$0.303              | 1       | N/A     | N/A       | \$0.300        | \$0.380        | 2              | N/A     | N/A     |               |                  |
| 1996 | \$0.165                   | 1       | \$0.593 | \$0.297        | 3       | \$0.320 | \$0.220    | 8        | \$0.370 | \$0.320               | 2       | \$0.488 | \$0.187 | 4       | N/A    |             |                         | \$0.544 | \$0.205   | \$0.330              | 1       | N/A     | N/A       | \$0.300        | \$0.410        | 2              | N/A     | N/A     |               |                  |
| 1997 | \$0.191                   | 1       | \$0.643 | \$0.321        | 3       | \$0.378 | \$0.261    | 8        | \$0.380 | 1                     | \$0.338 | \$0.249 | 2       | \$0.249 |        |             |                         | \$0.470 | \$0.258   | \$0.370              | 1       | N/A     | N/A       | \$0.230        | \$0.380        | 2              | N/A     | N/A     |               |                  |
| 1998 | \$0.202                   | 1       | \$0.667 | \$0.332        | 3       | \$0.417 | \$0.286    | 8        | \$0.390 | 1                     | \$0.338 | 1       | \$0.250 |         |        |             |                         | \$0.392 | \$0.335   | \$0.395              | 1       | N/A     | N/A       | \$0.230        | \$0.320        | 2              | N/A     | N/A     |               |                  |
| 1999 | \$0.209                   | 1       | \$0.667 | \$0.332        | 3       | \$0.381 | 1          | \$0.413  | 1       | \$0.370               | 1       | \$0.320 |         |         |        |             |                         | \$0.392 |           | \$0.417              | 1       | N/A     | N/A       | \$0.230        | \$0.320        | 2              | N/A     | N/A     |               |                  |
| 2000 | \$0.213                   | 1       | \$0.660 | \$0.332        | 3       | \$0.381 | 1          | \$0.427  | 1       | \$0.350               | 1       | \$0.350 |         |         |        |             |                         | \$0.424 |           | \$0.435              | 1       | N/A     | N/A       | \$0.250        | \$0.340        | 2              | N/A     | N/A     |               |                  |
| 2001 | \$0.220                   | 1       | \$0.660 | \$0.332        | 3       | \$0.385 | 1          | \$0.455  | 1       | \$0.350               | 1       | \$0.350 |         |         |        |             |                         | \$0.438 |           | \$0.447              | 1       | N/A     | N/A       | \$0.260        | \$0.360        | 2              | N/A     | N/A     |               |                  |
| 2002 | \$0.220                   | 1       | \$0.660 | \$0.332        | 3       | \$0.396 | 1          | \$0.504  | 1       | \$0.360               | 1       | \$0.360 |         |         |        |             |                         | \$0.424 |           | \$0.452              | 1       | N/A     | N/A       | \$0.270        | \$0.380        | 2              | N/A     | N/A     |               |                  |
| 2003 | \$0.271                   | 1       | \$0.727 | \$0.364        | 3       | \$0.396 | 1          | \$0.540  | 1       | \$0.370               | 1       | \$0.370 |         |         |        |             |                         | \$0.463 |           | \$0.463              | 1       | N/A     | N/A       | \$0.290        | \$0.410        | 2              | N/A     | N/A     |               |                  |
| 2004 | \$0.293                   | 1       | \$0.851 | \$0.427        | 3       | \$0.427 | 1          | \$0.611  | 1       | \$0.397               | 1       | \$0.397 |         |         |        |             |                         | \$0.525 |           | \$0.491              | 1       | N/A     | N/A       | \$0.310        | \$0.440        | 2              | N/A     | N/A     |               |                  |
| 2005 | \$0.319                   | 1       | \$0.901 | \$0.452        | 3       | \$0.477 | 1          | \$0.658  | 1       | \$0.460               | 1       | \$0.460 |         |         |        |             |                         | \$0.588 |           | \$0.522              | 1       | N/A     | N/A       | \$0.330        | \$0.470        | 2              | N/A     | N/A     |               |                  |
| 2006 | \$0.352                   | 1       | \$0.901 | \$0.452        | 3       | \$0.505 | 1          | \$0.701  | 1       | \$0.460               | 1       | \$0.460 |         |         |        |             |                         | \$0.660 | \$0.712   | \$0.592              | 1       | N/A     | N/A       | \$0.380        | \$0.550        | 2              | N/A     | N/A     |               |                  |
| 2007 | \$0.392                   | 1       | \$1.010 | \$0.509        | 3       | \$0.590 | 1          | \$0.753  | 1       | \$0.530               | 1       | \$0.530 |         |         |        |             |                         | \$0.766 | \$0.888   | \$0.596              | 1       | N/A     | N/A       | \$0.420        | \$0.780        | 3              | \$0.490 | \$0.560 |               |                  |
| 2008 | \$0.438                   | 1       | \$1.081 | \$0.544        | 3       | \$0.625 | 1          | \$0.798  | 1       | \$0.590               | 1       | \$0.590 |         |         |        |             |                         | \$0.814 | \$1.018   | \$0.615              | 1       | N/A     | N/A       | \$0.470        | \$0.880        | 3              | \$0.580 | \$0.670 |               |                  |
| 2009 | \$2.250                   | 1       | \$1.204 | \$0.607        | 3       | \$0.671 | 1          | \$0.886  | 1       | \$0.660               | 1       | \$0.660 |         |         |        |             |                         | \$0.942 | \$1.178   | \$0.645              | 1       | N/A     | N/A       | \$0.530        | \$0.970        | 3              | \$0.640 | \$0.730 |               |                  |
| 2010 | \$2.570                   | 1       | \$1.314 | \$0.664        | 3       | \$0.717 | 1          | \$0.928  | 1       | \$0.745               | 1       | \$0.745 |         |         |        |             |                         | \$1.054 | \$1.319   | \$0.710              | 1       | N/A     | N/A       | \$0.670        | \$1.110        | 3              | \$0.770 | \$0.780 |               |                  |
| 2011 | \$0.565                   | 1       | \$1.448 | \$0.731        | 3       | \$0.773 | 1          | \$1.025  | 1       | \$0.745               | 1       | \$0.745 |         |         |        |             |                         | \$1.202 | \$1.503   | \$0.795              | 1       | N/A     | N/A       | \$0.740        | \$1.400        | 3              | \$0.880 | \$0.880 |               |                  |
| 2012 | \$0.598                   | 1       | \$1.547 | \$0.780        | 3       | \$0.795 | 1          | \$1.118  | 1       | \$0.815               | 1       | \$0.815 |         |         |        |             |                         | \$1.272 | \$1.591   | N/A                  | 1       | \$0.790 | \$0.990   | \$0.830        | \$1.490        | 3              | \$0.950 | \$0.950 |               |                  |
| 2013 | \$0.616                   | 1       | \$1.642 | \$0.830        | 3       | \$0.795 | 1          | \$1.1978 | 1       | \$0.822               | 1       | \$0.822 |         |         |        |             |                         | \$1.288 | \$1.611   | N/A                  | N/A     | \$0.842 | \$1.055   | \$0.90         | \$1.56         | 3              | \$1.02  | \$1.02  |               |                  |
| 2014 | \$0.630                   | 1       | \$1.681 | \$0.851        | 3       | \$0.833 | 1          | \$1.2333 | 1       | \$0.871               | 1       | \$0.871 |         |         |        |             |                         | \$1.340 | \$1.675   | N/A                  | N/A     | \$0.876 | \$1.098   | \$0.96         | \$1.65         | 3              | \$1.10  | \$1.10  |               |                  |
| 2015 | \$0.640                   | 1       | \$1.681 | \$0.851        | 3       | \$0.865 | 1          | \$1.2456 | 1       | \$0.895               | 1       | \$0.895 |         |         |        |             |                         | \$1.362 | \$1.702   | N/A                  | N/A     | \$0.913 | \$1.144   | \$1.04         | \$1.73         | 3              | \$1.20  | \$1.20  |               |                  |
| 2016 | \$0.650                   | 1       | \$1.681 | \$0.851        | 3       | \$0.964 | 1          | \$1.2578 | 1       | \$0.930               | 1       | \$0.930 |         |         |        |             |                         | \$1.387 | \$1.734   | N/A                  | N/A     | \$0.949 | \$1.190   | \$1.09         | \$1.83         | 3              | \$1.26  | \$1.26  |               |                  |
| 2017 | \$0.670                   | 1       | \$1.695 | \$0.858        | 3       | \$1.006 | 1          | \$1.2878 | 1       | \$0.966               | 1       | \$0.966 |         |         |        |             |                         | \$1.413 | \$1.789   | N/A                  | N/A     | \$0.814 | \$1.020   | \$1.15         | \$1.93         | 3              | \$1.33  | \$1.33  |               |                  |
| 2018 | \$0.700                   | 1       | \$1.247 | \$0.599        | 4       | \$1.006 | 1          | \$1.1757 | 1       | \$1.084               | 1       | \$1.084 |         |         |        |             |                         | \$0.948 | 1         | \$1.480              | \$1.860 | N/A     | N/A       | \$1.006        | \$1.261        | \$1.15         | \$2.50  | 4       | \$1.46        | \$1.46           |
| 2019 | \$0.740                   | 1       | \$1.296 | \$0.314        | 4       | \$1.077 | 1          | \$1.2382 | 1       | \$1.240               | 1       | \$1.240 |         |         |        |             |                         | \$1.003 | 1         | \$1.570              | \$1.970 | N/A     | N/A       | \$1.100        | \$1.383        | \$1.27         | \$2.76  | 4       | \$1.61        | \$1.61           |

Note: "First" and "Last" - block rates in an inclining or declining block rate structure; "Blocks" - the total number of rate blocks per pricing structure. <sup>1</sup>The City of Pitt Meadows blocks refer to ICI customers. Until 1995, residential and farm customers were charged the last block rate for all consumption. <sup>2</sup>The City of Richmond discounts rates by 10% if paid on time. <sup>3</sup>Rates shown for 2002 – 2005 and 2009 – 2012 are for UBC Utilities; UEL data was unavailable.

Table 3.8: Sewer rates tied to water consumption, by member jurisdiction (\$/m<sup>3</sup>)

| Year | Burnaby |         |        |      | Coquitlam |         |        |      | Delta <sup>1</sup> |     | Langley City |            |     | Langley Township |     | Maple Ridge |         |        |      |
|------|---------|---------|--------|------|-----------|---------|--------|------|--------------------|-----|--------------|------------|-----|------------------|-----|-------------|---------|--------|------|
|      | First   | Last    | Blocks | %    | First     | Last    | Blocks | %    | Rate               | %   | Residential  | Commercial | %   | Rate             | %   | First       | Last    | Blocks | %    |
| 1995 | \$0.465 | \$0.255 | 4      | 100% | \$0.390   | \$0.33  | 2      | 100% | \$0.280            | 80% | N/A          | N/A        | N/A | \$0.942          | 80% | \$0.364     | \$0.240 | 5      | 100% |
| 1996 | \$0.502 | \$0.275 | 4      | 100% | \$0.410   | \$0.35  | 2      | 100% | \$0.350            | 80% | \$0.053      | \$0.363    | 80% | \$0.880          | 80% | \$0.366     | \$0.241 | 5      | 100% |
| 1997 | \$0.532 | \$0.292 | 4      | 100% | \$0.500   | \$0.43  | 2      | 100% | \$0.440            | 80% | \$0.189      | \$0.396    | 80% | \$0.739          | 80% | \$0.366     | \$0.241 | 5      | 100% |
| 1998 | \$0.559 | \$0.307 | 4      | 100% | \$0.500   | \$0.43  | 2      | 100% | \$0.493            | 80% | \$0.268      | \$0.396    | 80% | \$0.750          | 80% | \$0.365     | \$0.240 | 5      | 100% |
| 1999 | \$0.576 | \$0.316 | 4      | 100% | \$0.500   | \$0.43  | 2      | 100% | \$0.541            | 80% | N/A          | \$0.396    | 80% | \$0.750          | 80% | \$0.357     | \$0.287 | 3      | 100% |
| 2000 | N/A     | N/A     | N/A    | N/A  | \$0.530   | \$0.45  | 2      | 100% | \$0.557            | 80% |              | \$0.268    | 80% | \$0.750          | 80% |             | \$0.345 | 1      | 100% |
| 2001 | N/A     | N/A     | N/A    | N/A  | \$0.530   | \$0.45  | 2      | 100% | \$0.568            | 80% |              | \$0.450    | 80% | \$0.770          | 80% |             | \$0.357 | 1      | 100% |
| 2002 | N/A     | N/A     | N/A    | N/A  | \$0.511   | \$0.44  | 2      | 100% | \$0.580            | 80% |              | \$0.530    | 80% | \$0.788          | 80% |             | \$0.358 | 1      | 100% |
| 2003 | N/A     | N/A     | N/A    | N/A  | \$0.526   | \$0.45  | 2      | 100% | \$0.580            | 80% |              | \$0.650    | 80% | \$0.753          | 80% |             | \$0.288 | 1      | 100% |
| 2004 | N/A     | N/A     | N/A    | N/A  | \$0.539   | \$0.46  | 2      | 100% | \$0.590            | 80% |              | \$0.650    | 80% | \$0.753          | 80% |             | \$0.298 | 1      | 100% |
| 2005 | N/A     | N/A     | N/A    | N/A  | \$0.571   | \$0.49  | 2      | 100% | \$0.590            | 80% |              | \$0.650    | 80% | \$0.753          | 80% |             | \$0.317 | 1      | 100% |
| 2006 | \$0.722 | \$0.396 | 4      | 100% | \$0.610   | \$0.52  | 2      | 100% | \$0.600            | 80% |              | \$0.650    | 80% | \$0.770          | 80% |             | \$0.335 | 1      | 100% |
| 2007 | \$0.736 | \$0.404 | 4      | 100% | \$0.630   | \$0.56  | 2      | 100% | \$0.620            | 80% |              | \$0.670    | 80% | \$0.780          | 80% |             | \$0.353 | 1      | 100% |
| 2008 | \$0.795 | \$0.436 | 4      | 100% | \$0.630   | \$0.57  | 2      | 100% | \$0.640            | 80% |              | \$0.710    | 80% | \$0.820          | 80% |             | \$0.370 | 1      | 100% |
| 2009 | \$0.867 | \$0.475 | 4      | 100% | \$0.608   | \$0.57  | 2      | 100% | \$0.690            | 80% |              | \$0.720    | 80% | \$0.861          | 80% |             | \$0.389 | 1      | 100% |
| 2010 | \$0.941 | \$0.515 | 4      | 100% | \$0.624   | \$0.61  | 2      | 100% | \$0.710            | 80% |              | \$0.770    | 80% | \$0.945          | 80% |             | \$0.408 | 1      | 100% |
| 2011 | \$1.012 | \$0.554 | 4      | 100% |           | \$0.614 | 2      | 100% | \$0.740            | 80% |              | \$0.780    | 80% | \$0.982          | 80% |             | \$0.429 | 1      | 100% |
| 2012 | \$1.200 | \$0.660 | 4      | 100% |           | \$0.632 | 2      | 100% | \$0.800            | 80% |              | \$0.840    | 80% | \$1.000          | 80% |             | \$0.450 | 1      | 100% |
| 2013 | \$1.137 | \$0.622 | 4      | 100% |           | \$0.645 | 1      | 100% | \$0.87             | 80% |              | \$0.880    | 80% | \$1.000          | 80% |             | \$0.471 | 1      | 100% |
| 2014 | \$1.200 | \$0.660 | 4      | 100% |           | \$0.667 | 1      | 100% | \$0.92             | 80% |              | \$0.900    | 80% | \$1.030          | 80% |             | \$0.492 | 1      | 100% |
| 2015 | \$1.240 | \$0.680 | 4      | 100% |           | \$0.687 | 1      | 100% | \$0.97             | 80% |              | \$0.940    | 80% | \$1.098          | 80% |             | \$0.515 | 1      | 100% |
| 2016 | \$1.259 | \$0.690 | 4      | 100% |           | \$0.701 | 1      | 100% | \$0.99             | 80% |              | \$0.980    | 80% | \$1.124          | 80% |             | \$0.533 | 1      | 100% |
| 2017 | \$1.272 | \$0.697 | 4      | 100% |           | \$0.736 | 1      | 100% | \$1.06             | 80% |              | \$1.040    | 80% | \$1.190          | 80% |             | \$0.553 | 1      | 100% |
| 2018 | N/A     | N/A     | N/A    | 80%  |           | \$0.760 | 2      | 100% | \$1.08             | 80% |              | \$1.190    | 80% | \$1.224          | 80% |             | \$0.572 | 1      | 100% |
| 2019 | N/A     | N/A     | N/A    | 80%  |           | \$0.80  | 2      | 100% | \$1.08             | 80% |              | \$1.50     | 80% | \$1.356          | 80% |             | \$1.614 | 1      | 100% |

| Year | New Westminster <sup>1,2</sup> |         |        |     | North Vancouver City |         |        |      | Port Moody <sup>2</sup> |         |        |     | Richmond |      | Surrey <sup>1</sup> |     | Tsawwassen First Nation |      |
|------|--------------------------------|---------|--------|-----|----------------------|---------|--------|------|-------------------------|---------|--------|-----|----------|------|---------------------|-----|-------------------------|------|
|      | First                          | Last    | Blocks | %   | First                | Last    | Blocks | %    | First                   | Last    | Blocks | %   | Rate     | %    | Rate                | %   | Rate                    | %    |
| 1995 | \$0.832                        | \$0.146 | 4      | N/A | \$0.361              | \$0.196 | 3      | 100% | \$0.145                 | \$0.106 | 8      | N/A | N/A      | N/A  | N/A                 | N/A | N/A                     | N/A  |
| 1996 | \$0.791                        | \$0.161 | 4      | N/A | \$0.399              | \$0.232 | 3      | 100% | \$0.152                 | \$0.113 | 8      | 60% | N/A      | 100% | \$0.220             | 80% | N/A                     | N/A  |
| 1997 | \$0.870                        | \$0.177 | 4      | 80% | \$0.439              | \$0.272 | 3      | 100% | \$0.173                 | \$0.131 | 8      | 60% | N/A      | 100% | \$0.220             | 80% | N/A                     | N/A  |
| 1998 | \$0.896                        | \$0.182 | 4      | 80% | \$0.457              | \$0.332 | 2      | 100% | \$0.215                 | \$0.162 | 8      | 60% | N/A      | 100% | \$0.220             | 80% | N/A                     | N/A  |
| 1999 | \$0.914                        | \$0.186 | 4      | 80% | \$0.457              | \$0.332 | 2      | 100% | N/A                     | N/A     | N/A    | N/A | N/A      | 100% | \$0.350             | 80% | N/A                     | N/A  |
| 2000 | N/A                            | N/A     | N/A    | N/A |                      | \$0.471 | 1      | 100% |                         | \$0.198 | 1      | 60% | N/A      | 100% | \$0.400             | 80% | N/A                     | N/A  |
| 2001 | N/A                            | N/A     | N/A    | N/A |                      | \$0.485 | 1      | 100% |                         | \$0.198 | 1      | 60% | N/A      | 100% | \$0.400             | 80% | N/A                     | N/A  |
| 2002 | \$0.973                        | \$0.198 | 4      | 80% |                      | \$0.497 | 1      | 100% |                         | \$0.371 | 1      | 60% | N/A      | 100% | \$0.500             | 80% | N/A                     | N/A  |
| 2003 | \$0.993                        | \$0.202 | 4      | 80% |                      | \$0.510 | 1      | 100% |                         | \$0.371 | 1      | 60% | N/A      | 100% | \$0.500             | 80% | N/A                     | N/A  |
| 2004 | \$1.022                        | \$0.208 | 4      | 80% |                      | \$0.530 | 1      | 100% |                         | \$0.385 | 1      | 60% | \$0.500  | 100% | \$0.560             | 80% | N/A                     | N/A  |
| 2005 | \$1.083                        | \$0.220 | 4      | 80% |                      | \$0.547 | 1      | 100% |                         | \$0.389 | 1      | 60% | \$0.505  | 100% | \$0.560             | 80% | N/A                     | N/A  |
| 2006 | \$1.137                        | \$0.230 | 4      | 80% |                      | \$0.563 | 1      | 100% |                         | \$0.392 | 1      | 80% | \$0.559  | 100% | \$0.560             | 80% | N/A                     | N/A  |
| 2007 | \$1.222                        | \$0.247 | 4      | 80% |                      | \$0.605 | 1      | 100% |                         | \$0.413 | 1      | 80% | \$0.598  | 100% | \$0.570             | 80% | N/A                     | N/A  |
| 2008 | \$1.342                        | \$0.272 | 4      | 80% |                      | \$0.654 | 1      | 100% |                         | \$0.452 | 1      | 80% | \$0.619  | 100% | \$0.580             | 80% | N/A                     | N/A  |
| 2009 | \$1.421                        | \$0.289 | 4      | 80% |                      | \$0.700 | 1      | 100% |                         | \$0.505 | 1      | 80% | N/A      | N/A  | \$0.610             | 80% | N/A                     | N/A  |
| 2010 | \$1.475                        | \$0.300 | 4      | 80% |                      | \$0.800 | 1      | 100% |                         | \$0.551 | 1      | 80% | N/A      | N/A  | \$0.630             | 80% | N/A                     | N/A  |
| 2011 | \$1.555                        | \$0.316 | 4      | 80% |                      | \$0.900 | 1      | 100% |                         | \$0.618 | 1      | 80% | N/A      | N/A  | \$0.718             | 80% | N/A                     | N/A  |
| 2012 | \$1.674                        | \$0.339 | 4      | 80% |                      | \$1.056 | 1      | 100% |                         | \$0.636 | 1      | 80% | N/A      | N/A  | \$0.760             | 80% | N/A                     | N/A  |
| 2013 | \$1.833                        | \$0.371 | 4      | 80% |                      | \$1.077 | 1      | 100% |                         | \$0.636 | 1      | 80% | N/A      | N/A  | \$0.809             | 80% | N/A                     | N/A  |
| 2014 | \$1.988                        | \$0.403 | 4      | 80% |                      | \$1.140 | 1      | 100% |                         | \$0.667 | 1      | 80% | N/A      | N/A  | \$0.869             | 80% | N/A                     | N/A  |
| 2015 | \$2.137                        | \$0.433 | 4      | 80% |                      | \$1.180 | 1      | 100% |                         | \$0.689 | 1      | 80% | N/A      | N/A  | \$0.906             | 80% | N/A                     | N/A  |
| 2016 | \$2.298                        | \$0.465 | 4      | 80% |                      | \$1.219 | 1      | 100% |                         | \$0.689 | 1      | 80% | N/A      | N/A  | \$0.937             | 80% | N/A                     | N/A  |
| 2017 | \$2.459                        | \$0.498 | 4      | 80% |                      | \$1.277 | 1      | 100% |                         | \$0.689 | 1      | 80% | N/A      | N/A  | \$0.990             | 80% | N/A                     | N/A  |
| 2018 | N/A                            | \$1.508 | 5      | 80% |                      | \$1.418 | 1      | 100% |                         | N/A     | N/A    | N/A | \$1.160  | 100% | \$1.08              | 80% | \$1.138                 | 120% |
| 2019 | N/A                            | \$1.614 | 5      | 80% |                      | \$1.588 | 1      | 100% |                         | N/A     | N/A    | N/A | \$1.110  | 100% | \$1.240             | 80% | \$1.204                 | 120% |

Note: "First" or "Last" - block in an inclining/ declining block rate structure; "Blocks" - number of blocks per pricing structure. "% of water consumption used to bill for sewer charges." <sup>1</sup>The Cities of Delta, New Westminster, and Surrey sewer rates are also subject to a minimum charge. <sup>2</sup>Some City of New Westminster customers have sewer meters and are charged based on measured sewage volume.

