

| Subject: | Summer 2023 Water Supply Performance | |
|----------|--|---|
| Date: | October 30, 2023 | Meeting Date: November 8, 2023 |
| From: | Linda Parkinson, Director, Planning Policy and Ana Paul Kohl, Director, Operations and Maintenance, | lysis, Water Services Water Services |
| To: | Water Committee | |

RECOMMENDATION

That the Water Committee receive for information the report dated October 30, 2023, titled "Summer 2023 Water Supply Performance".

EXECUTIVE SUMMARY

The water supply system performed well during the high demand season of 2023 despite the challenges imposed by the significant summer drought. Stage 1 of the Drinking Water Conservation Plan was activated on May 1, 2023 and Stage 2 was implemented on August 4 due to the mid-season long range weather forecast indicating a high likelihood of a continued drought into the fall together with the sustained higher daily demands from May to July. While there were observed reductions in drinking water demands through August and September, the regional data implies that lawn watering was still occurring despite being banned in Stage 2 and that with increased education, enforcement, and progress in universal metering across the region, additional reductions are achievable. The success of water conservation measures will continue to be an essential factor in determining the need for and timing of future system expansion.

PURPOSE

To provide the Water Committee with an overview of water use and water supply system performance during the high demand season (May 1 to October 15) of 2023.

BACKGROUND

Stage 1 of the Drinking Water Conservation Plan (DWCP) was automatically activated on May 1, 2023. The report titled "Water Supply Update for Summer 2023" provided to the Water Committee at the May 17, 2023 meeting included a summary of the state of source water supply, past trends in water use, and an update on plans for operating the source reservoirs and water system during the high demand season.

Stage 2 of the DWCP was activated by the GVWD Commissioner on August 4, 2023 and a report titled "Water Supply Update – Stage 2" was provided at the September 13, 2023 Water Committee meeting. The report provided a summary of the demand trends and the status of available storage in the region's source reservoirs, based on data available to the end of August 2023.

As per the Committee's 2023 Work Plan, this report provides an overview of the performance of the regional water supply system during the high demand season of 2023. This report is based on data available for the entire high demand season, May 1 to October 15, 2023.

RESERVOIR STORAGE LEVELS

The Metro Vancouver region's collective snowpack was close to historical average levels this past winter. However, the snowpack began to melt rapidly in May when temperatures were almost four degrees warmer than normal. The Lower Mainland (and most of British Columbia) experienced drought conditions through the summer and the Lower Mainland basin moved to drought level five on August 17. The watersheds received approximately 50% of normal precipitation for the period of May 1 to October 1, 2023.

The source reservoirs were proactively managed through the spring and early summer to capture the incoming streamflow to ensure Capilano and Seymour Reservoirs reached their full pool elevations on June 24, 2023 and June 26, 2023, respectively. Palisade Lake was opened on July 14 to supplement Capilano Reservoir and temporarily closed on August 28 for necessary maintenance tasks. Palisade Lake was re-opened on September 11. Burwell Lake was opened on July 26, and Loch Lomond was opened on August 17 to supplement natural flows into Seymour Reservoir. All three alpine lakes are now closed.

Figure 1 illustrates that through the high demand period when the regional drinking water use typically increases above 1.0 billion litres per day (BL/d), the total source storage levels were maintained within the normal range. The high volume of storage at the end of the spring can be attributed to the normal snowpack and increased inflow in the spring due to higher than normal temperatures and the rapidly melting snowpack (which normally occurs over a longer period of time). However, storage volumes started decreasing drastically in early July as the region experienced a significant seasonal drought with high temperatures and no precipitation.

Despite the significant drought that the region experienced, and the resulting increased demands, the source reservoirs were managed to maintain a reliable water supply for the region by closely monitoring the overall system demands, river inflows, and system storage, and by the timely activation of Stage 2 watering restrictions.