### 3.4. Regional Water Consumption Trends

This section summarizes water consumption in the region. Member jurisdiction metering data was analyzed and compiled to produce statistics for the region provided in this section.

It is important to note that not all metering data was received in some years during the study period, especially in the period of 1985 to 1993 when less than 95% of GVWD supplied water was accounted for in the reporting of data by the member jurisdictions. Refer to Table 3.9 for an estimated percent reporting of data (based on volume). These information gaps may appear as an overestimation of unmetered consumption for those years, which should be taken into account when considering the results presented in this section. In 2019, most members have provided data, represented in the following tables and charts.

#### 3.4.1. Regional Consumption and Population Trends

Figure 3.8 shows total annual water consumption in the region from 1985 to 2019, along with estimates of the population serviced by the GVWD and member jurisdictions. Between 1985 and 2019, the regional population increased by 54%, from 1.2 million in 1985 to 2.65 million in 2019. For the same period, the population serviced by GVWD increased by 50% to 2.57 million in 2019, while the percentage of population serviced per year has dropped to 97% of the regional population. Overall, annual drinking water consumption increased by 12%, from 349 million m<sup>3</sup> in 1985 to 397 million m<sup>3</sup> in 2019.

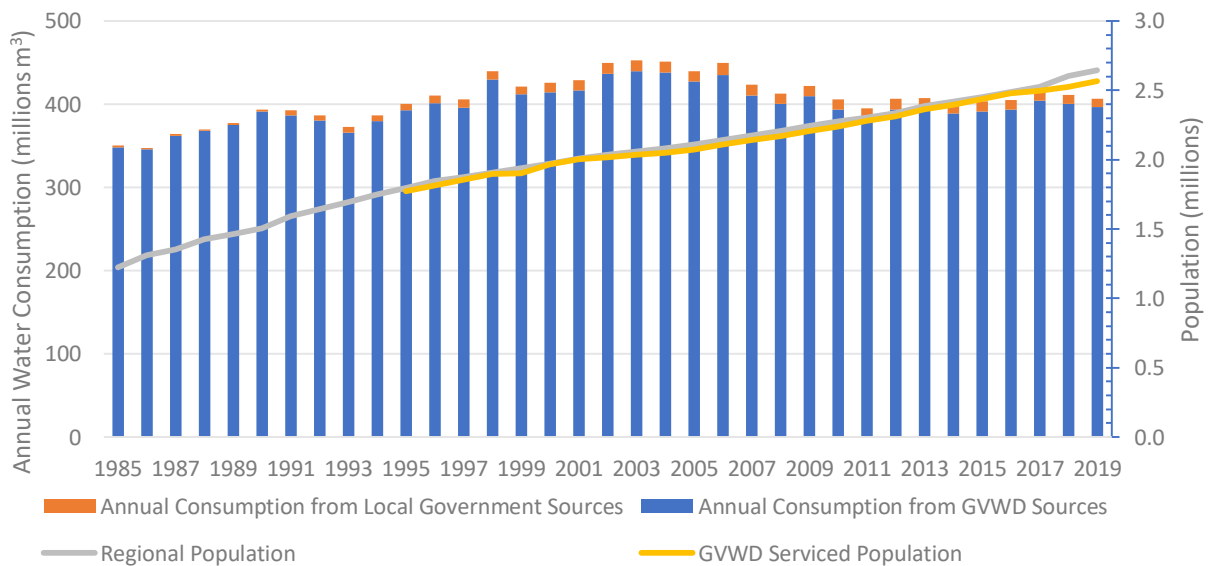


Figure 3.8: Total annual GVWD water consumption and serviced population

Note: Annual consumption values are taken from GVWD records of total supplied volumes and include losses of member jurisdiction system and unmetered consumption.

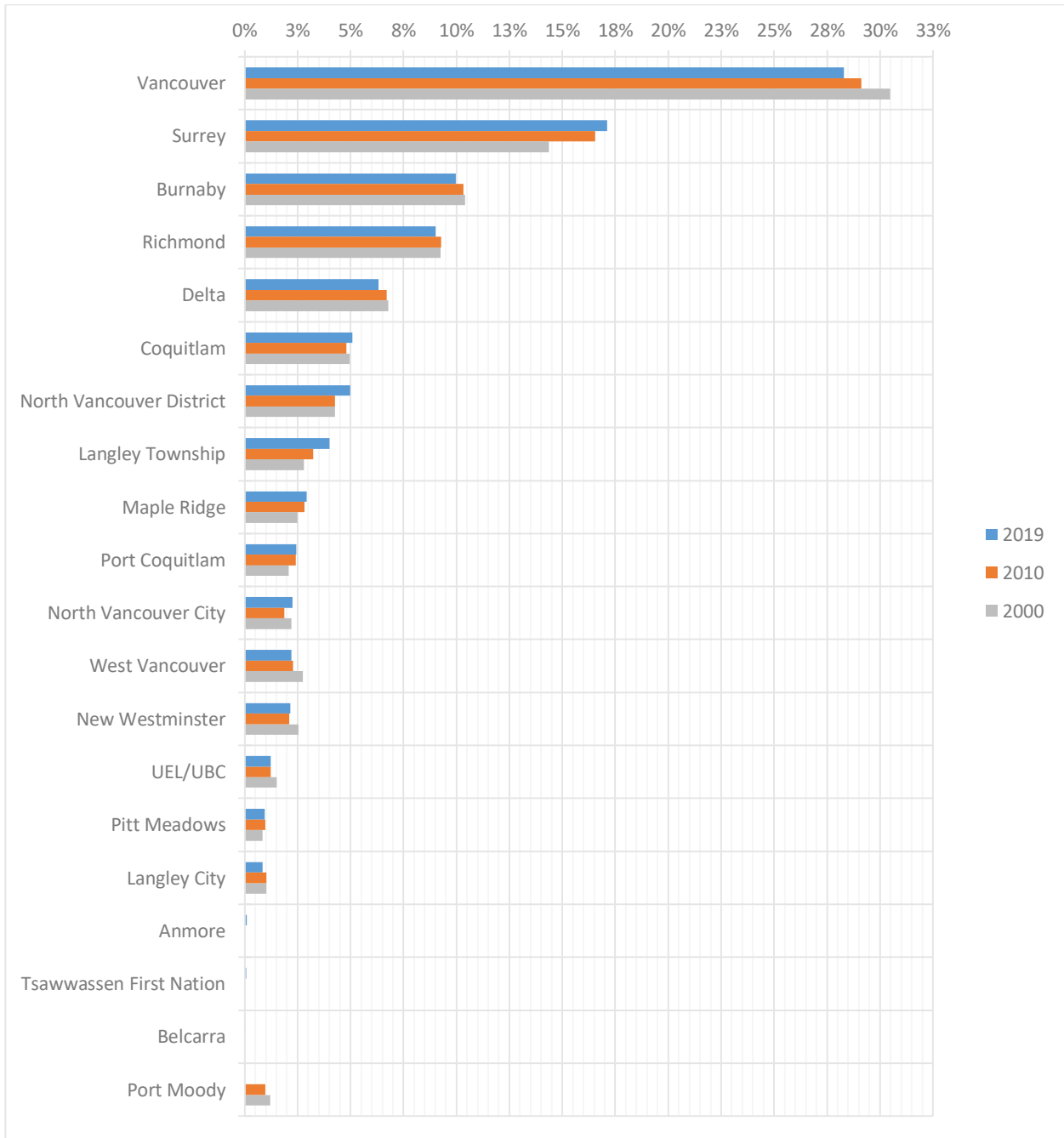


Figure 3.9: Proportional consumption of GVWD supplied water in 2019, by member jurisdiction

Note: The City of Delta, the Township of Langley, and the District of West Vancouver supplement GVWD supplied water with member jurisdiction water sources. During 2019, approximately 2%, 39%, and 40% of total annual water consumed in these three member jurisdictions respectively were derived from non-GVWD sources (not represented in this figure).



### 3.4.2. Unmetered vs. Metered Consumption

The figures below show the proportion of metered vs unmetered water consumption based on volume in the region and for each member jurisdiction.

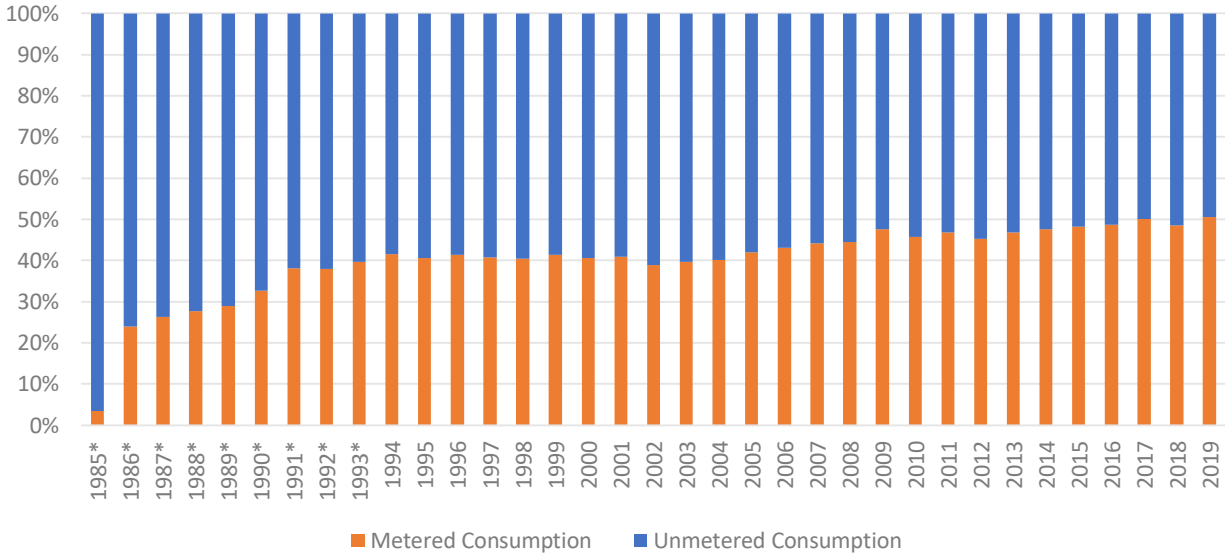


Figure 3.10: Proportion of metered and unmetered consumption in the GVWD region

\*data received for the report represented less than 95% of total consumption.

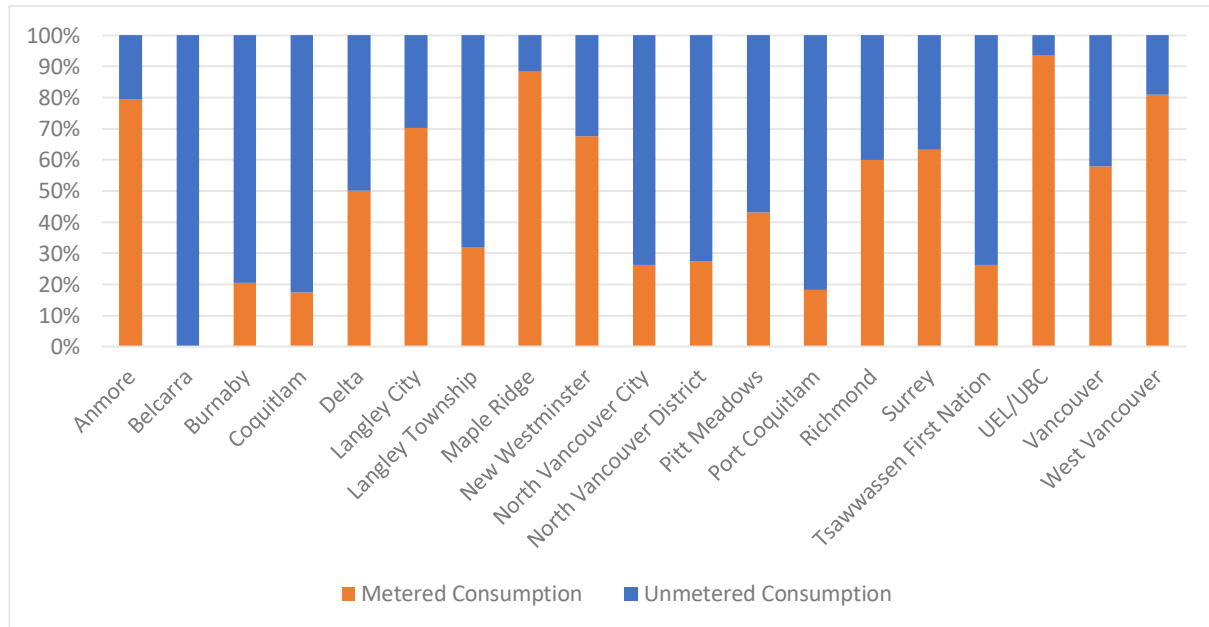


Figure 3.11: Proportion of metered and unmetered consumption in 2019, by member jurisdiction

Note: The City of Langley, the University Endowment Lands and UBC, and the District of West Vancouver are universally metered. Unmetered consumption shown for these member jurisdictions represents system losses and data requires further verification.

### 3.4.3. Regional Water Consumption by Sector

Figure 3.12 illustrates overall water consumption by sector in the region from 1985 to 2019, based on metering data from the member jurisdictions. An apparent increase in metered single-family and multi-family residential consumption can be seen throughout the study period, which can be attributed to the increase in residential metering in the region rather than increased consumption. Metered ICI (industrial, commercial, institutional, and agricultural) consumption has remained steady, with slight decreases since the mid-2000s. Unmetered consumption is provided as a bulk category because the lack of data prevented per sector categorization of unmetered water use. For example, a significant information gap exists in the residential sector where the number of unmetered single-family and multi-family connections is not yet defined for any member jurisdictions that are not universally metered.

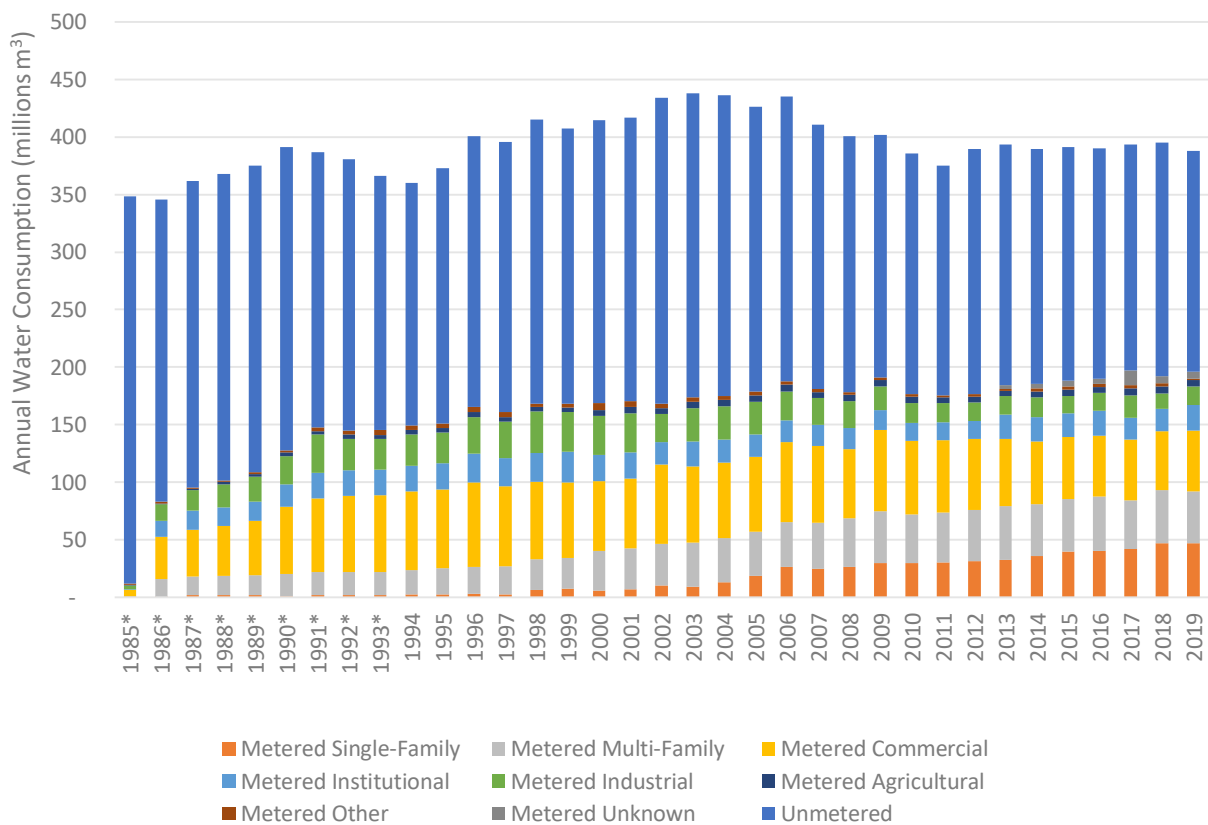


Figure 3.12: Water consumption by sector in the GVWD region

\*Data received for the report represented less than 95% of total consumption.

The following figures, Figure 3.13 to Figure 3.21 provide details of average consumption per connection type or sector, by member jurisdiction in 2019.

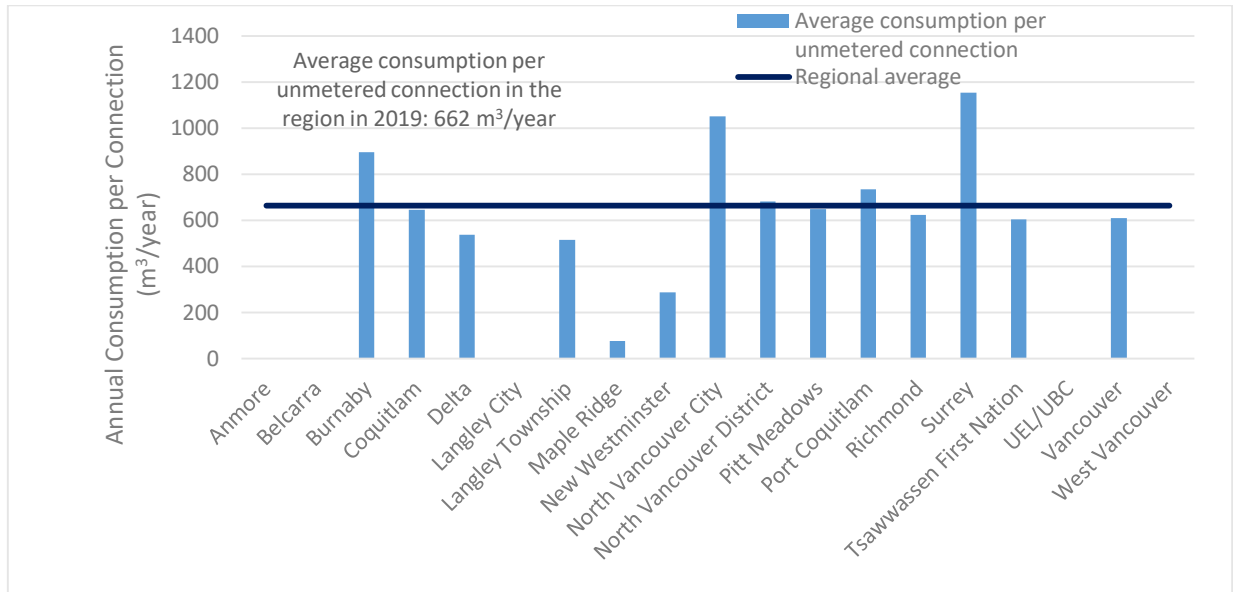


Figure 3.13: Unmetered water consumption in 2019, by member jurisdiction.

Note: Unmetered consumption includes single-family and multi-family, system losses, and other unmetered sectors.

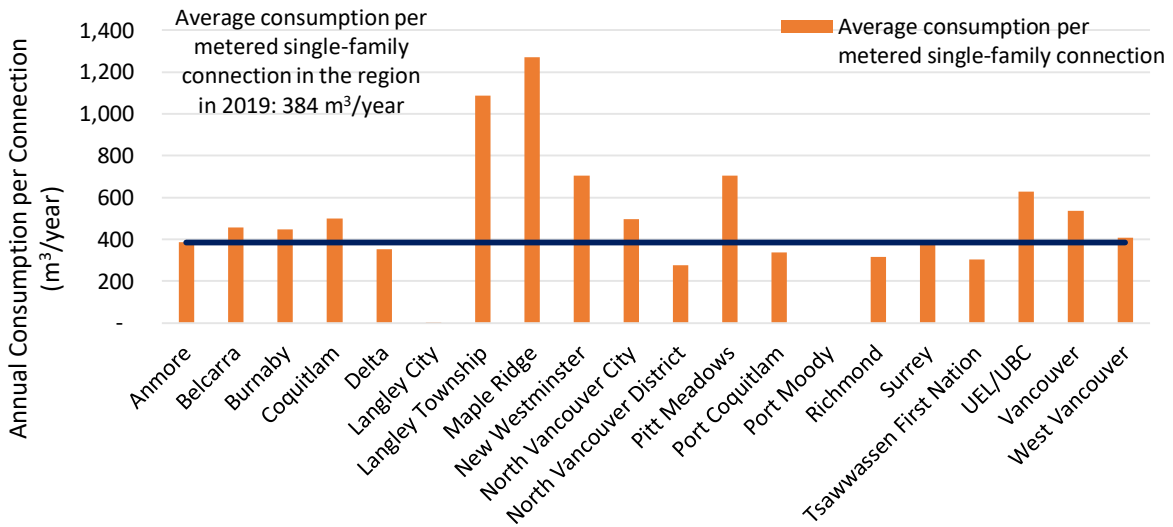


Figure 3.14: Metered single-family water consumption in 2019, by member jurisdiction

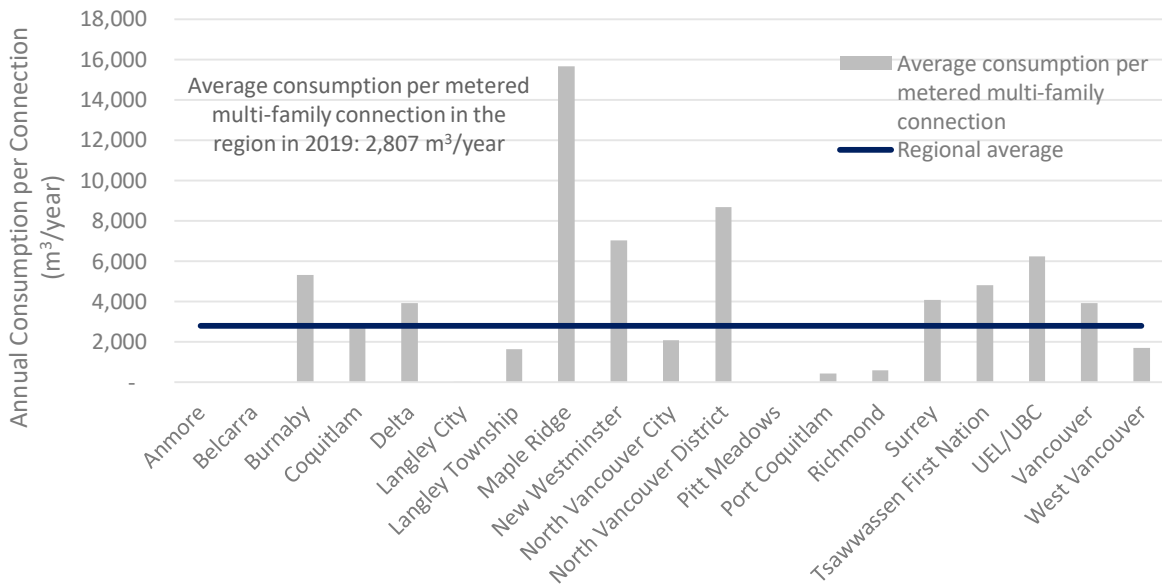


Figure 3.15: Metered multi-family water consumption in 2019, by member jurisdiction

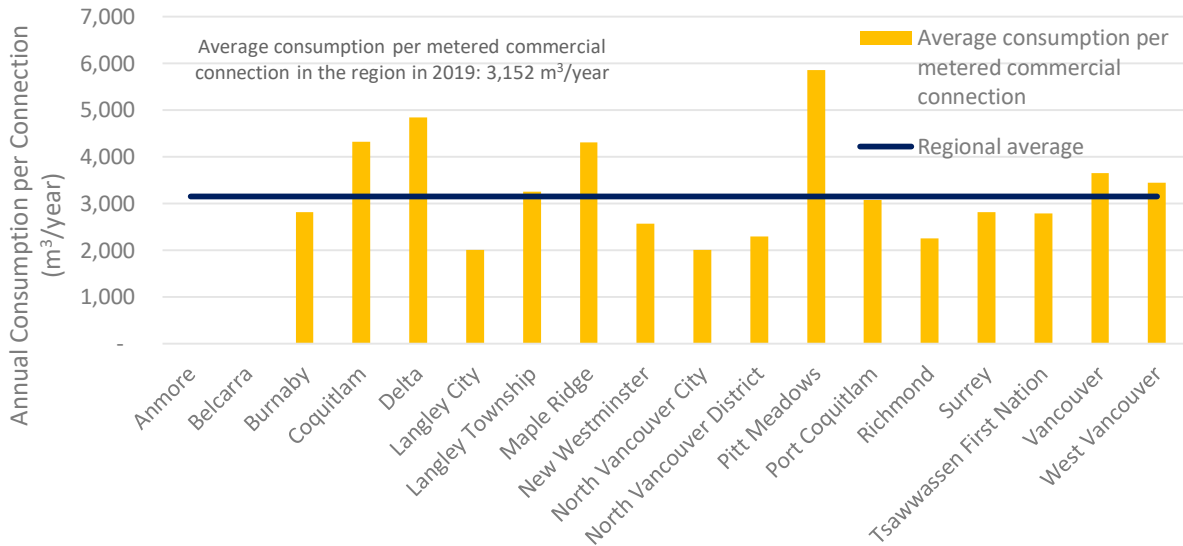


Figure 3.16: Metered commercial water consumption in 2019, by member jurisdiction

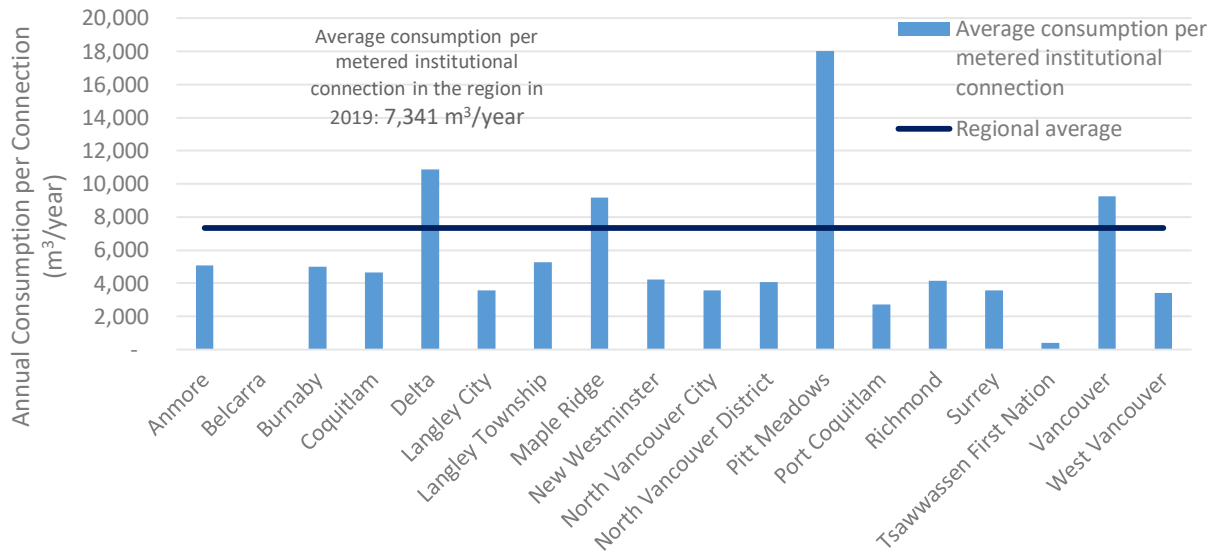


Figure 3.17: Metered Institutional water consumption in 2019, by member jurisdiction

Note: UEL/UBC not shown for clarity (355,518 m<sup>3</sup> annual consumption per connection, Institutional sector).

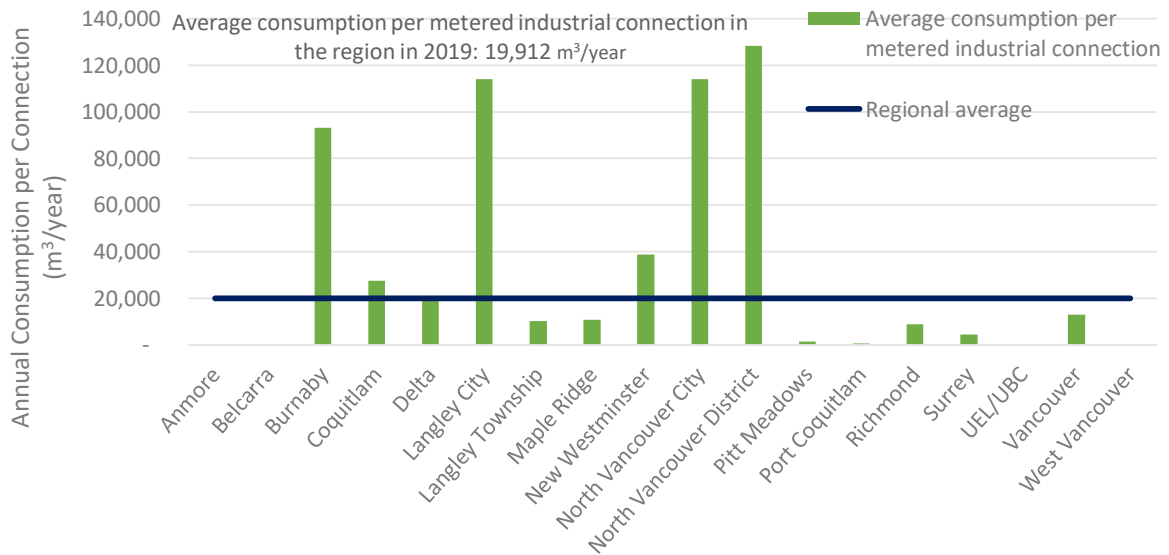


Figure 3.18: Metered industrial water consumption in 2019, by member jurisdiction.

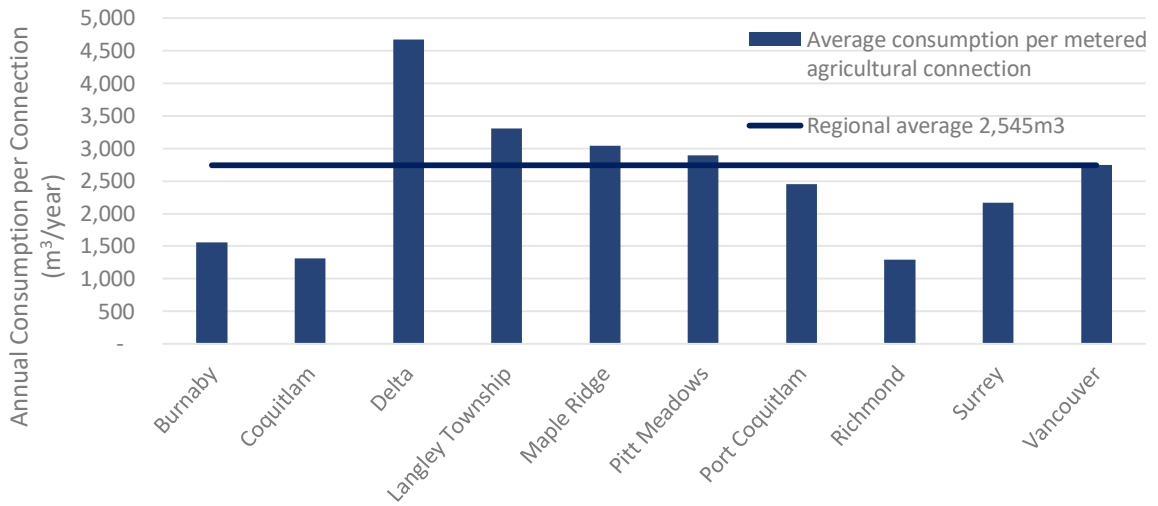


Figure 3.19: Metered Agricultural water consumption in 2019, by member jurisdiction with agricultural connections.

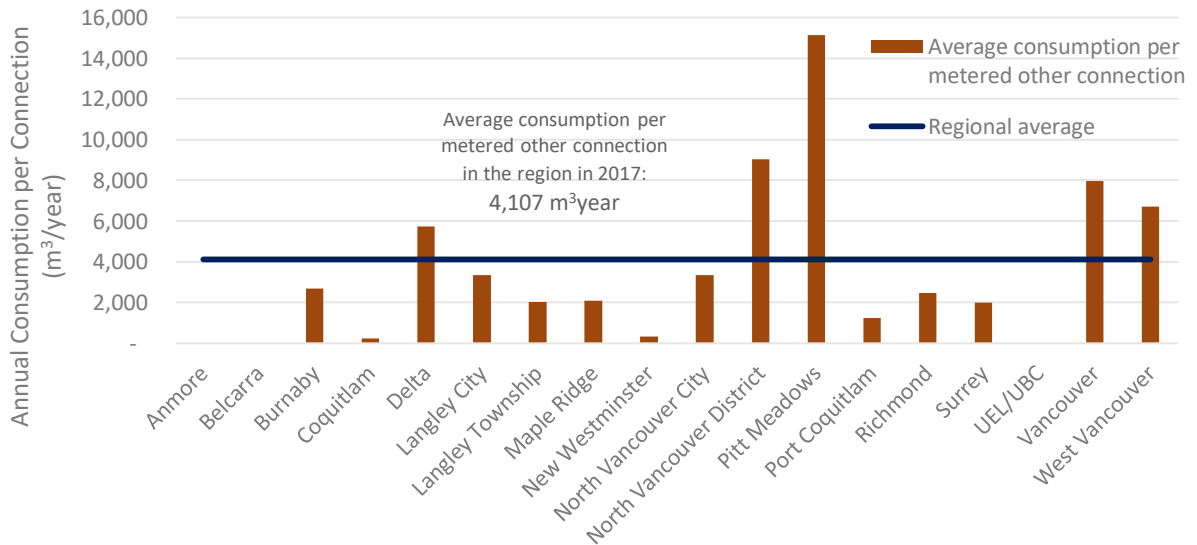


Figure 3.20: Metered "Other" water consumption in 2019, by member jurisdiction.

Note: Pitt Meadows consumption per metered 'Other' connection includes Katzie First Nation lands (total consumption of 36,672m<sup>3</sup> in 2019, comprises single family residential, commercial and industrial uses).

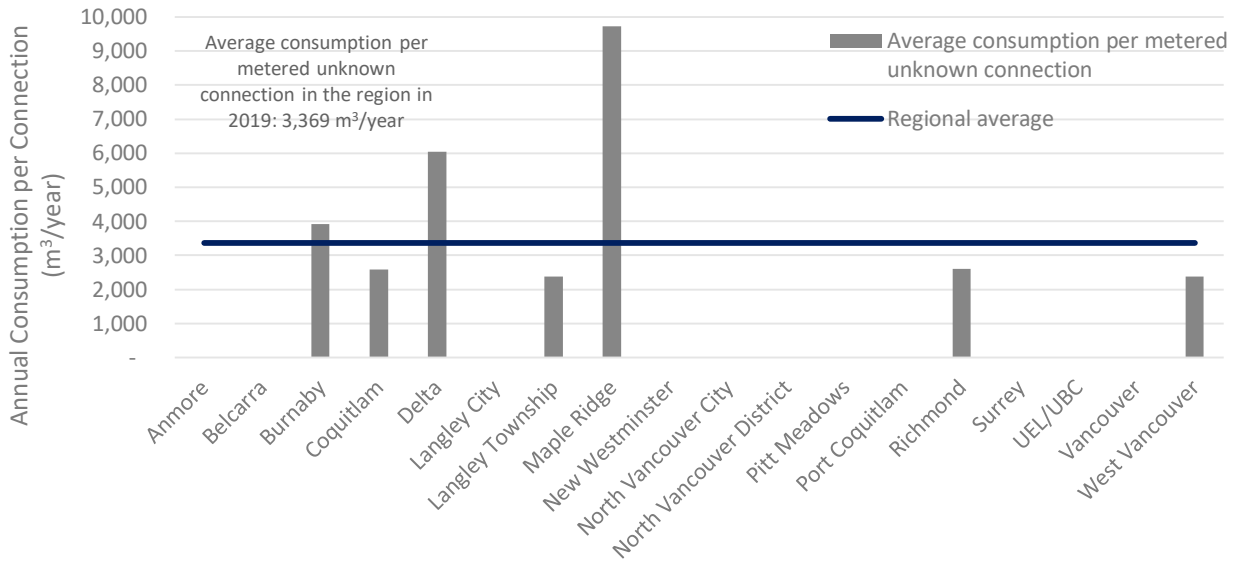


Figure 3.21: Metered "Unknown" water consumption in 2019, by member jurisdiction

Note: Average "Metered Unknown" consumption is within 10% of Average Metered Commercial consumption.

Table 3.9 and Table 3.10 outline the overall water consumption results from this study. Figure 3.22 shows trends in average unmetered flat rates and average metered rates with consumption trends from 1985 to 2019.