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

DRINKING WATER DEMANDS

As shown in Figure 2, the daily demands in May, June, and first half of July 2023 were consistently higher than in 2022. For May, June, and July, the average daily water demand increased steadily from 1.23 BL/d to 1.35 BL/d to 1.46 BL/d. The peak day consumption in the summer of 2023 was 1.56 BL/d, recorded on Wednesday, July 5. The 2022 peak day consumption was 1.59 BL/d which occurred on Saturday, July 30.

Water consumption was significantly higher in May, June, and July of 2023 than in 2022, leading to rapid drawdown of the reservoirs and ultimately the decision to activate Stage 2 watering restrictions considering the forecast for continued drought conditions into the fall. Overall, in terms of volume, the region used about 5.4% more water during the entire high demand season of 2023 (216.0 billion litres, BL) than that of 2022 (204.9 BL).

Figure 3 compares hourly water use during the week when the peak day occurred in summer 2023 (Saturday, July 1 to Friday, July 7) to the week when the peak day occurred in summer 2022 (Saturday, July 30 to Friday, August 4). During a warm and dry period at the beginning of July this year, the peak hour occurred at 5:00 am on Saturday, July 1, a designated residential lawn watering day (in Stage 1). The peak hour water use in 2022 was also on a designated residential lawn watering day (in Stage 1). The peak hour water use in 2023 was the same as 2022 amounting to 1.96 BL/d.



Figure 2 - Metro Vancouver Daily System Consumption Comparison 2022 and 2023





In addition to drinking water needs, Metro Vancouver's reservoirs must also provide required environmental flows to sustain fish populations. Special downstream environmental flow releases

were conducted from the Cleveland (Capilano) and Seymour Falls Dam facilities on July 20 to 21 and September 12 to 13, respectively. These operations increased flows above the summer minimums and were conducted in coordination with Fisheries and Oceans Canada, First Nations, and stewardship groups, to improve upstream migration conditions for adult Pacific Salmon impeded by drought level flows. This was an important initiative contributing to Pacific Salmon conservation and restoration during the early and extended 2023 summer drought.

WATER CONSERVATION MEASURES

Water supply and system operations can be challenged during the high demand season as drinking water demand typically increases by 50 percent or more compared to winter drinking water demand. Metro Vancouver's water conservation efforts focus on summer discretionary use through the DWCP. In October 2021, the GVWD Board endorsed an update to the DWCP which was first implemented on May 1, 2022. The most significant changes include the reduction of residential and non-residential lawn watering from two days per week to one day per week during Stage 1 and a complete ban on lawn watering in Stage 2 (which was previously implemented in Stage 3).

For May, June, and July, the average daily water demand increased steadily from 1.23 BL/d to 1.35 BL/d to 1.46 BL/d. Following the activation of Stage 2 watering restrictions on August 4, the average daily water demand slightly decreased to 1.33 BL/d in August, 1.17 BL/d in September, and 1.05 BL/d from October 1 to 15. During Stage 2 watering restrictions (August 4 to October 15) there have not been any days with regional water demands over 1.5 BL/d compared to 11 days during Stage 1.

Successful conservation of drinking water during the high demand season requires education and enforcement activities:

- Metro Vancouver undertakes several public education initiatives annually to promote the efficient use of drinking water resources throughout the region. Key initiatives in 2023 included the communication of the region-wide watering restrictions and the initiation of Stage 2 on August 4, the We Love Water campaign, and the Water Wagon Program. These initiatives work together to increase awareness of the drinking water system and the need for residential water conservation.
- In 2022, following the update of the DWCP in November 2021, the Metro Vancouver Summer Support Program (SSP) was developed to help member jurisdictions with the promotion and monitoring of compliance with the regional lawn watering restrictions during the implementation of the updated DWCP. The 2023 SSP ran from July 4 to September 29 and included morning and evening monitoring shifts in 11 participating member jurisdictions on weekday mornings and evenings. Relevant regional communication campaign materials and information about the program was provided to households showing signs of potential non-compliant lawn watering in an attempt to bring them into compliance through targeted education. The addresses and evidential details were provided to member jurisdictions for any subsequent follow-up they wanted to pursue. Preliminary feedback to date indicates that the participating members found the SSP valuable for their enforcement programs, and detailed feedback collection will begin in late October 2023.

• In addition to education, enforcement of watering restrictions by member jurisdictions is essential for successful water conservation in the region. Initial information from member jurisdictions through the advisory committees indicate that many members increased their enforcement efforts during Stage 2 to ensure residents and businesses were complying with the lawn watering ban. This included increased education, enforcement patrols, and ticketing by many members. Those members who are fully metered were able to follow up directly with residents who were identified as high volume users using the metered consumption data. Metro Vancouver staff will continue to liaise with members' staff through the advisory committees to collect data on enforcement activities, including the number of warnings and tickets issued, together with data on the progress of universal metering in the region.

IMPACTS OF WATER CONSERVATION MEASURES

In implementing the findings of the Water Supply Outlook 2120, Metro Vancouver is planning for future scenarios that incorporate variations in climate change impacts, population growth, and water demand patterns. Metro Vancouver is focused on both managing drinking water demand and increasing supply in order to meet the needs of a growing region.

In terms of drinking water demand, Metro Vancouver must focus on decreasing overall water demand (average daily demand), average per capita water use, and peak day demand. Average day demand during the high demand season impacts the available usable water volume in Metro Vancouver's three reservoirs and alpine lakes, while peak day demand impacts the sizing and timing of transmission infrastructure. The success of water conservation measures will continue to be an essential factor in determining the need for and timing of future system expansion.

ALTERNATIVES

This is an information report; no alternatives are presented.

FINANCIAL IMPLICATIONS

Revenues from water sales as of October 10 are 2 percent above budget.

CONCLUSION

Total source storage for Metro Vancouver water usage began the summer in the normal range and was deemed sufficient at the time to provide adequate supply through the summer season as discussed in the report titled "Water Supply Update for Summer 2023" provided to the Water Committee at its May 17, 2023 meeting. However, the region experienced a significant seasonal drought this year and reservoir levels declined drastically as of early July, which ultimately led to the decision to activate Stage 2 of the DWCP. Reservoir inflows and source storage continued to decline, as anticipated; however, the total water storage volume remained within the normal range.

The region's daily water use this summer was higher every day than in 2022, from May 1 to July 23. Peak water use occurred at the beginning of July, which is earlier than most prior years, other than 2021 when the peak use occurred on June 28 due to the heat dome. Influenced by the timely activation of Stage 2 watering restrictions, enhanced education, and enforcement by member jurisdictions, the water supply system performed without significant stress over the 2023 summer.

Summer 2023 was the first time that Stage 2 of the updated DWCP was implemented. Metro Vancouver and member jurisdictions must continue to focus on conservation initiatives, as any sustained reduction in average per capita consumption and peak day consumption will positively impact both system planning and operation.

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| Subject: | 2023 Water Communications and | Public Outreach Results |
|----------|--|--|
| Date: | October 26, 2023 | Meeting Date: November 8, 2023 |
| From: | Shellee Ritzman, Division Manager Dana Carlson, Project Coordinator | , Corporate Communications, External Relations Corporate Communications, External Relations |
| То: | Water Committee | |

RECOMMENDATION

That the Water Committee receive for information the report dated October 26, 2023, titled "2023 Water Communications and Public Outreach Results".

EXECUTIVE SUMMARY

Metro Vancouver undertakes annual communications initiatives to support drinking water conservation across the region. These include the *We Love Water* campaign, the Water Wagon program, and communication of lawn watering restrictions in accordance with the Drinking Water Conservation Plan.

The promotional strategy for these initiatives in 2023 included region-wide reach through television, radio, multicultural print, direct mail, online, outdoor digital billboards, and social media. These broadcast and digital promotions delivered a combined total of 59.7 million impressions.