Table 3.9: Annual water consumption by sector (m<sup>3</sup>) in the GVWD

| Year | Estimated Reporting of Data | Total Consumption Volume | Volume Purchased From GVWD | Volume from Own Sources | Unmetered <sup>1</sup> | Total Metered | Single-Family | Multi-Family | Breakdown of Metered Sectors |               |            |              |                    |                      |
|------|-----------------------------|--------------------------|----------------------------|-------------------------|------------------------|---------------|---------------|--------------|------------------------------|---------------|------------|--------------|--------------------|----------------------|
|      |                             |                          |                            |                         |                        |               |               |              | Commercial                   | Institutional | Industrial | Agricultural | Other <sup>2</sup> | Unknown <sup>3</sup> |
| 1985 | 11.6%                       | 40,293,505               | 38,301,204                 | 1,992,301               | 28,465,321             | 11,828,184    | 115,141       | 558,147      | 5,747,702                    | 600,653       | 3,139,111  | 774,151      | 893,279            | -                    |
| 1986 | 56.1%                       | 193,891,901              | 192,028,606                | 1,863,295               | 110,737,845            | 83,154,056    | 436,400       | 15,407,464   | 36,953,423                   | 13,452,604    | 14,591,272 | 846,554      | 1,466,342          | -                    |
| 1987 | 59.6%                       | 215,806,031              | 213,849,700                | 1,956,331               | 120,373,666            | 95,432,365    | 1,654,224     | 16,381,441   | 40,712,695                   | 16,323,343    | 17,817,645 | 1,164,461    | 1,378,556          | -                    |
| 1988 | 61.3%                       | 225,622,102              | 223,795,306                | 1,826,796               | 123,872,624            | 101,749,478   | 1,835,190     | 17,018,334   | 43,141,693                   | 16,105,557    | 20,257,758 | 2,014,928    | 1,376,021          | -                    |
| 1989 | 63.9%                       | 240,011,098              | 238,263,970                | 1,747,128               | 131,482,703            | 108,528,395   | 1,946,828     | 17,367,966   | 47,230,874                   | 16,489,628    | 21,525,792 | 2,329,879    | 1,637,428          | -                    |
| 1990 | 76.1%                       | 301,415,494              | 299,623,651                | 1,791,843               | 169,946,062            | 127,850,905   | 657,913       | 19,837,381   | 58,338,593                   | 19,462,016    | 24,378,142 | 3,037,479    | 2,139,380          | -                    |
| 1991 | 87.9%                       | 340,276,570              | 334,358,388                | 5,918,182               | 192,522,384            | 147,754,186   | 1,924,092     | 19,978,192   | 64,207,549                   | 21,900,626    | 33,425,717 | 2,876,967    | 3,441,043          | -                    |
| 1992 | 87.8%                       | 334,179,392              | 328,073,448                | 6,105,945               | 189,415,862            | 144,763,529   | 1,857,977     | 20,095,536   | 66,069,909                   | 22,612,419    | 27,203,662 | 3,483,385    | 3,440,644          | -                    |
| 1993 | 94.4%                       | 345,492,870              | 338,923,502                | 6,569,368               | 200,282,879            | 145,209,991   | 1,830,234     | 20,227,470   | 66,451,933                   | 22,327,206    | 26,854,770 | 3,249,301    | 4,269,078          | -                    |
| 1994 | 94.9%                       | 360,254,620              | 353,216,844                | 7,037,776               | 210,856,102            | 149,398,517   | 2,208,799     | 21,323,720   | 68,276,915                   | 22,571,607    | 27,385,322 | 3,604,855    | 4,027,299          | -                    |
| 1995 | 94.9%                       | 372,914,792              | 365,647,717                | 7,267,075               | 221,665,066            | 151,249,726   | 2,575,850     | 22,556,015   | 68,588,218                   | 23,036,585    | 26,322,085 | 3,803,059    | 4,367,911          | -                    |
| 1996 | 99.8%                       | 400,522,150              | 391,105,812                | 9,416,338               | 234,829,073            | 165,693,077   | 3,225,920     | 23,306,690   | 73,143,605                   | 25,291,768    | 31,724,911 | 4,144,208    | 4,855,976          | -                    |
| 1997 | 100.0%                      | 395,840,896              | 385,914,582                | 9,926,314               | 234,643,893            | 161,197,003   | 2,615,010     | 24,208,980   | 69,896,613                   | 24,470,191    | 31,565,220 | 3,962,907    | 4,478,080          | -                    |
| 1998 | 96.6%                       | 429,791,381              | 419,695,571                | 10,095,810              | 246,867,561            | 168,120,983   | 6,576,650     | 26,588,318   | 66,944,371                   | 25,395,534    | 35,872,893 | 4,095,295    | 2,647,924          | -                    |
| 1999 | 98.8%                       | 412,178,800              | 403,305,043                | 8,873,757               | 239,042,012            | 168,373,381   | 7,278,367     | 27,134,748   | 65,215,070                   | 26,743,469    | 34,706,183 | 3,902,500    | 3,393,046          | -                    |
| 2000 | 100.0%                      | 414,685,349              | 403,262,890                | 11,422,459              | 246,049,094            | 168,636,255   | 5,770,562     | 34,796,104   | 60,264,209                   | 22,647,653    | 34,190,464 | 4,923,175    | 6,044,089          | -                    |
| 2001 | 100.0%                      | 416,997,581              | 405,355,917                | 11,641,664              | 246,428,218            | 170,569,363   | 6,797,980     | 35,956,638   | 60,522,229                   | 22,831,200    | 33,643,177 | 5,736,058    | 5,082,082          | -                    |
| 2002 | 99.8%                       | 436,382,060              | 422,904,827                | 13,477,234              | 266,236,524            | 169,157,020   | 10,300,586    | 35,032,566   | 69,061,420                   | 20,429,111    | 24,590,893 | 4,651,919    | 4,026,227          | -                    |
| 2003 | 99.7%                       | 439,365,825              | 426,112,865                | 13,252,960              | 264,590,415            | 173,650,285   | 9,044,454     | 37,274,763   | 66,395,240                   | 22,779,286    | 28,982,919 | 5,251,451    | 3,922,172          | -                    |
| 2004 | 99.7%                       | 437,974,199              | 424,884,268                | 13,089,851              | 261,408,286            | 175,124,567   | 13,170,012    | 37,087,546   | 65,876,918                   | 20,877,850    | 29,063,496 | 5,472,124    | 3,576,621          | -                    |
| 2005 | 99.7%                       | 427,476,902              | 414,891,863                | 12,585,039              | 247,255,032            | 178,835,394   | 18,529,533    | 37,063,772   | 65,222,385                   | 20,458,788    | 28,546,480 | 5,412,855    | 3,601,581          | -                    |
| 2006 | 100.0%                      | 435,306,205              | 421,098,416                | 14,207,789              | 247,672,862            | 187,633,343   | 26,364,525    | 37,673,299   | 70,009,389                   | 19,488,235    | 25,163,255 | 5,944,728    | 2,989,912          | -                    |
| 2007 | 100.0%                      | 410,597,405              | 397,437,736                | 13,159,669              | 229,488,077            | 181,109,328   | 24,614,243    | 38,787,831   | 67,211,885                   | 19,024,409    | 23,741,453 | 4,587,339    | 3,142,168          | -                    |
| 2008 | 100.0%                      | 400,582,729              | 388,065,655                | 12,517,074              | 222,281,532            | 178,301,225   | 26,584,398    | 40,552,653   | 60,813,913                   | 19,194,053    | 23,227,296 | 5,438,266    | 2,490,645          | -                    |
| 2009 | 98.0%                       | 409,962,365              | 397,561,580                | 12,400,785              | 210,529,338            | 191,085,754   | 29,456,861    | 43,779,930   | 71,087,831                   | 18,021,568    | 20,854,219 | 5,625,396    | 2,259,950          | -                    |
| 2010 | 98.0%                       | 393,652,410              | 381,032,086                | 12,620,324              | 209,425,724            | 176,482,228   | 30,003,090    | 40,442,396   | 64,303,690                   | 16,777,165    | 17,242,189 | 5,420,909    | 2,292,788          | -                    |
| 2011 | 98.1%                       | 382,641,848              | 370,262,712                | 12,379,136              | 199,900,279            | 175,512,185   | 30,175,380    | 42,066,250   | 63,609,546                   | 16,294,780    | 16,563,154 | 4,826,265    | 1,976,812          | -                    |
| 2012 | 98.9%                       | 393,934,690              | 381,261,858                | 12,672,832              | 213,475,489            | 176,298,229   | 31,474,486    | 43,218,666   | 62,164,301                   | 16,211,560    | 16,308,986 | 4,931,851    | 1,988,380          | -                    |
| 2013 | 98.8%                       | 398,432,758              | 384,711,230                | 13,721,528              | 208,971,025            | 179,908,081   | 32,360,040    | 46,467,542   | 58,216,125                   | 17,030,249    | 16,254,009 | 4,279,946    | 1,984,789          | 3,315,381            |
| 2014 | 98.8%                       | 394,059,539              | 380,791,934                | 13,267,605              | 204,336,920            | 179,838,662   | 35,331,218    | 45,213,682   | 54,022,234                   | 16,823,401    | 16,795,209 | 5,220,399    | 2,531,749          | 3,900,770            |
| 2015 | 98.7%                       | 396,401,647              | 384,693,225                | 11,708,422              | 202,732,456            | 183,833,161   | 39,236,689    | 45,405,960   | 53,856,675                   | 16,701,455    | 15,207,469 | 5,724,044    | 2,883,477          | 4,817,393            |
| 2016 | 98.8%                       | 394,732,896              | 383,130,644                | 11,602,252              | 200,280,488            | 184,804,065   | 40,014,096    | 46,799,861   | 53,047,397                   | 17,173,741    | 15,437,705 | 5,172,606    | 2,898,330          | 4,260,328            |
| 2017 | 97.3%                       | 398,895,126              | 388,140,316                | 10,754,810              | 196,638,596            | 192,782,593   | 41,935,869    | 41,640,330   | 52,753,047                   | 15,609,290    | 19,068,274 | 6,362,357    | 2,596,098          | 12,817,328           |
| 2018 | 98.7%                       | 399,793,658              | 389,042,570                | 10,751,088              | 209,194,648            | 185,854,010   | 46,879,038    | 46,484,850   | 48,164,758                   | 18,401,600    | 13,042,843 | 4,958,160    | 2,422,859          | 5,499,902            |
| 2019 | 97.8%                       | 393,230,852              | 383,270,561                | 9,960,291               | 192,094,271            | 196,026,581   | 46,944,251    | 45,354,007   | 52,337,484                   | 22,266,093    | 16,287,929 | 5,392,746    | 1,610,040          | 5,912,992            |

<sup>1</sup> Unmetered consumption - system losses, most residential, industrial, institutional and agricultural consumption, some commercial consumption, and consumption by some civic properties (e.g. parks and public washrooms). <sup>2</sup> "Other" - miscellaneous connections for which the appropriate sector could not be determined, e.g. transportation and utilities. <sup>3</sup> "Unknown" connections for which no BC Assessment Authority Actual Use Code (AUC) was provided.



Table 3.10: Annual water consumption by sector (% of total consumption) in the GVWD

| Year | Total Consumption Volume | Volume Purchased From GVWD | Volume from Own Sources | Unmetered <sup>1</sup> | Total Metered | Breakdown of Metered Sectors |              |            |               |            |              |                    |                      |
|------|--------------------------|----------------------------|-------------------------|------------------------|---------------|------------------------------|--------------|------------|---------------|------------|--------------|--------------------|----------------------|
|      |                          |                            |                         |                        |               | Single-Family                | Multi-Family | Commercial | Institutional | Industrial | Agricultural | Other <sup>2</sup> | Unknown <sup>3</sup> |
| 1985 | 100%                     | 95.06%                     | 4.94%                   | 70.64%                 | 29.36%        | 0.29%                        | 1.39%        | 14.26%     | 1.49%         | 7.79%      | 1.92%        | 2.22%              | 0%                   |
| 1986 | 100%                     | 99.04%                     | 0.96%                   | 57.11%                 | 42.89%        | 0.23%                        | 7.95%        | 19.06%     | 6.94%         | 7.53%      | 0.44%        | 0.76%              | 0%                   |
| 1987 | 100%                     | 99.09%                     | 0.91%                   | 55.78%                 | 44.22%        | 0.77%                        | 7.59%        | 18.87%     | 7.56%         | 8.26%      | 0.54%        | 0.64%              | 0%                   |
| 1988 | 100%                     | 99.19%                     | 0.81%                   | 54.90%                 | 45.10%        | 0.81%                        | 7.54%        | 19.12%     | 7.14%         | 8.98%      | 0.89%        | 0.61%              | 0%                   |
| 1989 | 100%                     | 99.27%                     | 0.73%                   | 54.78%                 | 45.22%        | 0.81%                        | 7.24%        | 19.68%     | 6.87%         | 8.97%      | 0.97%        | 0.68%              | 0%                   |
| 1990 | 100%                     | 99.41%                     | 0.59%                   | 56.38%                 | 42.42%        | 0.22%                        | 6.58%        | 19.35%     | 6.46%         | 8.09%      | 1.01%        | 0.71%              | 0%                   |
| 1991 | 100%                     | 98.26%                     | 1.74%                   | 56.58%                 | 43.42%        | 0.57%                        | 5.87%        | 18.87%     | 6.44%         | 9.82%      | 0.85%        | 1.01%              | 0%                   |
| 1992 | 100%                     | 98.17%                     | 1.83%                   | 56.68%                 | 43.32%        | 0.56%                        | 6.01%        | 19.77%     | 6.77%         | 8.14%      | 1.04%        | 1.03%              | 0%                   |
| 1993 | 100%                     | 98.10%                     | 1.90%                   | 57.97%                 | 42.03%        | 0.53%                        | 5.85%        | 19.23%     | 6.46%         | 7.77%      | 0.94%        | 1.24%              | 0%                   |
| 1994 | 100%                     | 98.05%                     | 1.95%                   | 58.53%                 | 41.47%        | 0.61%                        | 5.92%        | 18.95%     | 6.27%         | 7.60%      | 1.00%        | 1.12%              | 0%                   |
| 1995 | 100%                     | 98.05%                     | 1.95%                   | 59.44%                 | 40.56%        | 0.69%                        | 6.05%        | 18.39%     | 6.18%         | 7.06%      | 1.02%        | 1.17%              | 0%                   |
| 1996 | 100%                     | 97.65%                     | 2.35%                   | 58.63%                 | 41.37%        | 0.81%                        | 5.82%        | 18.26%     | 6.31%         | 7.92%      | 1.03%        | 1.21%              | 0%                   |
| 1997 | 100%                     | 97.49%                     | 2.51%                   | 59.28%                 | 40.72%        | 0.66%                        | 6.12%        | 17.66%     | 6.18%         | 7.97%      | 1.00%        | 1.13%              | 0%                   |
| 1998 | 100%                     | 97.65%                     | 2.35%                   | 57.44%                 | 39.12%        | 1.53%                        | 6.19%        | 15.58%     | 5.91%         | 8.35%      | 0.95%        | 0.62%              | 0%                   |
| 1999 | 100%                     | 97.85%                     | 2.15%                   | 57.99%                 | 40.85%        | 1.77%                        | 6.58%        | 15.82%     | 6.49%         | 8.42%      | 0.95%        | 0.82%              | 0%                   |
| 2000 | 100%                     | 97.25%                     | 2.75%                   | 59.33%                 | 40.67%        | 1.39%                        | 8.39%        | 14.53%     | 5.46%         | 8.24%      | 1.19%        | 1.46%              | 0%                   |
| 2001 | 100%                     | 97.21%                     | 2.79%                   | 59.10%                 | 40.90%        | 1.63%                        | 8.62%        | 14.51%     | 5.48%         | 8.07%      | 1.38%        | 1.22%              | 0%                   |
| 2002 | 100%                     | 96.91%                     | 3.09%                   | 61.01%                 | 38.76%        | 2.36%                        | 8.03%        | 15.83%     | 4.68%         | 5.64%      | 1.07%        | 0.92%              | 0%                   |
| 2003 | 100%                     | 96.98%                     | 3.02%                   | 60.22%                 | 39.52%        | 2.06%                        | 8.48%        | 15.11%     | 5.18%         | 6.60%      | 1.20%        | 0.89%              | 0%                   |
| 2004 | 100%                     | 97.01%                     | 2.99%                   | 59.69%                 | 39.99%        | 3.01%                        | 8.47%        | 15.04%     | 4.77%         | 6.64%      | 1.25%        | 0.82%              | 0%                   |
| 2005 | 100%                     | 97.06%                     | 2.94%                   | 57.84%                 | 41.84%        | 4.33%                        | 8.67%        | 15.26%     | 4.79%         | 6.68%      | 1.27%        | 0.84%              | 0%                   |
| 2006 | 100%                     | 96.74%                     | 3.26%                   | 56.90%                 | 43.10%        | 6.06%                        | 8.65%        | 16.08%     | 4.48%         | 5.78%      | 1.37%        | 0.69%              | 0%                   |
| 2007 | 100%                     | 96.79%                     | 3.21%                   | 55.89%                 | 44.11%        | 5.99%                        | 9.45%        | 16.37%     | 4.63%         | 5.78%      | 1.12%        | 0.77%              | 0%                   |
| 2008 | 100%                     | 96.88%                     | 3.12%                   | 55.49%                 | 44.51%        | 6.64%                        | 10.12%       | 15.18%     | 4.79%         | 5.80%      | 1.36%        | 0.62%              | 0%                   |
| 2009 | 100%                     | 96.98%                     | 3.02%                   | 51.35%                 | 46.61%        | 7.19%                        | 10.68%       | 17.34%     | 4.40%         | 5.09%      | 1.37%        | 0.55%              | 0%                   |
| 2010 | 100%                     | 96.79%                     | 3.21%                   | 53.20%                 | 44.83%        | 7.62%                        | 10.27%       | 16.34%     | 4.26%         | 4.38%      | 1.38%        | 0.58%              | 0%                   |
| 2011 | 100%                     | 96.76%                     | 3.24%                   | 52.24%                 | 45.87%        | 7.89%                        | 10.99%       | 16.62%     | 4.26%         | 4.33%      | 1.26%        | 0.52%              | 0%                   |
| 2012 | 100%                     | 96.78%                     | 3.22%                   | 54.19%                 | 44.75%        | 7.99%                        | 10.97%       | 15.78%     | 4.12%         | 4.14%      | 1.25%        | 0.50%              | 0%                   |
| 2013 | 100%                     | 96.56%                     | 3.44%                   | 52.45%                 | 45.15%        | 8.12%                        | 11.66%       | 14.61%     | 4.27%         | 4.08%      | 1.07%        | 0.50%              | 0.83%                |
| 2014 | 100%                     | 96.63%                     | 3.37%                   | 51.85%                 | 45.64%        | 8.97%                        | 11.47%       | 13.71%     | 4.27%         | 4.26%      | 1.32%        | 0.64%              | 0.99%                |
| 2015 | 100%                     | 97.05%                     | 2.95%                   | 51.14%                 | 46.38%        | 9.90%                        | 11.45%       | 13.59%     | 4.21%         | 3.84%      | 1.44%        | 0.73%              | 1.22%                |
| 2016 | 100%                     | 97.06%                     | 2.94%                   | 50.74%                 | 46.82%        | 10.14%                       | 11.86%       | 13.44%     | 4.35%         | 3.91%      | 1.31%        | 0.73%              | 1.08%                |
| 2017 | 100%                     | 97.30%                     | 2.70%                   | 49.30%                 | 48.33%        | 10.51%                       | 10.44%       | 13.22%     | 3.91%         | 4.78%      | 1.59%        | 0.65%              | 3.21%                |
| 2018 | 100%                     | 97.31%                     | 2.69%                   | 52.33%                 | 46.49%        | 11.73%                       | 11.63%       | 12.05%     | 4.60%         | 3.26%      | 1.24%        | 0.61%              | 1.38%                |
| 2019 | 100%                     | 97.47%                     | 2.53%                   | 48.85%                 | 49.85%        | 11.94%                       | 11.53%       | 13.31%     | 5.66%         | 4.14%      | 1.37%        | 0.41%              | 1.50%                |

<sup>1</sup> Unmetered consumption - system losses, most residential, industrial, institutional and agricultural consumption, some commercial consumption, and consumption by some civic properties (e.g. parks and public washrooms). <sup>2</sup> "Other" - miscellaneous connections for which the appropriate sector could not be determined, e.g. transportation and utilities. <sup>3</sup> "Unknown" - connections for which no BC Assessment Authority Actual Use Code (AUC) was provided.

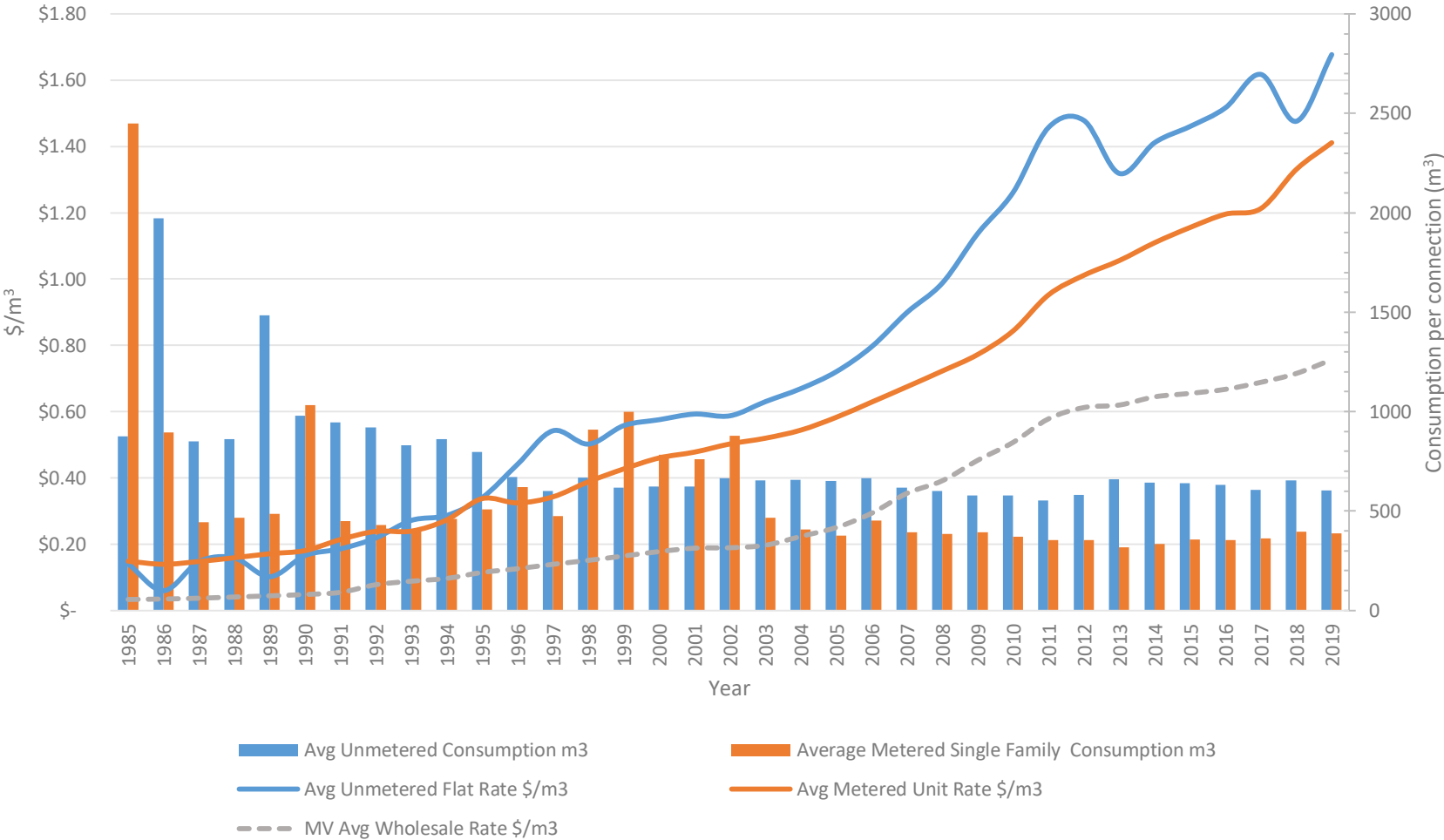


Figure 3.22: Average Unmetered Flat Rate vs Average Metered Rate trends with consumption patterns 1985 – 2019

Note: Unmetered consumption assumed to comprise single and multi-family connection mainly; Unmetered Flat Rate \$/m3 equals Average Annual Unmetered Flat Rate divided by Annual Unmetered Consumption; Data requires corrections). The average rates are derived from all rates, including commercial and industrial where applicable, and all blocks and seasonal rates. 2018 data to be verified.

### 3.4.4. Regional Industrial, Commercial, Institutional, and Agricultural Consumption

Metered water consumption for the ICI sectors (industrial, commercial, institutional, and agricultural) was separated by sector using By Sector Codes (BSC), as defined in Methodology. This was completed for each member jurisdiction, and member jurisdiction data were combined for overall ICI consumption data in the region. Since agricultural sector consumption is around 1.4% of regional consumption, it is included in the ICI sector.

Metered consumption for all ICI connections during 2019 was 103,879,731 m<sup>3</sup> or 284,602 m<sup>3</sup>/day. ICI consumption in the region from 2009 to 2019 is shown for By Sector Code (BSC) categories in Figure 3.24 and Figure 3.35. Metered connections and consumption by BSC category in the region from 2009 to 2019 is provided in Table 3.11, Table 3.12, and Table 3.13.

In 2019, there were 24,773 metered connections in the ICI sector in the region, representing a 16% increase since 2009. This includes 1,756 accounts which are categorized as ‘Unknown’ and assumed to be commercial. The largest increase appears to have been in the General Food Products sector in 2019, although this data needs to be verified. Other sectors such as Education, Agriculture, Medical and Health, Recreation and Warehouses show an increase in the number of connections by more than 10% over the same period, although the year-over-year increment is less pronounced in some sectors. The largest reduction in the number of connections is in the petroleum and allied sector, at 29% over the same 10-year period.