Earned media resulted in a total potential combined reach and impressions of 1.4 billion (compared to 69 million in 2022) with an ad value equivalent of \$52 million. The hot, dry weather and province-wide drought made water conservation and supply top of mind for both residents and the media. The Water Wagon program resulted in 24,104 water bottle refills and fountain uses, and 3,094 engagements with residents about drinking water conservation and quality.

PURPOSE

To update the Committee on regional communications to support the 2023 watering restrictions, the 2023 regional water conservation campaign, and the 2023 Water Wagon program.

BACKGROUND

Metro Vancouver undertakes several communications initiatives annually to help the public understand the importance of their role in ensuring drinking water resources are conserved and efficiently used throughout the region. Communication of the region-wide watering regulations supports the Drinking Water Conservation Plan, which helps manage the outdoor use of drinking water during the high demand period and largely impacts lawn watering.

The regional communications campaign, *We Love Water*, features watering restrictions reminders and provides residents with advice and tips for using less drinking water in their homes. The campaign also works to increase awareness of Metro Vancouver's water sources, system, and the

need for residential drinking water conservation within the context of a growing population and climate change.

The Water Wagon program promotes the use of tap water and reduces instances of single use water bottles at community events while providing conservation education opportunities with residents across the region.

WATER CONSERVATION COMMUNICATIONS

Communication Approach and Timing

Metro Vancouver began promoting the regional watering regulations with a media release sent on April 5, in advance of the May 1 implementation date. On June 26, the *We Love Water* campaign began. Two additional media releases were distributed in July, urging the public to conserve water in light of the hot weather and above average demand for water. On July 28, Metro Vancouver distributed a media release to inform residents that the region was heightening restrictions to Stage 2 watering restrictions in effect on August 4. The Stage 2 watering restrictions messaging launched August 4 and ran until the campaign ended on September 24, 2023.

Promotions were directed towards homeowners in detached houses, duplexes, and townhouses with lawns, as they are most likely to engage in the outdoor water uses that contribute to higher seasonal water demand. To emphasize the message of water conservation, the creative was changed to reflect lawn sprinklers turned off on dormant brown/golden lawns rather than active watering on green lawns.

Metro Vancouver Member Engagement

Metro Vancouver made communication materials available to all GVWD members for display, distribution, and to supplement members' enforcement programs. Items included social media content, co-branded materials such as posters and rack cards, translated assets, digital billboards, and digital banners upon request.

Evaluation

Website Traffic April 1 to October 2, 2023

- The welovewater.ca website received a total of 66,193 page views of which 43,492 visits (66%) were during the Stage 1 period, and 22,701 (34%) visits were during Stage 2.
- Inversely, the lawn watering restrictions web page via metrovancouver.org/lawns received 59,307 total page views of which 19,157 (32%) of visits were during Stage 1 and 40,150 (68%) of visits were during Stage 2.
- This increase is partly due to an in-market pivot to promote the Stage 2 watering restrictions and directing web traffic to the watering restrictions web page instead of the campaign website.

Television and Radio

- Two videos and Facebook creative aired on Global BC television resulting in an estimated 8.4 million impressions.
- On Telus and Shaw, a 30 second PSA ran on 14 television networks targeted to the Metro Vancouver region, with a minimum 1,000 estimated airings.

• A 30 second radio ad was featured on seven radio stations, resulting in 11.6 million impressions.

Digital Media

- YouTube advertising reached 489,310 people an average of 3.4 times, for a total of 1.7 million impressions. The average video view rate was 50.8% above industry benchmarks.
- Social posts (Facebook and Instagram) delivered roughly 6.8 million impressions and were seen on average 10.6 times by over 642,000 residents.
- Online banner ads delivered 7.4 million impressions, and weather-triggered advertising delivered an additional 1.4 million impressions on mobile devices.
- Google Search served 30,602 impressions and generated 11,885 clicks achieving the highest click-through-rate compared to previous years (38.84% in 2023, 37.03% in 2022 and 31.08% in 2021). These numbers were achieved prior to being paused upon the implementation of Stage 2 messaging.