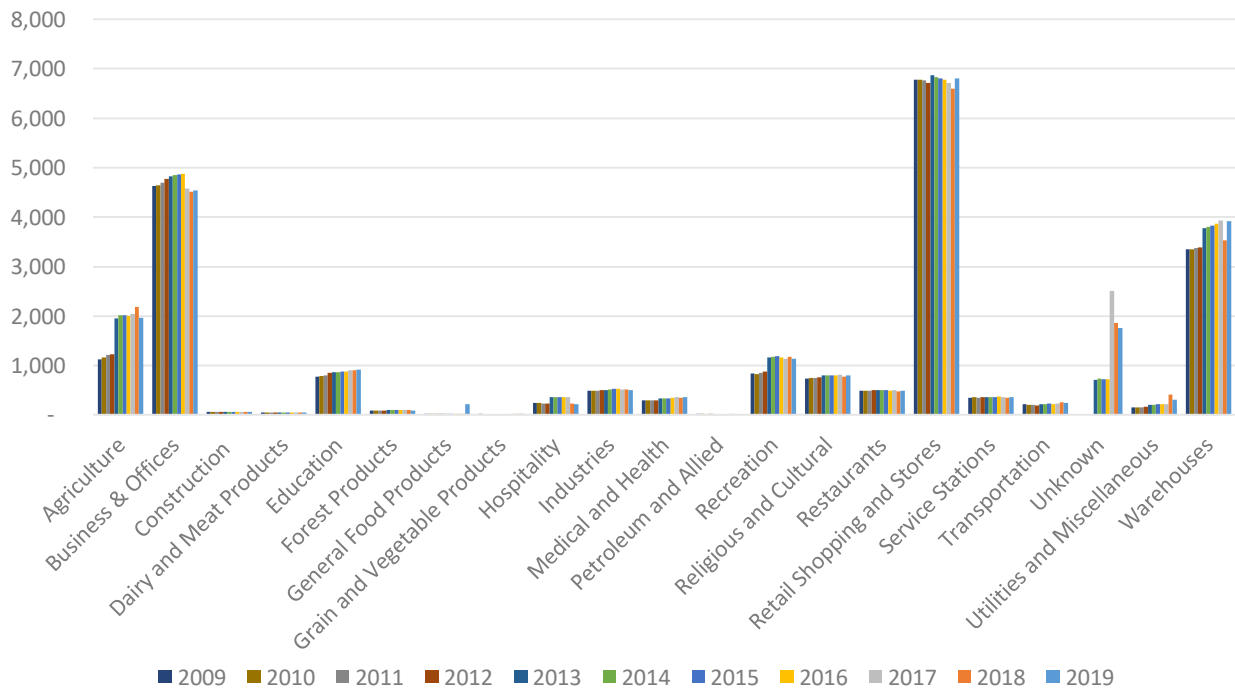


Figure 3.23: Number of metered ICI connections by sector in the region, 2009 to 2019

Note that the metered connections shown for each category are based on the coding of properties by the BC Assessment Authority, and the codes assigned to ICI accounts by members within their jurisdiction. There could be overlaps between categories, for example, if a restaurant is in an office building or shopping centre, the restaurant may have been included in the Business & Office sector or the Retail Shopping and Stores sector instead of the Restaurant sector. There are variations in the assignment between member jurisdictions as well.

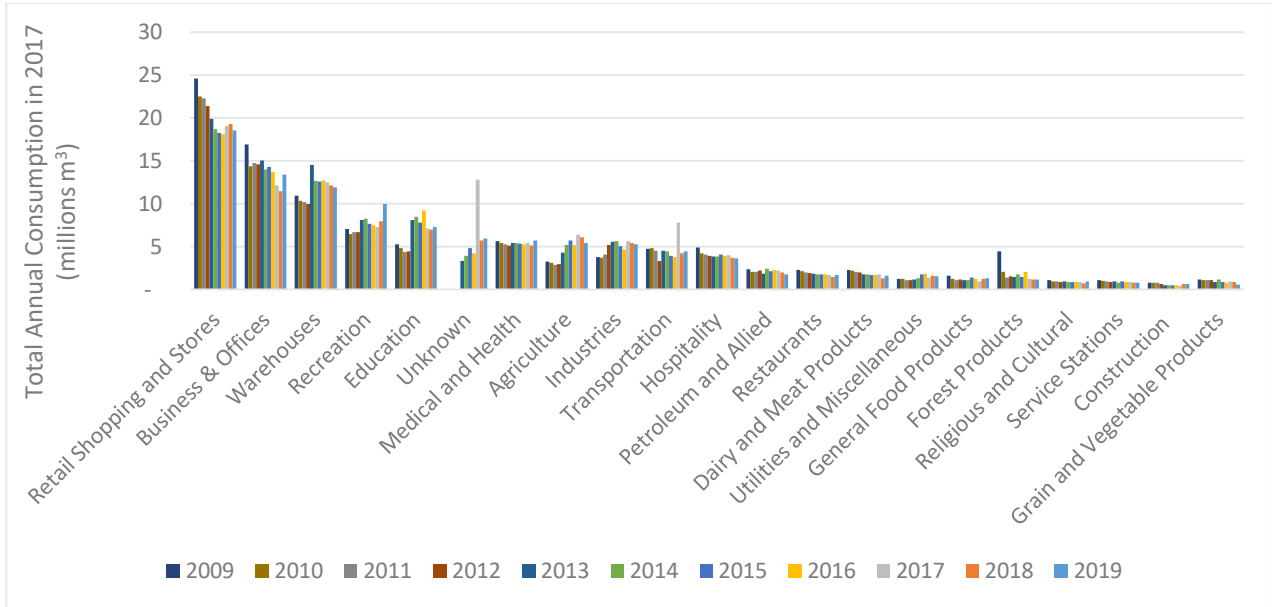


Figure 3.24: Metered ICI water consumption by sector, 2009 to 2019

Notes: Reduction in ICI ‘Unknown’ category could increase other ICI sectors. Assumes the regional ICI sector is universally metered and therefore captured in the billing data provided by members. ICI consumption data by BSC category was not available from the City of Port Moody and the University Endowment Lands/UBC.

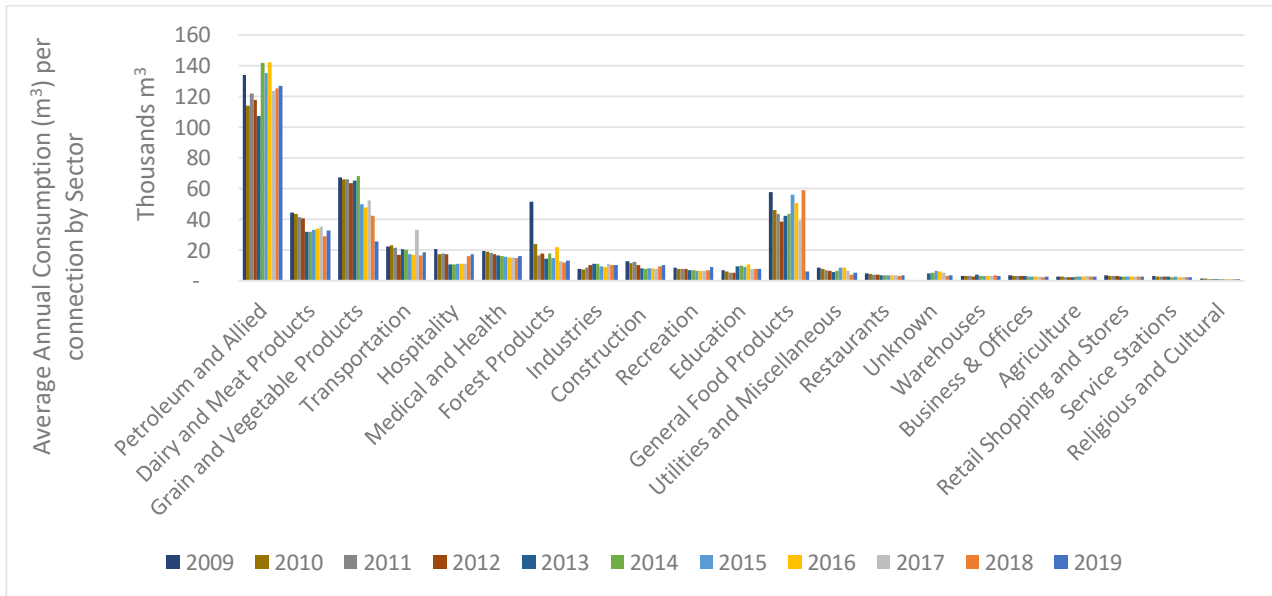


Figure 3.25: Average annual consumption per ICI connection by sector, 2009 to 2019

Table 3.11: Number of metered ICI connections in the GVWD

|                                     | 2009          | 2010          | 2011          | 2012          | 2013          | 2014          | 2015          | 2016          | 2017          | 2018          | 2019          |
|-------------------------------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|
| <b>Agriculture</b>                  | 1,130         | 1,168         | 1,213         | 1,232         | 1,957         | 2,012         | 2,014         | 2,008         | 2,047         | 2,191         | 1,967         |
| <b>Business &amp; Offices</b>       | 4,628         | 4,644         | 4,691         | 4,776         | 4,829         | 4,854         | 4,862         | 4,882         | 4,580         | 4,515         | 4,538         |
| <b>Construction</b>                 | 66            | 69            | 68            | 67            | 61            | 61            | 61            | 61            | 58            | 67            | 62            |
| <b>Dairy and Meat Products</b>      | 51            | 51            | 49            | 49            | 56            | 55            | 52            | 51            | 50            | 47            | 49            |
| <b>Education</b>                    | 777           | 790           | 805           | 854           | 864           | 869           | 872           | 875           | 909           | 899           | 922           |
| <b>Forest Products</b>              | 87            | 86            | 85            | 88            | 100           | 98            | 96            | 96            | 99            | 98            | 91            |
| <b>General Food Products</b>        | 28            | 27            | 26            | 30            | 26            | 26            | 25            | 25            | 25            | 21            | 213           |
| <b>Grain and Vegetable Products</b> | 18            | 17            | 17            | 17            | 14            | 17            | 17            | 17            | 18            | 21            | 23            |
| <b>Hospitality</b>                  | 241           | 245           | 229           | 227           | 363           | 362           | 366           | 362           | 362           | 231           | 213           |
| <b>Industries</b>                   | 485           | 494           | 485           | 499           | 507           | 509           | 524           | 524           | 509           | 521           | 507           |
| <b>Medical and Health</b>           | 291           | 290           | 293           | 297           | 333           | 335           | 340           | 348           | 354           | 345           | 355           |
| <b>Petroleum and Allied</b>         | 18            | 18            | 17            | 19            | 17            | 17            | 16            | 16            | 18            | 9             | 14            |
| <b>Recreation</b>                   | 837           | 823           | 846           | 882           | 1,160         | 1,173         | 1,189         | 1,165         | 1,132         | 1,180         | 1,135         |
| <b>Religious and Cultural</b>       | 730           | 744           | 753           | 766           | 796           | 800           | 806           | 806           | 813           | 773           | 806           |
| <b>Restaurants</b>                  | 494           | 495           | 495           | 506           | 500           | 500           | 500           | 495           | 497           | 476           | 495           |
| <b>Retail Shopping and Stores</b>   | 6,777         | 6,784         | 6,760         | 6,715         | 6,871         | 6,835         | 6,800         | 6,773         | 6,720         | 6,597         | 6,807         |
| <b>Service Stations</b>             | 352           | 354           | 351           | 356           | 364           | 361           | 365           | 367           | 365           | 352           | 359           |
| <b>Transportation</b>               | 212           | 209           | 210           | 198           | 218           | 220           | 225           | 223           | 237           | 259           | 238           |
| <b>Warehouses</b>                   | 3,349         | 3,348         | 3,373         | 3,384         | 3,776         | 3,801         | 3,822         | 3,867         | 3,927         | 1,861         | 1,756         |
| <b>Utilities and Miscellaneous</b>  | 153           | 159           | 157           | 166           | 204           | 207           | 212           | 217           | 216           | 412           | 305           |
| <b>Unknown</b>                      | -             | -             | -             | -             | 710           | 729           | 724           | 718           | 2,510         | 3,532         | 3,918         |
| <b>Total ICI</b>                    | <b>20,724</b> | <b>20,815</b> | <b>20,923</b> | <b>21,128</b> | <b>23,726</b> | <b>23,841</b> | <b>23,888</b> | <b>23,896</b> | <b>25,446</b> | <b>24,407</b> | <b>24,773</b> |

"Unknown" refers to connections for which no BC Assessment Authority Actual Use Code (AUC) was provided.

Table 3.12: Total annual consumption (m<sup>3</sup>) by ICI Sector in the GVWD

|                                       | 2009               | 2010              | 2011              | 2012              | 2013               | 2014              | 2015              | 2016              | 2017               | 2018              | 2019               |
|---------------------------------------|--------------------|-------------------|-------------------|-------------------|--------------------|-------------------|-------------------|-------------------|--------------------|-------------------|--------------------|
| <b>Agriculture</b>                    | 3,234,232          | 3,149,812         | 2,874,700         | 2,978,111         | 4,279,946          | 5,220,399         | 5,724,044         | 5,172,606         | 6,362,357          | 6,113,288         | 5,392,746          |
| <b>Business &amp; Offices</b>         | 16,946,865         | 14,398,150        | 14,755,313        | 14,610,632        | 15,062,433         | 13,977,388        | 14,291,883        | 13,671,426        | 12,112,590         | 11,447,192        | 13,402,912         |
| <b>Construction</b>                   | 827,397            | 780,359           | 827,207           | 675,473           | 489,342            | 483,439           | 496,138           | 486,416           | 447,099            | 626,085           | 641,260            |
| <b>Dairy &amp; Meat Products</b>      | 2,267,716          | 2,210,352         | 2,039,482         | 1,986,586         | 1,795,983          | 1,744,068         | 1,720,750         | 1,726,450         | 1,750,525          | 1,358,687         | 1,593,278          |
| <b>Education</b>                      | 4,776,164          | 4,288,911         | 3,978,239         | 4,079,685         | 4,024,789          | 3,647,054         | 3,932,275         | 4,707,387         | 3,603,922          | 6,980,005         | 7,323,737          |
| <b>Forest Products</b>                | 4,477,318          | 2,055,256         | 1,403,048         | 1,558,854         | 1,455,087          | 1,746,469         | 1,441,361         | 2,091,948         | 1,256,539          | 1,174,638         | 1,200,478          |
| <b>General Food Products</b>          | 1,619,148          | 1,240,379         | 1,128,304         | 1,154,783         | 1,102,844          | 1,131,182         | 1,395,693         | 1,262,344         | 979,340            | 1,241,749         | 1,320,037          |
| <b>Grain &amp; Vegetable Products</b> | 1,212,064          | 1,119,171         | 1,124,712         | 1,076,940         | 910,632            | 1,157,178         | 845,214           | 809,059           | 942,018            | 886,364           | 590,793            |
| <b>Hospitality</b>                    | 4,929,031          | 4,271,471         | 4,063,991         | 3,916,504         | 3,888,836          | 3,886,149         | 4,086,210         | 3,960,205         | 4,000,866          | 3,683,418         | 3,670,654          |
| <b>Industries</b>                     | 3,774,672          | 3,718,794         | 4,094,634         | 5,189,816         | 5,558,252          | 5,622,267         | 5,037,229         | 4,654,276         | 5,636,856          | 5,425,126         | 5,295,331          |
| <b>Medical &amp; Health</b>           | 5,646,613          | 5,459,234         | 5,260,639         | 5,103,095         | 5,425,818          | 5,402,769         | 5,374,603         | 5,315,644         | 5,411,033          | 5,159,490         | 5,735,667          |
| <b>Petroleum &amp; Allied</b>         | 2,408,456          | 2,052,452         | 2,067,736         | 2,236,477         | 1,826,291          | 2,411,194         | 2,164,717         | 2,275,240         | 2,220,194          | 1,996,758         | 1,773,323          |
| <b>Recreation</b>                     | 7,086,062          | 6,483,261         | 6,674,148         | 6,690,559         | 8,077,624          | 8,260,049         | 7,666,475         | 7,524,157         | 7,282,806          | 7,993,916         | 10,007,526         |
| <b>Religious &amp; Cultural</b>       | 1,097,297          | 991,146           | 954,033           | 906,574           | 936,249            | 897,952           | 877,512           | 894,445           | 909,532            | 767,190           | 990,270            |
| <b>Restaurants</b>                    | 2,297,912          | 2,143,712         | 2,029,921         | 1,957,901         | 1,870,749          | 1,781,385         | 1,780,980         | 1,751,932         | 1,701,638          | 1,509,103         | 1,714,055          |
| <b>Retail Shopping &amp; Stores</b>   | 24,586,064         | 22,487,548        | 22,320,350        | 21,401,288        | 19,866,758         | 18,718,117        | 18,249,057        | 18,108,578        | 19,094,288         | 19,331,491        | 18,523,856         |
| <b>Service Stations</b>               | 1,085,285          | 1,003,356         | 929,413           | 909,982           | 939,760            | 835,642           | 956,862           | 884,187           | 881,053            | 782,963           | 840,932            |
| <b>Transportation</b>                 | 4,737,179          | 4,795,650         | 4,536,628         | 3,331,413         | 4,508,999          | 4,452,925         | 3,933,789         | 3,812,067         | 7,821,552          | 4,265,579         | 4,450,315          |
| <b>Warehouses</b>                     | 10,959,056         | 10,342,991        | 10,212,862        | 9,957,491         | 14,558,327         | 12,669,435        | 12,620,789        | 12,746,477        | 12,543,243         | 5,705,334         | 5,924,167          |
| <b>Utilities &amp; Miscellaneous</b>  | 1,289,709          | 1,227,820         | 1,073,656         | 1,081,856         | 1,186,398          | 1,347,934         | 1,777,538         | 1,874,935         | 1,431,615          | 1,646,018         | 1,580,491          |
| <b>Unknown</b>                        | -                  | -                 | -                 | -                 | 3,315,381          | 3,900,770         | 4,817,393         | 4,260,328         | 12,817,328         | 12,108,268        | 11,907,902         |
| <b>Total ICI</b>                      | <b>105,258,240</b> | <b>94,219,824</b> | <b>92,349,018</b> | <b>90,804,019</b> | <b>101,080,498</b> | <b>99,293,763</b> | <b>99,190,512</b> | <b>97,990,108</b> | <b>109,206,394</b> | <b>98,247,564</b> | <b>103,879,731</b> |

"Unknown" refers to connections for which no BC Assessment Authority Actual Use Code (AUC) was provided.

Table 3.13: Average annual consumption per connection (m<sup>3</sup>) by ICI Sector in the GVWD

|                                       | 2009    | 2010    | 2011    | 2012    | 2013    | 2014    | 2015    | 2016    | 2017    | 2018    | 2019    |
|---------------------------------------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| <b>Agriculture</b>                    | 2,862   | 2,697   | 2,370   | 2,417   | 2,187   | 2,595   | 2,842   | 2,576   | 3,108   | 2,790   | 2,742   |
| <b>Business &amp; Offices</b>         | 3,662   | 3,100   | 3,145   | 3,059   | 3,119   | 2,880   | 2,940   | 2,800   | 2,645   | 2,535   | 2,953   |
| <b>Construction</b>                   | 12,536  | 11,310  | 12,165  | 10,082  | 8,022   | 7,925   | 8,133   | 7,974   | 7,709   | 9,345   | 10,343  |
| <b>Dairy &amp; Meat Products</b>      | 44,465  | 43,340  | 41,622  | 40,543  | 32,071  | 31,710  | 33,091  | 33,852  | 35,010  | 28,908  | 32,516  |
| <b>Education</b>                      | 6,147   | 5,429   | 4,942   | 4,777   | 4,658   | 4,197   | 4,509   | 5,380   | 3,965   | 7,764   | 7,943   |
| <b>Forest Products</b>                | 51,463  | 23,898  | 16,506  | 17,714  | 14,551  | 17,821  | 15,014  | 21,791  | 12,692  | 11,986  | 13,192  |
| <b>General Food Products</b>          | 57,827  | 45,940  | 43,396  | 38,493  | 42,417  | 43,507  | 55,828  | 50,494  | 39,174  | 59,131  | 6,197   |
| <b>Grain &amp; Vegetable Products</b> | 67,337  | 65,834  | 66,160  | 63,349  | 65,045  | 68,069  | 49,718  | 47,592  | 52,334  | 42,208  | 25,687  |
| <b>Hospitality</b>                    | 20,452  | 17,435  | 17,747  | 17,253  | 10,713  | 10,735  | 11,165  | 10,940  | 11,052  | 15,946  | 17,233  |
| <b>Industries</b>                     | 7,783   | 7,528   | 8,443   | 10,400  | 10,963  | 11,046  | 9,613   | 8,882   | 11,074  | 10,413  | 10,444  |
| <b>Medical &amp; Health</b>           | 19,404  | 18,825  | 17,954  | 17,182  | 16,294  | 16,128  | 15,808  | 15,275  | 15,285  | 14,955  | 16,157  |
| <b>Petroleum &amp; Allied</b>         | 133,803 | 114,025 | 121,632 | 117,709 | 107,429 | 141,835 | 135,295 | 142,203 | 123,344 | 125,005 | 126,666 |
| <b>Recreation</b>                     | 8,466   | 7,878   | 7,889   | 7,586   | 6,963   | 7,042   | 6,448   | 6,459   | 6,434   | 6,775   | 8,817   |
| <b>Religious &amp; Cultural</b>       | 1,503   | 1,332   | 1,267   | 1,184   | 1,176   | 1,122   | 1,089   | 1,110   | 1,119   | 992     | 1,229   |
| <b>Restaurants</b>                    | 4,652   | 4,331   | 4,101   | 3,869   | 3,741   | 3,563   | 3,562   | 3,539   | 3,424   | 3,170   | 3,463   |
| <b>Retail Shopping &amp; Stores</b>   | 3,628   | 3,315   | 3,302   | 3,187   | 2,891   | 2,739   | 2,684   | 2,674   | 2,841   | 2,930   | 2,721   |
| <b>Service Stations</b>               | 3,083   | 2,834   | 2,648   | 2,556   | 2,582   | 2,315   | 2,622   | 2,409   | 2,414   | 2,224   | 2,342   |
| <b>Transportation</b>                 | 22,345  | 22,946  | 21,603  | 16,825  | 20,683  | 20,241  | 17,484  | 17,094  | 33,002  | 16,469  | 18,699  |
| <b>Warehouses</b>                     | 3,272   | 3,089   | 3,028   | 2,943   | 3,855   | 3,333   | 3,302   | 3,296   | 3,194   | 3,428   | 3,039   |
| <b>Utilities &amp; Miscellaneous</b>  | 8,429   | 7,722   | 6,839   | 6,517   | 5,816   | 6,512   | 8,385   | 8,640   | 6,628   | 3,995   | 5,182   |
| <b>Unknown</b>                        | N/A     | N/A     | N/A     | N/A     | 4,670   | 5,351   | 6,654   | 5,934   | 5,107   | 3,066   | 3,374   |

"Unknown" refers to connections for which no BC Assessment Authority Actual Use Code (AUC) was provided.