Print

A direct mail postcard outlining the watering restrictions and outdoor water conservation tips was delivered during the first week of July to 537,600 single family homes and townhouses across the region.

Out-of-Home

Campaign messaging achieved 22.3 million impressions through 11 digital, weather triggered billboards located on major traffic routes throughout Metro Vancouver.

Multicultural Media

Digital and print translated ads promoting Stage 1 watering restrictions were published in the first week of May in community and daily newspapers targeting Asian and South Asian communities in Metro Vancouver.

Earned Media

Media coverage of the restrictions and conservation was frequent. All major media outlets picked up the story, along with community papers, newsletters, and smaller publications. Canadian Press mentioned the restrictions and the region's conservation efforts in a number of their wire stories, which were picked up broadly.

- print/online media articles: 700
- broadcast stories: 1,000
- combined reach and impressions: 1.4 billion (compared to 69 million in 2022)
- ad value equivalent: \$52 million (compared to \$610,000 in 2022)

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

WATER WAGON PROGRAM

Metro Vancouver's Water Wagon and associated Tap Water Team provides free water bottle refills at regional events to highlight our water system, encourage drinking tap water, and reduce singleuse bottled water. The outreach team engaged with residents through displays and interactive games to share the 'mountain to tap' story of Metro Vancouver's drinking water.

The Water Wagon was at 18 community events across 11 member jurisdictions between May 13 and September 16, for a total of 34 event days, which includes 15 days at the PNE. New to this year's key messaging was information about the Stage 2 watering restrictions.

The Water Wagon filled 18,413 water bottles and supported 5,691 water fountain uses. The Tap Water Team experienced 3,034 engagements with residents during the events.

ALTERNATIVES

This is an information report. No alternatives are presented.

FINANCIAL IMPLICATIONS

The 2023 budget for watering restrictions communications, the regional *We Love Water* campaign, and the Water Wagon program was \$477,728.

CONCLUSION

Metro Vancouver communicates the watering restrictions through advertising, media engagement, and promotional materials distributed to GVWD members for their public education and enforcement programs. The regional water conservation campaign entered the market June 26 supporting Stage 1 watering restrictions through conservation messaging. Campaign tactics and messaging was updated July 28 to communicate the move to Stage 2 watering restrictions. Campaign advertising appeared on news media, digital billboards across the region, on social media and digital platforms, and through GVWD members' promotional programs.

This year, the Water Wagon travelled to 11 member jurisdictions to participate in community events for a total of 34 event days, which includes 15 days at the PNE. The Water Wagon program promoted the use of tap water through more than 3,000 engagements with residents.

Attachments

- 1. 2023 Water Conservation Communications Materials
- 2. 2023 Water Wagon Program Event Schedule

References

- 1. <u>www.welovewater.ca</u>
- 2. <u>www.metrovancouver.org/lawns</u>

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ATTACHMENT 1



2023 Water Conservation Materials

Stage 1 Water Restrictions/We Love Water



From left to right: Postcard (front and back), images for social media, and rack cards (front and back)

Stage 2 Water Restrictions



From left to right: poster, images for social media, and rack card (front and back)