### 3.4.5. Estimated Regional Residential Consumption

Estimated residential consumption was determined on a per member jurisdiction basis, and these estimates were combined to produce estimates for the region. For member jurisdictions that meter all ICI connections, unmetered consumption minus system losses was assumed to represent unmetered residential consumption, which along with metered residential consumption forms total residential consumption for each member jurisdiction. Water consumption by sector data for the City of Port Moody and UEL/UBC was unavailable and therefore not included in the regional estimates for residential water consumption. For more information on calculation methodology, refer to Section 2.0.

Based on these assumptions and the data provided and analyzed, it is estimated that residential consumption accounted for approximately 62% of total water consumption in the region in 2019. This represents an annual volume of 280,626,394 m<sup>3</sup> or 264 L/capita/day in 2019. Figure 3.26 shows the proportion of estimated residential consumption as part of overall consumption over the study period 1985 to 2019, and Figure 3.27 provides estimates on a per capita basis.

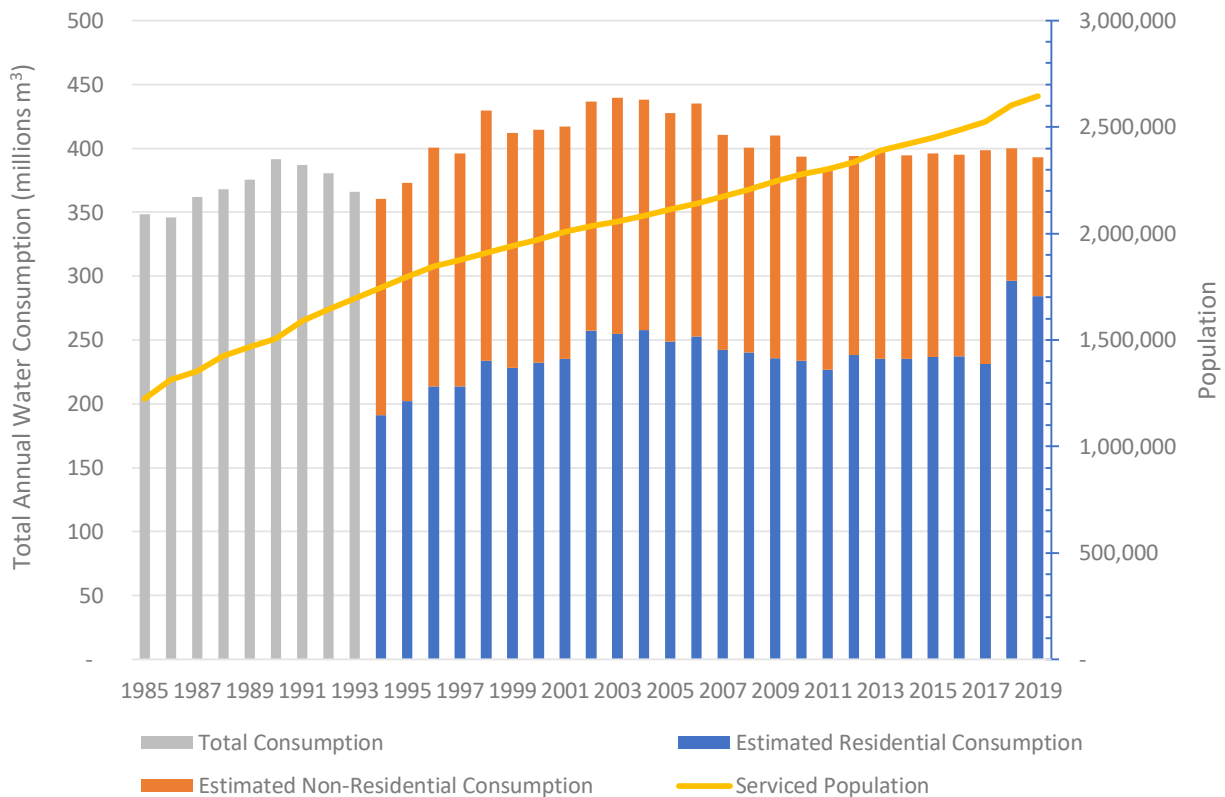


Figure 3.26: GVWD total and estimated residential consumption

Note: Years for which data received represented less than 95% of total regional consumption. Estimated residential consumption was not calculated due to the lack of reported data.



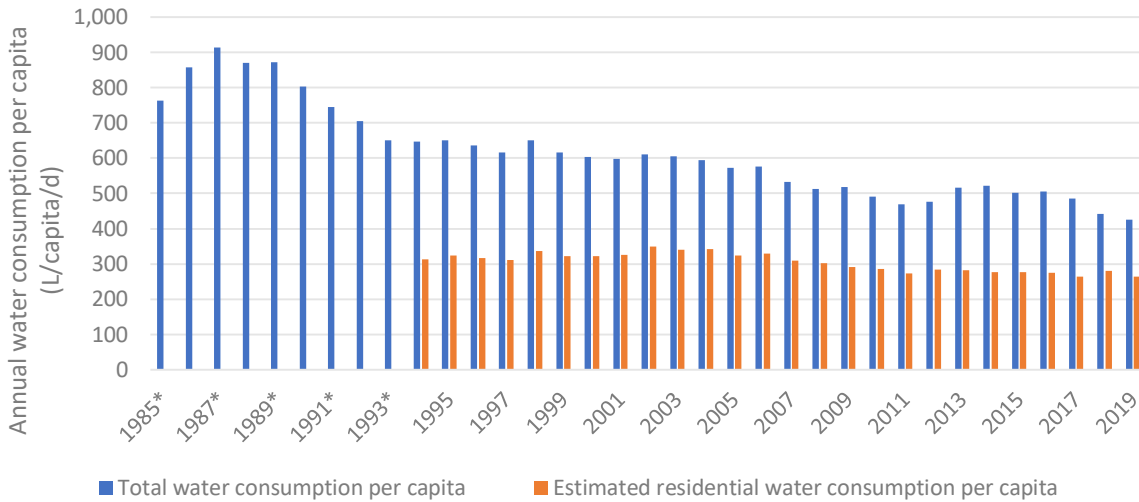


Figure 3.27: Per capita total and estimated residential consumption

\*Years for which data received represented less than 95% of total regional consumption. Estimated residential consumption was not calculated due to the lack of reporting data.

Figure 3.28 illustrates the breakdown of overall water use in the region during 2019, based on estimates of residential use, metered consumption data, and self-reported member jurisdiction system losses.

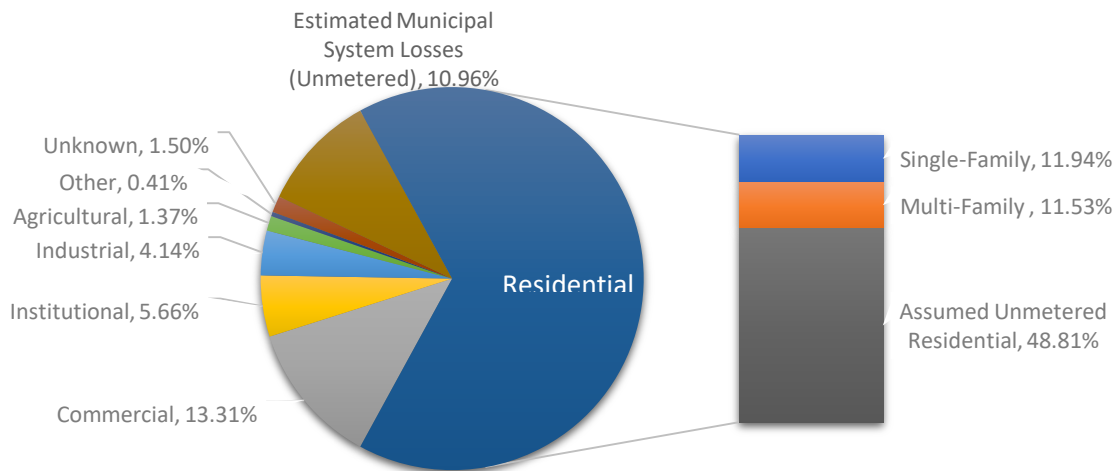
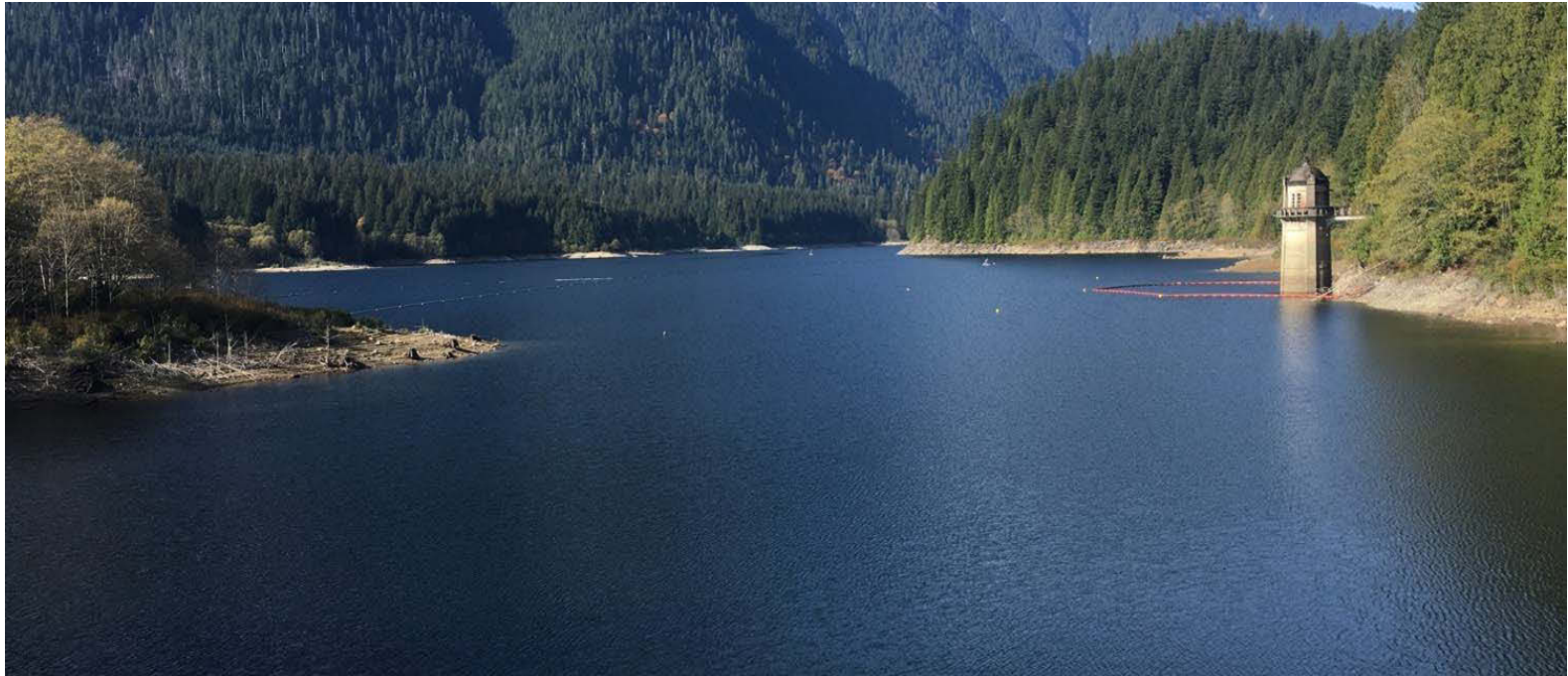


Figure 3.28: Water consumption in the GVWD region by estimated sectors in 2019

Note: Estimated residential consumption values are intended to provide an approximated indication of residential consumption in the region. Since these estimations include many assumptions about unmetered consumption and self-reported system losses provided by member jurisdictions, the values presented should not be used when precision and accuracy are required.

## **Appendix A: Instructional Guideline**



## **Water Use by Sector Report – Instructional Guideline for Local Government Data Request (2019)**

October 2020

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## 1.0 PROJECT SUMMARY AND REQUEST FOR DATA

Following the REAC-WSC meeting on September 9, 2020, Metro Vancouver is in the process of collecting local government water services data for the 2019 edition of the Greater Vancouver Water District (GVWD) and Local Government Water Use by Sector Report. The Water Use by Sector Report compiles water meter billing data from all member municipalities on water use trends by sector.

The previous edition (published November 2019) reported on data from 1985 to 2017. Metro Vancouver is currently collecting data for the years 2018 and 2019. For this data request, please complete and submit the following two components to Metro Vancouver:

1. Municipal Questionnaire 2018-2019; and
2. Billing Data.

A feedback form is also included to help further our understanding of how this report provides value to your organization. Your responses and suggestions will help improve the process of assembling the report as Metro Vancouver strives to make the report as useful as possible. You may receive a request for a follow-up discussion based on your submitted feedback.

## 2.0 PROJECT SCHEDULE AND MILESTONES

Metro Vancouver has updated its processing software to be able to publish the Water Use by Sector reports more quickly. These updates make data submission and processing more efficient and continuous improvements are anticipated. The objective is to ensure the information within the report is up-to-date for reliable use and reference. Therefore, the following milestones are critical to the timeliness of the 2019 report:

- Deadline for receiving data and questionnaire – November 20, 2020;
- Data validation, corrections and processing, analysis – December 2020 to April 2021;
- Draft No.1 – May 2021;
- Members comments and feedback – July 2021;
- Final Water Use by Sector Report 2019 – August 2021.

In the first quarter of 2021, Metro Vancouver will review the option of collecting 2020 data and including it within the 2019 report.

## 3.0 DATA REQUEST INSTRUCTIONS

Similar to the previous report cycle, please send in the completed Municipal Questionnaire template and Billing Data in the format requested. The goal is to increase efficiency and reduce turn-around times by improving the quality of data received.

Please note that Metro Vancouver uses the Microsoft Office 2016 standard package, so it is requested that submitted files be compatible with this program. Templates for the Municipal Questionnaire and Billing Data are attached to the email as Microsoft Excel files. A copy of this information package is also attached to the email. A sample SQL Query from the previous report cycle is included in Appendix 1.

### 3.1. Municipal Questionnaire 2018-2019

This Excel-based form gathers information such as municipal statistics, water billing frequencies and rates. Within this spreadsheet, there are individual tabs for each working group municipality. Please complete and save your responses in the tab for your municipality. Instructions for each line item are provided within the excel sheet, with space for any section-specific comments (see Appendix 3 for a sample).

### 3.2. Billing Data

Please submit 2018 and 2019 water meter billing data in separate CSV files for each year. Each line of the CSV file will contain six values, separated by a comma. An option is to provide the data as Excel files utilizing the inbuilt 'Tables' features of Excel 2016, keeping to the column headers as given below.

| Value # | Description            | Notes   | Example |
|---------|------------------------|---|---------|
| 1       | Unique customer number | A unique, identifying number representing each connection | 102393  |
| 2       | AUC                    | Three character Actual Use Code (000 to 670)              | 001     |
| 3       | Billing year           | Four-digit year   | 2018    |
| 4       | Billing month          | Values from "1" to "12"                                   | 6       |
| 5       | Billing day            | Values from "1" to "31"                                   | 30      |
| 6       | Billing volume         | Do not include commas in the number.                      | 1309    |

Depending on your municipality's billing frequency, there may be multiple lines per account i.e. one line for each billing period. If there are any commas within a value, please enclose the field with double-quotes. Below are all examples of valid lines in the CSV file. See Appendix 3 for a sample.

```
101273,000,2016,3,31,91
101313,002,2016,3,31,87
109903,216,2016,9,30,33
103371,403,2016,12,31,2505
101238,160,2016,,,55998.73
101239,180,2016,,,2527.83
101210,060,2016,,,1403.85
102211,225,2016,,,289.26
15602,030,2016,01,,242
15602,030,2016,02,,255
15602,030,2016,03,,216
```

A few quality checks on your data before submission will help with the report timelines. Billing data for the two years of 2018 and 2019 should be in separate files. Please ensure all billing accounts have an assigned three-character AUC Code. It would also be of great help if members review and compare with their data from the previous years (1985-2017) and make any necessary improvements.

## 4.0 SUBMISSION ITEMS

Please submit the following three items via email to [allen.sebastian@metrovancover](mailto:allen.sebastian@metrovancover) **before Friday, November 20, 2020**:

1. Municipal Questionnaire: Excel-based questionnaire to complete (.xls file attached to email). Files should have the following naming structure: "MUNICIPALITYNAME\_YYYYMMMDD.xls".
2. Billing Data: instructions provided in Section 3.2 (.xls file attached to email). Billing Data CSV files should have the following naming structure: "MUNICIPALITYNAME\_YYYY\_Billing.csv", with one file each for 2018 and 2019. Use "MUNICIPALITYNAME\_YYYY\_Billing.xls" for Excel files.
3. Completed Feedback Form: Please see Appendix 2 for the feedback form. Submitted files should have the following naming structure: "MUNICIPALITYNAME\_Feedback2019". Files can be Microsoft Word or pdf.

Your participation will help us develop a more efficient data analysis process and your commitment to the success of this project is appreciated. If you have any questions or suggestions, please feel free to contact:

Allen Sebastian by email at [allen.sebastian@metrovancover.org](mailto:allen.sebastian@metrovancover.org).



## APPENDIX 1 - SAMPLE SQL QUERY

To assist with data export, see the below sample SQL query (Tempest, 2 pages) provided by the City of Coquitlam for the 2017 Report:

```
SELECT
ub_customers.account_number ACCOUNT_NUMBER,
Atd_attributes.attribute_value ACTUAL_USE_CODE,
READING_LIST_TOTALS.BILLING_YEAR,
READING_LIST_TOTALS.BILLING_MONTH,
READING_LIST_TOTALS.BILLING_DAY,
READING_LIST_TOTALS.BILLING_VOLUME
FROM
(SELECT READINGS_LIST.customer_id,
READINGS_LIST.CUSTOMER_NAME,
READINGS_LIST.BILLING_YEAR,
READINGS_LIST.reading_period,
MIN( TO_CHAR( ub_bills.bill_date, 'mm')) BILLING_MONTH,
MIN( TO_CHAR( ub_bills.bill_date, 'dd')) BILLING_DAY,
SUM( ROUND( READINGS_LIST.cons_billed, NVL(ub_measures.view_decimals,0)))
BILLING_VOLUME
FROM
(SELECT DISTINCT
ub_readings.customer_id,
ub_readings.reading_id,
ub_readings.bill_id,
land_owner.name1 CUSTOMER_NAME,
dbo.TDGF_UB_READING_BILL_YEAR( ub_readings.reading_id, ub_readings.customer_id)
BILLING_YEAR,
dbo.TDGF_UB_READING_BILL_PERIOD( ub_readings.reading_id, ub_readings.customer_id)
READING_PERIOD,
(ub_readings.consumption_su * ub_readings.meter_direction *
(ub_readings.customer_share / 100)) CONS_BILLED
FROM ub_readings
LEFT OUTER JOIN
land_equity
ON land_equity.equity_id = ub_readings.customer_id
AND land_equity.equity_type = 'OWNER'
AND land_equity.equity_seq = 1
LEFT OUTER JOIN
land_equity tenant
ON tenant.equity_id = ub_readings.customer_id
AND tenant.equity_type = 'TENANT'
AND tenant.equity_seq = 1
LEFT OUTER JOIN
land_owner
ON land_owner.owner_id =
CASE WHEN land_equity.equity_id IS NOT NULL
THEN land_equity.owner_id
ELSE tenant.owner_id
END
WHERE ub_readings.reading_year BETWEEN :billing_year_from AND :billing_year_to
AND ub_readings.meter_reading IS NOT NULL
```

```

AND ub_readings.reading_date IS NOT NULL
AND ub_readings.reading_date <= NVL( land_equity.stop_date,
ub_readings.reading_date )
AND ub_readings.reading_date >= NVL( land_equity.start_date,
ub_readings.reading_date )
AND NVL( ub_readings.replaced_flag, '0') = '0'
AND ub_readings.approved_date IS NOT NULL
AND ub_readings.total_days > 0
) READINGS_LIST
INNER JOIN
ub_measures
ON ub_measures.factor = 1
INNER JOIN ub_bills
ON ub_bills.bill_id = READINGS_LIST.bill_id
GROUP BY
READINGS_LIST.customer_id,
READINGS_LIST.CUSTOMER_NAME,
READINGS_LIST.BILLING_YEAR,
READINGS_LIST.reading_period
) READING_LIST_TOTALS
INNER JOIN
ub_customers
ON ub_customers.customer_id = READING_LIST_TOTALS.customer_id
INNER JOIN
land_relation
ON land_relation.relation_id = READING_LIST_TOTALS.customer_id
AND land_relation.type = 'UTILITY'
AND land_relation.parent_child = 'C'
LEFT OUTER JOIN
td_attributes Atd_attributes
ON Atd_attributes.source_id = land_relation.legal_id
AND Atd_attributes.attribute_type_id = 'AUC'
ORDER BY 1, 3, 2

```

SUPERSEDED

## APPENDIX 2 - FEEDBACK FORM 2019

As you complete this data request, please provide your feedback on the process and suggestions on what may be improved.

|  | Feedback (fill out responses below)   |
|--|---|
| <b>Municipal Questionnaire</b>   |   |
| Please rate the understanding and completing of the questionnaire.   | <input type="checkbox"/> 1 – extremely difficult; <input type="checkbox"/> 2; <input type="checkbox"/> 3 - okay<br><input type="checkbox"/> 4; <input type="checkbox"/> 5 – very easy                                 |
| Comments or suggestions for improvements?  |   |
| <b>Billing Data</b>  |   |
| Please rate the level of effort required to provide the billing data for 2018 and 2019.  | <input type="checkbox"/> 1 – extremely difficult; <input type="checkbox"/> 2; <input type="checkbox"/> 3 - okay<br><input type="checkbox"/> 4; <input type="checkbox"/> 5 – very easy                                 |
| Please comment on the level of effort required to provide billing data in the format requested.                                      |   |
| Comments or suggestions for improvements?  |   |
| <b>Report 2017*</b>  |   |
| Identify sections of the report you find most useful and why?  |   |
| Which sections did not have any relevance to your organization at this time? How could this be improved?                             |   |
| Were there any metric, measure, or comparison that you feel could be of value to the region and should be included? Please suggest.  |   |
| <b>Other Feedback</b>  |   |
| MV wishes to move towards an annual reporting cycle. Please rate your organization’s interest and readiness towards this initiative. | <input type="checkbox"/> 1 – no interest, not ready; <input type="checkbox"/> 2; <input type="checkbox"/> 3 – makes no difference<br><input type="checkbox"/> 4; <input type="checkbox"/> 5 – very interested, ready. |

\*For a copy of the 2017 Report, please contact Stephanie Erickson, at Policy, Planning & Analysis, Water Services by phone 604/436-6893 or email [Stephanie.Erickson@metrovancover.org](mailto:Stephanie.Erickson@metrovancover.org)

# APPENDIX 3 – QUESTIONNAIRE AND BILLING DATA

These are images of the questionnaire and billing data templates provided with the Request for Data.

## Municipal Questionnaire

Municipal Questionnaire - MUNICIPALITYNAME

- Enter values for yellow cells
- Click on cell to select from dropdown menu for green cells

### Instructions

|  |  |  |
|--|--|--|
| <b>1.0 General Billing Systems Information</b>                                     |  |  |
| 1.1 Year of submission   |  | Enter year of submission (e.g. 2018, 2019)                           |
| 1.2 Billing system used  |  | Specify if "Other"   |
| 1.3 Billing frequency 1  |  | Select from dropdown menu  |
| Billing frequency 2  |  | Select from dropdown menu, select N/A if no second billing frequency |
| 1.4 Unit of measure used   |  | Select from dropdown menu  |
| 1.5 Comments   |  | Please provide any additional comments here                          |
| <hr/>  |  |  |
| <b>2.0 Population and Serviced Connections</b>                                     |  |  |
| 2.1 Total municipal population   |  | Provide total estimated municipal population                         |
| 2.2 Municipal population served with water from municipal sources                  |  | If no municipal sources, enter 0                                     |
| 2.3 Municipal population served by private wells                                   |  | If no private wells, enter 0   |
| 2.4 Total number of serviced connections   |  | Provide total number of serviced connections (metered and unmetered) |
| 2.5 Comments   |  | Please provide any additional comments here                          |
| <hr/>  |  |  |
| <b>3.0 Water Use Information</b>   |  |  |
| 3.1 Estimate of system losses (leaks etc.)   |  | Enter as a percentage of total annual water use (1-100%)             |
| 3.2 Quantity of water from municipal sources (non-GVWD) in m3                      |  | If no municipal sources, enter 0                                     |
| 3.3 Please indicate if the following municipal connections are unmetered:          |  |  |
| - Public schools   |  | Select from dropdown menu  |
| - Public parks   |  | Select from dropdown menu  |
| - Public Washrooms   |  | Select from dropdown menu  |
| - City yards   |  | Select from dropdown menu  |
| - Cemeteries   |  | Select from dropdown menu  |
| - Firehalls  |  | Select from dropdown menu  |
| - Other  |  | Select from dropdown menu  |
| - Please specify other unmetered municipal water uses                              |  | Please specify, n/a if none  |
| 3.4 Please indicate the estimated overall level of metering for each type of user: |  |  |
| - Single-family (can also include basement suites, laneway houses, etc.)           |  | Select from dropdown menu  |
| - Multi-family   |  | Select from dropdown menu  |
| - Commercial   |  | Select from dropdown menu  |
| - Industrial   |  | Select from dropdown menu  |
| - Institutional  |  | Select from dropdown menu  |
| - Agricultural   |  | Select from dropdown menu  |
| - All other metered  |  | Select from dropdown menu  |
| - Please specify other water uses  |  | Please specify, n/a if none  |
| 3.5 Comments   |  | Please provide any additional comments here                          |
| <hr/>  |  |  |
| <b>4.0 Water Billing Rates (not yet customized for Anmore)</b>                     |  |  |
| 4.1 Unmetered Services - Annual Flat Rate Charges (\$/year):                       |  |  |
| - Detached single-family   |  | Enter as an annual flat rate (\$/year)                               |
| - Single-family within duplex  |  | Enter as an annual flat rate (\$/year)                               |
| - Single-family within multiple  |  | Enter as an annual flat rate (\$/year)                               |
| - Commercial and one living quarter  |  | Enter as an annual flat rate (\$/year)                               |
| - Commercial with no living quarters   |  | Enter as an annual flat rate (\$/year)                               |
| 4.2 Metered Services - Water Rates per Cubic Metre (\$/m3):                        |  |  |
| - All water consumed   |  | Enter as a metered rate (\$/m3)                                      |
| - Minimum monthly charge   |  | Enter as a flat rate (\$/billing period)                             |
| - Minimum quarterly charge   |  | Enter as a flat rate (\$/billing period)                             |
| 4.3 Sewer Rates per Cubic Metre:   |  |  |
| - Sewer rates based on what % of water consumption                                 |  | Enter as a percentage of total water use (1-100%)                    |
| - First 288 m3 for monthly billing, 864 m3 for quarterly billing                   |  | Enter as a metered rate (\$/m3)                                      |
| - Next 300 m3 for monthly billing, 900 m3 for quarterly billing                    |  | Enter as a metered rate (\$/m3)                                      |
| - Next 850 m3 for monthly billing, 2,550 m3 for quarterly billing                  |  | Enter as a metered rate (\$/m3)                                      |
| - In excess  |  | Enter as a metered rate (\$/m3)                                      |
| 4.4 Comments   |  | Please provide any additional comments here                          |
| <hr/>  |  |  |
| <b>5.0 General Comments</b>  |  |  |
| Please provide any general comments  |  |  |

**Billing Data SAMPLE\_XLS**

| Unique Customer ID | Actual Use Code | Billing Year | Billing month | Billing day | Billing Volume |
|--------------------|-----------------|--------------|---------------|-------------|----------------|
| 107090             | 0               | 2016         | 3             | 31          | 38             |
| 102297             | 0               | 2016         | 3             | 31          | 96             |
| 101273             | 0               | 2016         | 3             | 31          | 91             |
| 101313             | 2               | 2016         | 3             | 31          | 87             |
| 109903             | 216             | 2016         | 9             | 30          | 33             |
| 103371             | 403             | 2016         | 12            | 31          | 2505           |
| 101714             | 405             | 2016         | 12            | 31          | 275            |
| 101234             | 0               | 2016         |               |             | 273.4          |
| 101236             | 190             | 2016         |               |             | 18486.32       |
| 101237             | 110             | 2016         |               |             | 1218.93        |
| 101238             | 160             | 2016         |               |             | 55998.73       |
| 101239             | 180             | 2016         |               |             | 2527.83        |
| 101210             | 60              | 2016         |               |             | 1403.85        |
| 102211             | 225             | 2016         |               |             | 289.26         |
| 102212             | 208             | 2016         |               |             | 404.2          |
| 102213             | 225             | 2016         |               |             | 7391.34        |
| 102214             | 200             | 2016         |               |             | 1231.08        |
| 102215             | 642             | 2016         |               |             | 7447.34        |
| 15602              | 30              | 2016         | 1             |             | 242            |
| 15602              | 30              | 2016         | 2             |             | 255            |
| 15602              | 30              | 2016         | 3             |             | 216            |
| 15602              | 30              | 2016         | 4             |             | 262            |
| 15602              | 30              | 2016         | 5             |             | 227            |
| 15602              | 30              | 2016         | 6             |             | 262            |
| 15602              | 30              | 2016         | 7             |             | 259            |
| 15602              | 30              | 2016         | 8             |             | 271            |
| 15602              | 30              | 2016         | 9             |             | 303            |
| 15602              | 30              | 2016         | 10            |             | 247            |
| 15602              | 30              | 2016         | 11            |             | 289            |
| 15602              | 30              | 2016         | 12            |             | 274            |

**Billing Data SAMPLE CSV**

|        |     |      |    |    |          |
|--------|-----|------|----|----|----------|
| 107090 | 0   | 2016 | 3  | 31 | 38       |
| 102297 | 0   | 2016 | 3  | 31 | 96       |
| 101273 | 0   | 2016 | 3  | 31 | 91       |
| 101313 | 2   | 2016 | 3  | 31 | 87       |
| 109903 | 216 | 2016 | 9  | 30 | 33       |
| 103371 | 403 | 2016 | 12 | 31 | 2505     |
| 101714 | 405 | 2016 | 12 | 31 | 275      |
| 101234 | 0   | 2016 |    |    | 273.4    |
| 101236 | 190 | 2016 |    |    | 18486.32 |
| 101237 | 110 | 2016 |    |    | 1218.93  |
| 101238 | 160 | 2016 |    |    | 55998.73 |
| 101239 | 180 | 2016 |    |    | 2527.83  |
| 101210 | 60  | 2016 |    |    | 1403.85  |
| 102211 | 225 | 2016 |    |    | 289.26   |
| 102212 | 208 | 2016 |    |    | 404.2    |
| 102213 | 225 | 2016 |    |    | 7391.34  |
| 102214 | 200 | 2016 |    |    | 1231.08  |
| 102215 | 642 | 2016 |    |    | 7447.34  |
| 15602  | 30  | 2016 | 1  |    | 242      |
| 15602  | 30  | 2016 | 2  |    | 255      |
| 15602  | 30  | 2016 | 3  |    | 216      |
| 15602  | 30  | 2016 | 4  |    | 262      |
| 15602  | 30  | 2016 | 5  |    | 227      |
| 15602  | 30  | 2016 | 6  |    | 262      |
| 15602  | 30  | 2016 | 7  |    | 259      |
| 15602  | 30  | 2016 | 8  |    | 271      |
| 15602  | 30  | 2016 | 9  |    | 303      |
| 15602  | 30  | 2016 | 10 |    | 247      |
| 15602  | 30  | 2016 | 11 |    | 289      |
| 15602  | 30  | 2016 | 12 |    | 274      |

## **Appendix B: Classification Codes**

*General Sector Descriptions*

| General Sector | Description               | Notes  |
|----------------|---------------------------|--|
| 1              | Single-Family Residential | Single-family  |
| 2              | Multi-Family Residential  | Duplexes, strata, apartments, etc.                                     |
| 3              | Commercial                | Services, restaurants, retail, wholesale                               |
| 4              | Institutional             | Education, religious buildings, recreation and parks, government       |
| 5              | Industrial                | Manufacturing, processing chemical, foods, forestry, mining, petroleum |
| 6              | Agricultural              | Farms and farm related   |
| 7              | Other                     | Transportation, utilities, miscellaneous                               |

*British Columbia Assessment Authority (BCAA) Actual Use Codes*

| BCAA Actual Use Code | Description                             |
|----------------------|---|
| 0 – 70               | Residential                             |
| 110 – 191            | Farm                                    |
| 200 – 290            | Commercial                              |
| 400 – 490            | Industrial                              |
| 415 – 429            | Industrial – Forestry                   |
| 430 – 438            | Industrial – Petroleum                  |
| 500 – 590            | Transportation, Communications, Utility |
| 600 – 670            | Civic, Institutional, Other             |

*By Sector Classification (BSC) Codes*

| BSC Code | Sector                       |
|----------|------------------------------|
| 0        | Single-Family Residential    |
| 1        | Agriculture                  |
| 2        | Business & Offices           |
| 3        | Construction                 |
| 4        | Dairy and Meat Products      |
| 5        | Education                    |
| 6        | Forest Products              |
| 7        | General Food Products        |
| 8        | Grain and Vegetable Products |
| 9        | Hospitality                  |
| 10       | Industries                   |
| 11       | Medical and Health           |
| 12       | Petroleum and Allied         |
| 13       | Recreation                   |
| 14       | Religious and Cultural       |
| 15       | Restaurants                  |
| 16       | Retail Shopping and Stores   |
| 17       | Service Stations             |
| 18       | Transportation               |
| 19       | Warehouses                   |
| 20       | Utilities and Miscellaneous  |
| 21       | Multi-Family Residential     |



## BCAA Actual Use Codes Conversion to By Sector Classification (BSC) codes and General Sector Codes

| Actual Use Code | Description | By Sector Code | General Sector |
|-----------------|-------------|----------------|----------------|
|-----------------|-------------|----------------|----------------|

### Single-Family Residential

|     |   |   |   |
|-----|---|---|---|
| 000 | SINGLE FAMILY DWELLING                              | 0 | 1 |
| 001 | VACANT RESIDENTIAL LESS THAN 2 ACRES                | 0 | 1 |
| 002 | PROPERTY SUBJECT TO SEC 19(8)                       | 0 | 1 |
| 020 | RESIDENTIAL OUTBUILDING ONLY                        | 0 | 1 |
| 032 | SINGLE FAMILY DWELLING WITH BASEMENT SUITE          | 0 | 1 |
| 037 | MANUFACTURED HOME - (WITHIN MANUFACTURED HOME PARK) | 0 | 1 |
| 038 | MANUFACTURED HOME - (NOT IN MANUFACTURED HOME PARK) | 0 | 1 |
| 040 | SEASONAL DWELLING                                   | 0 | 1 |
| 060 | 2 ACRES OR MORE - SINGLE FAMILY DWELLING, DUPLEX    | 0 | 1 |
| 061 | 2 ACRES OR MORE - VACANT                            | 0 | 1 |
| 062 | 2 ACRES OR MORE - SEASONAL DWELLING                 | 0 | 1 |
| 063 | 2 ACRES OR MORE - MANUFACTURED HOME                 | 0 | 1 |
| 070 | 2 ACRES OR MORE - OUTBUILDING                       | 0 | 1 |

### Agriculture

|     |                            |   |   |
|-----|----------------------------|---|---|
| 110 | GRAIN & FORAGE             | 1 | 6 |
| 111 | GRAIN & FORAGE - VACANT    | 1 | 6 |
| 120 | VEGETABLE & TRUCK          | 1 | 6 |
| 121 | VEGETABLE & TRUCK - VACANT | 1 | 6 |
| 130 | TREE FRUITS                | 1 | 6 |
| 131 | TREE FRUITS - VACANT       | 1 | 6 |
| 140 | SMALL FRUITS               | 1 | 6 |
| 141 | SMALL FRUITS - VACANT      | 1 | 6 |
| 150 | BEEF                       | 1 | 6 |
| 151 | BEEF - VACANT              | 1 | 6 |
| 160 | DAIRY                      | 1 | 6 |
| 161 | DAIRY - VACANT             | 1 | 6 |
| 170 | POULTRY                    | 1 | 6 |
| 171 | POULTRY - VACANT           | 1 | 6 |
| 180 | MIXED                      | 1 | 6 |
| 181 | MIXED - VACANT             | 1 | 6 |
| 190 | OTHER                      | 1 | 6 |
| 191 | OTHER - VACANT             | 1 | 6 |

### Business & Offices

|     |                               |   |   |
|-----|-------------------------------|---|---|
| 208 | OFFICE BUILDING (PRIMARY USE) | 2 | 3 |
| 210 | BANK                          | 2 | 3 |
| 216 | COMMERCIAL STRATA-LOT         | 2 | 3 |
| 217 | AIR SPACE TITLE               | 2 | 3 |

| Actual Use Code | Description   | By Sector Code | General Sector |
|-----------------|---|----------------|----------------|
| 219             | STRATA LOT - PARKING COMMERCIAL                         | 2              | 3              |
| 228             | AUTOMOBILE PAINT SHOP, GARAGES, ETC.                    | 2              | 3              |
| 260             | PARKING - LOT ONLY, PAVED OR GRAVEL                     | 2              | 3              |
| 262             | PARKING GARAGE  | 2              | 3              |
| 288             | SIGN OR BILLBOARD ONLY                                  | 2              | 3              |
| 490             | PARKING LOT ONLY (PAVED OR GRAVEL)                      | 2              | 5              |
| 620             | GOVERNMENT BUILDINGS (INCLUDES COURTHOUSE, POST OFFICE) | 2              | 4              |

#### Construction

|     |                                     |   |   |
|-----|-------------------------------------|---|---|
| 276 | LUMBER YARD OR BUILDING SUPPLIES    | 3 | 3 |
| 445 | SAND & GRAVEL (VACANT AND IMPROVED) | 3 | 5 |
| 446 | CEMENT PLANTS                       | 3 | 5 |
| 447 | ASPHALT PLANTS                      | 3 | 5 |
| 448 | CONCRETE MIXING PLANTS              | 3 | 5 |

#### Dairy and Meat Products

|     |                |   |   |
|-----|----------------|---|---|
| 402 | MEAT & POULTRY | 4 | 5 |
| 403 | SEA FOOD       | 4 | 5 |
| 404 | DAIRY PRODUCTS | 4 | 5 |

#### Education

|     |  |   |   |
|-----|--|---|---|
| 650 | SCHOOLS & UNIVERSITIES, COLLEGE OR TECHNICAL SCHOOLS | 5 | 4 |
|-----|--|---|---|

#### Forest Products

|     |   |   |   |
|-----|---|---|---|
| 415 | SAWMILLS  | 6 | 5 |
| 416 | PLANER MILLS (WHEN SEPARATE FROM SAWMILL)             | 6 | 5 |
| 417 | PLYWOOD MILLS   | 6 | 5 |
| 418 | SHINGLE MILLS   | 6 | 5 |
| 419 | SASH & DOOR   | 6 | 5 |
| 420 | LUMBER REMANUFACTURING (WHEN SEPARATE FROM SAWMILL)   | 6 | 5 |
| 421 | VACANT  | 6 | 5 |
| 424 | PULP & PAPER MILLS (INCLUDING FINE PAPER)             | 6 | 5 |
| 425 | PAPER BOX, PAPER BAG, AND OTHER PAPER REMANUFACTURING | 6 | 5 |
| 426 | LOGGING OPERATIONS                                    | 6 | 5 |
| 427 | LOGGING ROADS & BRIDGES                               | 6 | 5 |
| 428 | IMPROVED  | 6 | 5 |
| 429 | MISCELLANEOUS (FOREST AND ALLIED INDUSTRY)            | 6 | 5 |

#### General Food Products

|     |  |   |   |
|-----|--|---|---|
| 406 | CONFECTIONERY MANUFACTURING & SUGAR PROCESSING | 7 | 5 |
| 407 | SOFT DRINK BOTTLING                            | 7 | 5 |
| 414 | MISCELLANEOUS (FOOD PROCESSING)                | 7 | 5 |

#### Grain and Vegetable Products

|     |                                |   |   |
|-----|--------------------------------|---|---|
| 400 | FRUIT & VEGETABLE              | 8 | 5 |
| 405 | BAKERY & BISCUIT MANUFACTURING | 8 | 5 |

| Actual Use Code | Description                             | By Sector Code | General Sector |
|-----------------|---|----------------|----------------|
| 408             | BREWERY                                 | 8              | 5              |
| 409             | WINERY                                  | 8              | 5              |
| 410             | DISTILLERY                              | 8              | 5              |
| 413             | FLOUR MILLS & BREAKFAST CEREAL PRODUCTS | 8              | 5              |

#### Hospitality

|     |   |   |   |
|-----|---|---|---|
| 230 | HOTEL                                       | 9 | 3 |
| 232 | MOTEL & AUTO COURT                          | 9 | 3 |
| 233 | INDIVIDUAL STRATA LOT - HOTEL/MOTEL         | 9 | 3 |
| 237 | BED & BREAKFAST OPERATION 4 OR MORE UNITS   | 9 | 3 |
| 239 | BED & BREAKFAST OPERATION LESS THAN 4 UNITS | 9 | 3 |

#### Industries

|     |  |    |   |
|-----|--|----|---|
| 401 | INDUSTRIAL - VACANT                                    | 10 | 5 |
| 412 | FEED MANUFACTURING                                     | 10 | 5 |
| 440 | MINING - COAL  | 10 | 5 |
| 442 | MINING & MILLING - METALLIC                            | 10 | 5 |
| 443 | MINING & MILLING - NON-METALLIC (INCLUDING ASBESTOS)   | 10 | 5 |
| 444 | SMELTING & REFINING                                    | 10 | 5 |
| 449 | MISCELLANEOUS (MINING AND ALLIED INDUSTRIES)           | 10 | 5 |
| 450 | RUBBER & PLASTICS PRODUCTS                             | 10 | 5 |
| 452 | LEATHER INDUSTRY                                       | 10 | 5 |
| 454 | TEXTILES & KNITTING MILLS                              | 10 | 5 |
| 456 | CLOTHING INDUSTRY                                      | 10 | 5 |
| 458 | FURNITURE & FIXTURES INDUSTRY                          | 10 | 5 |
| 460 | PRINTING & PUBLISHING INDUSTRY                         | 10 | 5 |
| 462 | PRIMARY METAL INDUSTRIES (IRON & STEEL MILLS           | 10 | 5 |
| 464 | METAL FABRICATING INDUSTRIES                           | 10 | 5 |
| 466 | MACHINERY MANUFACTURING (EXCLUDING ELECTRICAL)         | 10 | 5 |
| 468 | TRANSPORTATION EQUIPMENT INDUSTRY (INCLUDING AIRCRAFT) | 10 | 5 |
| 470 | ELECTRICAL & ELECTRONICS PRODUCTS INDUSTRY             | 10 | 5 |
| 472 | CHEMICAL & CHEMICAL PRODUCTS INDUSTRIES                | 10 | 5 |
| 474 | MISCELLANEOUS & (INDUSTRIAL OTHER)                     | 10 | 5 |

#### Medical and Health

|     |   |    |   |
|-----|---|----|---|
| 285 | NURSING HOME  | 11 | 3 |
| 286 | CONGREGATE CARE FACILITY                              | 11 | 3 |
| 287 | GROUP HOME  | 11 | 3 |
| 640 | HOSPITALS (NURSING HOMES REFER TO COMMERCIAL SECTION) | 11 | 4 |

#### Petroleum and Allied

|     |   |    |   |
|-----|---|----|---|
| 430 | PETROLEUM AND GAS EXPLORATION (INCLUDING OIL AND GAS) | 12 | 5 |
| 431 | PRODUCTION PIPELINES                                  | 12 | 5 |
| 432 | OIL REFINING PLANTS                                   | 12 | 5 |
| 433 | GAS SCRUBBING PLANTS                                  | 12 | 5 |

| Actual Use Code | Description                             | By Sector Code | General Sector |
|-----------------|---|----------------|----------------|
| 434             | PETROLEUM BULK PLANTS                   | 12             | 5              |
| 435             | LIQUID GAS STORAGE PLANTS               | 12             | 5              |
| 436             | OIL & GAS TRANSPORTATION PIPELINES      | 12             | 5              |
| 437             | OIL & GAS PUMPING & COMPRESSOR STATIONS | 12             | 5              |
| 438             | MISCELLANEOUS (PETROLEUM INDUSTRY)      | 12             | 5              |

#### Recreation

|     |  |    |   |
|-----|--|----|---|
| 234 | MANUFACTURED HOME PARK                               | 13 | 3 |
| 236 | CAMPGROUND (COMMERCIAL)                              | 13 | 3 |
| 238 | SEASONAL RESORT                                      | 13 | 3 |
| 250 | THEATRE BUILDINGS                                    | 13 | 3 |
| 252 | DRIVE-IN THEATRES                                    | 13 | 3 |
| 266 | BOWLING ALLEY  | 13 | 3 |
| 270 | HALL (COMMUNITY, LODGE, CLUB, ETC.)                  | 13 | 3 |
| 600 | RECREATIONAL & CULTURAL BUILDINGS (INCLUDES CURLING) | 13 | 4 |
| 601 | CIVIC, INSTITUTIONAL & RECREATIONAL - VACANT         | 13 | 4 |
| 610 | PARKS & PLAYING FIELDS                               | 13 | 4 |
| 612 | GOLF COURSES (INCLUDES PUBLIC & PRIVATE)             | 13 | 4 |
| 614 | CAMPGROUNDS (INCLUDES GOVERNMENT CAMPGROUNDS, YMCA)  | 13 | 4 |
| 654 | RECREATIONAL CLUBS, SKI HILLS                        | 13 | 4 |
| 660 | LAND CLASSIFIED RECREATIONAL USED FOR                | 13 | 4 |

#### Religious and Cultural

|     |   |    |   |
|-----|---|----|---|
| 642 | CEMETERIES (INCLUDES PUBLIC OR PRIVATE) | 14 | 4 |
| 652 | CHURCHES & BIBLE SCHOOLS                | 14 | 4 |

#### Restaurants

|     |                       |    |   |
|-----|-----------------------|----|---|
| 254 | NEIGHBOURHOOD PUB     | 15 | 3 |
| 256 | RESTAURANT ONLY       | 15 | 3 |
| 257 | FAST FOOD RESTAURANTS | 15 | 3 |
| 258 | DRIVE-IN RESTAURANT   | 15 | 3 |

#### Retail Shopping and Stores

|     |                                       |    |   |
|-----|---------------------------------------|----|---|
| 200 | STORE(S) AND SERVICE - COMMERCIAL     | 16 | 3 |
| 201 | VACANT                                | 16 | 3 |
| 202 | STORE(S) AND LIVING QUARTERS          | 16 | 3 |
| 203 | STORES AND/OR OFFICES WITH APARTMENTS | 16 | 3 |
| 204 | STORE(S) AND OFFICES                  | 16 | 3 |
| 206 | NEIGHBOURHOOD STORE                   | 16 | 3 |
| 209 | SHOPPING CENTRE - NEIGHBOURHOOD       | 16 | 3 |
| 211 | SHOPPING CENTRE - COMMUNITY           | 16 | 3 |
| 212 | DEPARTMENT STORE                      | 16 | 3 |
| 213 | SHOPPING CENTRE - REGIONAL            | 16 | 3 |
| 214 | SHOPPING CENTRE                       | 16 | 3 |

| Actual Use Code | Description                                | By Sector Code | General Sector |
|-----------------|--|----------------|----------------|
| 215             | FOOD MARKET                                | 16             | 3              |
| 220             | AUTOMOBILE DEALERSHIP                      | 16             | 3              |
| 227             | AUTOMOBILE SALES (LOT)                     | 16             | 3              |
| 240             | GREENHOUSES AND NURSERIES (NOT FARM CLASS) | 16             | 3              |
| 290             | MISCELLANEOUS RETAIL STORES                | 16             | 3              |

#### Service Stations

|     |                                   |    |   |
|-----|-----------------------------------|----|---|
| 222 | SERVICE STATION                   | 17 | 3 |
| 224 | SELF-SERVE SERVICE STATION        | 17 | 3 |
| 225 | CONVENIENCE STORE/SERVICE STATION | 17 | 3 |
| 226 | CAR WASH                          | 17 | 3 |

#### Transportation

|     |   |    |   |
|-----|---|----|---|
| 280 | MARINE FACILITIES - MARINA                        | 18 | 3 |
| 476 | GRAIN ELEVATORS                                   | 18 | 5 |
| 478 | DOCKS & WHARVES                                   | 18 | 5 |
| 480 | SHIPYARDS   | 18 | 5 |
| 500 | RAILWAY   | 18 | 7 |
| 505 | MARINE & NAVIGATIONAL FACILITIES (INCLUDES FERRY) | 18 | 7 |
| 510 | BUS COMPANY, INCLUDING STREET RAILWAY             | 18 | 7 |
| 515 | AIRPORTS, HELIPORTS, ETC                          | 18 | 7 |
| 590 | MISCELLANEOUS (TRANSPORTATION & COMMUNICATION)    | 18 | 7 |
| 622 | ALRT  | 18 | 7 |
| 623 | ALRT/MIXED USE                                    | 18 | 7 |

#### Warehouses

|     |  |    |   |
|-----|--|----|---|
| 218 | STRATA-LOT SELF STORAGE-BUSINESS USE   | 19 | 3 |
| 272 | STORAGE & WAREHOUSING - OPEN           | 19 | 3 |
| 273 | STORAGE & WAREHOUSING - CLOSED         | 19 | 3 |
| 274 | STORAGE & WAREHOUSING - COLD           | 19 | 3 |
| 488 | STRATA-LOT SELF STORAGE-INDUSTRIAL USE | 19 | 5 |

#### Utilities and Miscellaneous

|     |   |    |   |
|-----|---|----|---|
| 520 | TELEPHONE   | 20 | 7 |
| 525 | FIBEROPTIC CONDUIT  | 20 | 7 |
| 530 | TELECOMMUNICATIONS (OTHER THAN TELEPHONE)                   | 20 | 7 |
| 540 | COMMUNITY ANTENNA TELEVISION (CABLEVISION)                  | 20 | 7 |
| 550 | GAS DISTRIBUTION SYSTEMS                                    | 20 | 7 |
| 560 | WATER DISTRIBUTION SYSTEMS                                  | 20 | 7 |
| 570 | IRRIGATION SYSTEMS  | 20 | 7 |
| 580 | ELECTRICAL POWER SYSTEMS (INCLUDING NON-UTILITY)            | 20 | 7 |
| 615 | GOVERNMENT RESERVES (INCLUDES GREENBELTS (NOT IN FARM USE)) | 20 | 4 |
| 625 | GARBAGE DUMPS, SANITARY FILLS, SEWER LAGOONS, ETC.          | 20 | 7 |
| 630 | WORKS YARDS   | 20 | 4 |

| Actual Use Code | Description  | By Sector Code | General Sector |
|-----------------|--|----------------|----------------|
| 632             | RANGER STATION                                     | 20             | 4              |
| 634             | GOVERNMENT RESEARCH CENTRES (INCLUDES NURSERIES &) | 20             | 4              |
| 670             | AMUSEMENT & RECREATION, OTHRS NEC                  | 20             | 7              |

**Multi-Family Residential**

|     |  |    |   |
|-----|--|----|---|
| 029 | STRATA LOT - PARKING RESIDENTIAL                   | 21 | 2 |
| 030 | STRATA-LOT RESIDENCE (CONDOMINIUM)                 | 21 | 2 |
| 031 | STRATA-LOT SELF STORAGE-RES USE                    | 21 | 2 |
| 033 | DUPLEX   | 21 | 2 |
| 034 | DUPLEX - UP & DOWN                                 | 21 | 2 |
| 035 | DUPLEX - SINGLE UNIT OWNERSHIP                     | 21 | 2 |
| 039 | ROW HOUSING - SINGLE UNIT OWNERSHIP                | 21 | 2 |
| 042 | STRATA-LOT SEASONAL DWELLING (CONDOMINIUM)         | 21 | 2 |
| 043 | PARKING - LOT ONLY, PAVED OR GRAVEL                | 21 | 2 |
| 047 | TRIPLEX  | 21 | 2 |
| 049 | FOURPLEX   | 21 | 2 |
| 050 | MULTI-FAMILY - APARTMENT BLOCK                     | 21 | 2 |
| 051 | MULTI-FAMILY - VACANT                              | 21 | 2 |
| 052 | MULTI-FAMILY - GARDEN APARTMENT & ROW HOUSING      | 21 | 2 |
| 053 | MULTI-FAMILY - CONVERSION                          | 21 | 2 |
| 054 | MULTI-FAMILY - HIGH-RISE                           | 21 | 2 |
| 055 | MULTI-FAMILY - MINIMAL COMMERCIAL                  | 21 | 2 |
| 056 | MULTI-FAMILY - RESIDENTIAL HOTEL                   | 21 | 2 |
| 057 | STRATIFIED RENTAL TOWNHOUSE                        | 21 | 2 |
| 058 | STRATIFIED RENTAL APARTMENT - FRAME CONSTRUCTION   | 21 | 2 |
| 059 | STRATIFIED RENTAL APARTMENT - HI-RISE CONSTRUCTION | 21 | 2 |



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To: Water Committee

From: Jesse Montgomery, Division Manager, Environment, Water Services

Date: October 22, 2021 Meeting Date: November 4, 2021

Subject: **Watershed Fisheries Initiatives Annual Update**

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### **RECOMMENDATION**

That the Water Committee receive for information the report dated October 22, 2021, titled "Watershed Fisheries Initiatives Annual Update".

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### **EXECUTIVE SUMMARY**

As a component of organizational contributions, GVWD manages and participates in fisheries initiatives both upstream and downstream of the dams that define the three water supply areas in the Capilano, Seymour and Coquitlam River Watersheds. Liquid Waste Services, Regional Parks, Water Services and other Metro Vancouver departments collectively contribute to Pacific salmon conservation and restoration. GVWD strives to ensure fisheries protection and enhancement initiatives are evaluated, planned and implemented in a manner which consistently meets the Capilano Seymour Joint Water Use Plan and the Board Strategic Plan goal to *Work with First Nations and fisheries agencies in supporting the restoration of fish populations in the watersheds while maintaining the delivery of clean, safe drinking water.*

### **PURPOSE**

To provide the Committee with an annual update on fisheries initiatives and activities associated with the Capilano, Seymour and Coquitlam Watersheds.

### **BACKGROUND**

To facilitate Metro Vancouver's mandate of providing high quality drinking water as well as to actively support local fisheries initiatives, Metro Vancouver collaborates with Fisheries and Oceans Canada (DFO), the Ministry of Forests, Lands, Natural Resource Operations and Rural Development (FLNRORD), BC Hydro, First Nations and stewardship groups. The initiatives described in this report are based on years of collaboration and rigorous scientific assessment. Climate change considerations such as shifting water temperature and river flow regimes are integrated into project planning.

As fisheries management and instream project works are winding down for the 2021 season, this report provides the Committee with an update on activities as identified in the Committee's 2021 Work Plan.

### **WATERSHED FISHERIES INITIATIVES**

#### **Capilano Watershed**

The Capilano River Hatchery is located downstream of Cleveland Dam and is operated by DFO. The Capilano River Hatchery is currently in the design phase of a comprehensive redevelopment of the 50-year-old facility; staff are working with DFO to support this project, primarily in water supply



configurations from GVWD infrastructure. The hatchery annually transports a maximum of 7,500 adult coho salmon and all surplus steelhead trout (averaging 30 adults) upstream of the Capilano Reservoir to spawn. Staff worked with DFO this past summer to upgrade adult fish release infrastructure upstream of the dam.

Metro Vancouver staff have been actively capturing out-migrating juvenile salmon and trout (smolts) since 2008 in an effort to improve fish survival rates past Cleveland Dam. Staff successfully captured and transported 43,297 Coho and 461 Steelhead smolts from upstream of the dam to the Capilano River Estuary (Image 1). The total catch is the second most on record and was made possible by dam operational strategies in which spillway discharge was minimized during the peak out-migration.

Staff worked on fish passage improvements through upper watershed drainage structures (bridges and culverts) to improve fish habitat connectivity from the mainstem of the Capilano River to its productive tributary streams. At Enchantment Creek, a rock ramp was installed on the downstream side of the bridge crossing to help improve fish passage during low flow periods (Image 2). Metal baffles were also installed to help concentrate flows passing under the bridge towards the newly constructed rock ramp.

As follow-up to a fish stranding study in the Capilano River downstream of Cleveland Dam, completed under The *Water Sustainability Act* order for the Capilano Seymour Joint Water Use Plan (JWUP), staff continue to work on opportunities to minimize impacts to fisheries. An effectiveness assessment of the Capilano Fish Trap and Truck Program is nearing completion (year-end) and is the last of three pre-hydropower development ordered monitoring studies required under the JWUP order.

### **Seymour Watershed**

The Seymour Salmonid Society operates the Seymour River Hatchery immediately downstream of Seymour Falls Dam. Hatchery operations are funded by DFO, Metro Vancouver and community sponsors. In September 2020, the GVWD Board approved renewal of the Contribution Agreement with the Seymour Salmonid Society, which provides \$125,000 in annual core funding through December 31, 2023.

The Seymour Salmonid Society has also led ongoing efforts to restore fish passage past the rockslide that blocked the river channel 13 kilometres downstream of the Seymour Falls Dam in December 2014. Rock-breaking operations have been continually undertaken and this fall has seen the largest return of Coho salmon upstream past the rockslide since it initially blocked fish passage. These returning adult Coho will either naturally spawn in the river downstream of the dam; be captured and transported to the hatchery for processing or be captured and transported to the Seymour River upstream of the dam for natural spawning. In addition, 40,000 Coho fry raised at the hatchery were again transported upstream of Seymour Falls Dam this spring. 2021 also saw a strong return of adult Pink salmon to the Seymour River downstream of the rockslide, some of which were collected to be utilized for hatchery propagation.

The *Water Sustainability Act* order for the Capilano Seymour Joint Water Use Plan required a Fish Stranding Study be completed in the Seymour River downstream of Seymour Falls Dam. This study is currently underway (extended from 2020) and may identify some opportunities for improvement in

dam operations to minimize impacts to downstream fish populations. A final report is expected by year-end.

### **Coquitlam Watershed**

Metro Vancouver staff continue to participate in the Kwikwetlem Sockeye Restoration Program (KSRP), in collaboration with BC Hydro, Kwikwetlem First Nation, local and senior government agencies, as well as community stewardship groups. Staff continue their work with the KSRP partnership to support the construction of BC Hydro's Coquitlam Sockeye Hatchery near their dam facility. This support is currently proposed to include a critical primary water supply from adjacent GVWD infrastructure. The facility is anticipated to form a key aspect building toward restoration of a Sockeye population, a critical cultural restoration goal of the Kwikwetlem First Nation.

As follow-up to last year's transport of adult Coho salmon upstream of Coquitlam Dam, there are plans again this fall to transport up to 100 Coho adults for natural spawning in Coquitlam Lake tributaries. Coho salmon returns have been encouraging this year in the Capilano, Seymour and Coquitlam rivers.

### **ALTERNATIVES**

This is an information report; no alternatives are presented.

### **FINANCIAL IMPLICATIONS**

The initiatives described in this report have been funded from the Watershed and Environment Program budget as well as through partnerships with other organizations.

### **CONCLUSION**

Metro Vancouver continues to proactively participate in a variety of meaningful fisheries initiatives both upstream and downstream of the dams that define the three water supply areas in the Capilano, Seymour and Coquitlam River Watersheds. A key Metro Vancouver objective is to ensure fisheries protection and enhancement initiatives are evaluated, planned and implemented in a manner which consistently meets the District's mandate of providing high quality drinking water supplies.

### **Attachment**

2021 fisheries field work photos

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Image 1: Releasing Coho and Steelhead smolts at Burrard Inlet (GVWD First Narrows North Shaft site).



Image 2: Fish passage improvements at the Enchantment Creek bridge crossing in the upper Capilano Watershed.



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To: Water Committee

From: Marilyn Towill, General Manager, Water Services

Date: October 21, 2021 Meeting Date: November 4, 2021

Subject: **Manager's Report**

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## RECOMMENDATION

That the Water Committee receive for information the report dated October 21, 2021, titled "Manager's Report".

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### 1. Reservoir Limnology Program

Limnology is the study of inland waters, lakes, reservoirs and rivers, and includes the measurement of physical, chemical and biological parameters. The Watershed and Environment group will complete the 2021 reservoir limnology sampling season in late November. Water samples are collected from April through November in each of the three reservoirs. No inter-annual changes of note were seen this season and the reservoirs continue to be in a state of low biological productivity, providing excellent source water quality. This marks the program's eighth year with the goal of assembling comprehensive background data sets to monitor for changes over time associated with shifting climate conditions.

### 2. Environmental Management Framework Update

Water Services and Liquid Waste Services continue to work on the development and implementation of an ISO 14001-based Environmental Management System. This process is being facilitated through a five-year consulting contract with Associated Engineering, with 2021 marking year four of program development. This year's focus has been development and implementation of a fuel management program, refinement and review of a utility *Environmental Risk Management Policy*, and setting objectives for environmental performance. Key actions taken this year include the design and pending construction of an upgrade to the Seymour Capilano Filtration Plant's bulk fuel transfer area to meet current regulatory requirements and testing of electric hand-held field equipment which could replace the gas-powered equivalents and reduce emissions. In 2022 the program will target refinements to waste disposal, road salt, invasive species, and refrigerant management as well as seeking approval of the *Environmental Risk Management Policy* by the Water Committee and Board.

### 3. Quality Management System for Drinking Water Update

A major departmental continuous improvement initiative to document a *Quality Management System for Drinking Water* (QMSDW) Operational Plan is undergoing final senior staff endorsement. The QMSDW establishes processes and procedures focusing on the development of management strategies and critical control measures to mitigate potential risks to public health to help ensure the continuous provision of clean, safe drinking water to the region. An information report that includes the final QMSDW Operational Plan is planned for Committee and Board in early Q1 2022.

#### **4. Regional Water Supply System Seismic Resiliency Study**

The Regional Water Supply System Seismic Resiliency Study was awarded to WSP in early July of 2021. The study's purpose is to update, from previous work, the seismic vulnerabilities of Metro Vancouver's water distribution system's facilities and underground infrastructure. Seismic hazard maps will be completed to classify locations that are most vulnerable to damage during a seismic event. The analysis work is complete and staff are expecting a draft report in November. The findings will assist Metro Vancouver to develop operational scenarios for supplying water in case of damage to high risk infrastructure as well as to refine and prioritize maintenance and capital works. A Water Committee report will be prepared in early 2022.

#### **5. Work Plan**

##### **Attachment**

Water Committee 2021 Work Plan

47667894

**Water Committee 2021  
Work Plan**

**Priorities**

| <b>1st Quarter</b>   | <b>Status</b> |
|--|---------------|
| Annual Energy Management Program Update  | Complete      |
| Capilano Hydropower Project Business Case Update                               | Complete      |
| Corrosion Control Program – Copper Pipes Protection                            | Complete      |
| Long Term Financial Plan   | Complete      |
| Residential Water Metering – Overview of Local Experience                      | Complete      |
| Water Meter Replacement Program  | Complete      |
| Contract Approvals – Contracts > \$5 Million (as applicable)                   | Complete      |
| Water Policies (as applicable)   | Complete      |
| <b>2nd Quarter</b>   |               |
| Coquitlam Lake Water Supply Project Update                                     | Complete      |
| Drinking Water Customer Information Guide                                      | Complete      |
| Drinking Water Management Plan Update  | Complete      |
| First Nation Engagement Updates  | Complete      |
| GVWD Water Quality Annual Report   | Complete      |
| Lawn Water Regulations Communication & Regional Water Conservation Campaign    | Complete      |
| Seymour Salmonid Society 2020 Annual Report                                    | Complete      |
| Status of GVWD Capital Expenditures  | Complete      |
| Water Services Wildfire Preparedness Update                                    | Complete      |
| Water Supply Update for Summer 2021  | Complete      |
| Water Use-by-Sector Report   | In Progress   |
| Contract Approvals – Contracts > \$5 Million (as applicable)                   | Complete      |
| Water Policies (as applicable)   | Complete      |
| <b>3rd Quarter</b>   |               |
| Annual Dam Safety Program Update   | Complete      |
| Status of GVWD Capital Expenditures  | Complete      |
| Quality Management System for Drinking Water Update                            | In Progress   |
| Contract Approvals – Contracts > \$5 Million (as applicable)                   | Complete      |
| Water Policies (as applicable)   | Complete      |
| <b>4th Quarter</b>   |               |
| Annual Budget and 5-year Financial Plan – Water Services                       | Complete      |
| Environmental Management Framework   | In Progress   |
| Regional Water Conservation Campaign and Water Regulations Communications 2021 | In Progress   |
| Regional Water Supply System Seismic Resiliency Study                          | In Progress   |
| Status of GVWD Capital Expenditures  | Complete      |
| Summer 2021 Water Supply Performance   | In Progress   |
| Watershed Fisheries Initiatives Annual Update                                  | In Progress   |
| Contract Approvals – Contracts > \$5 Million (as applicable)                   | Pending       |
| Water Policies (as applicable)   | Pending       |