| | | i total event days | ł |
|---|---------------------|---------------------|--------|
| Event | Date | Member Jurisdiction | # Days |
| Centennial May Days | May 13 | Port Coquitlam | 1 |
| Public Works Open House | May 27 | Port Coquitlam | 1 |
| Pitt Meadows Day | June 3 | Pitt Meadows | 1 |
| Langley City Community Day Festival | June 10 | City of Langley | 1 |
| Splash! Father's Day Fishing (Metro | June 18 | District of North | 1 |
| Vancouver) | | Vancouver | |
| National Indigenous Peoples Day | June 21 | New Westminster | 1 |
| Vancouver International Mountain Film | June 24 | City of North | 1 |
| Festival | | Vancouver | |
| RCMP Musical Ride | June 26 | Burnaby | 1 |
| Canada Day | July 1 | Coquitlam | 1 |
| Khatsahlano Street Party | July 8 | Vancouver | 1 |
| Vancouver Chinatown Festival | July 15 and 16 | Vancouver | 2 |
| S <u>k</u> wxwú7mesh Days Festival | July 23 | West Vancouver | 1 |
| Car Free Day | July 29 | New Westminster | 1 |
| Vancouver International Pride Tennis | August 5 | Vancouver | 1 |
| Tournament | | | |
| Dr. Bee's Bees and Blueberries Festival | August 12 and 13 | Pitt Meadows | 2 |
| PNE Fair (Metro Vancouver) | August 19 to Sept 4 | Vancouver | 15 |
| University Neighbourhood Association | September 9 | Vancouver | 1 |
| Neighbours Day | | | |
| Geti Fest | September 16 | Maple Ridge | 1 |

2023 Water Wagon Program Event Schedule – 34 total event days



Canada Day, Coquitlam





Skwxwú7mesh Days Festival, West Vancouver

The Fair at the PNE



| Subject: | GVWD Capital Program Expenditure Update to S | eptember 30, 2023 |
|----------|--|--------------------------------|
| Date: | October 26, 2023 | Meeting Date: November 8, 2023 |
| From: | Goran Oljaca, Director Engineering and Construct | ion, Water Services |
| То: | Water Committee | |

RECOMMENDATION

That the Water Committee receive for information the report dated October 26, 2023, titled "GVWD Capital Program Expenditure Update to September 30, 2023".

EXECUTIVE SUMMARY

The capital expenditure reporting process as approved by the Board provides for regular status reports on capital expenditures. This report includes both the overall capital program for the water utility with a multi-year view of capital projects, and the actual capital spending for the 2023 fiscal year to September 30, 2023 in comparison to the prorated annual capital cash flow. In 2023, the annual capital expenditures for the GVWD are \$159.8 million to date compared to a prorated annual capital cash flow of \$300 million. Forecasted expenditures for the current water utility capital program remain within the approved budgets through to completion.

PURPOSE

To report on the status of the GVWD Capital Program and financial performance for the 2023 fiscal year to September 30, 2023.

BACKGROUND

The capital expenditure reporting process provides for regular status reports on capital expenditures. This report covers the GVWD capital projects managed by both the Water Services and the Project Delivery departments.

These reports for 2023 look at both the overall capital program for the water utility with a multiyear view of capital projects and the actual capital spending for 2023 fiscal year to September 30, 2023 in comparison to the annual Capital Cash Flow.

2023 CAPITAL EXPENDITURES

Overall Capital Program

The capital spending on all the GVWD capital projects completed in 2023 or ongoing at some point in 2023 is forecasted to be over the previously estimated total project cost by approximately \$1.66 billion, or 15.2% of total estimated cost. These estimated costs include future phases that are yet to be considered and approved by the Board through future planning cycles or Stage Gate process. With the rare exception, projects tend to complete with actual spending below Board approved limits predominantly due to savings on budgeted contingency amounts.

Attachment 1 provides the details behind the summary information including specific capital projects, summary of financial information, and notes where required. Attachment 2 provides additional project status information for some of the key projects.

2023 Capital Program Process

As part of the 2023 Capital Program Process, the annual Capital Cash Flow comprises the projected spending for a list of capital projects either continuing or to be started within the calendar year. In 2023, capital expenditures for the GVWD are \$159.8 million to September 30, 2023 compared to a prorated annual Capital Cash Flow of \$300 million. The current underspend is due to several factors including delays in permitting, limited market capacity for projects and construction delays. Capital Spending is expected to increase to as progress payments for projects listed above have been updated, verified, and processed as well as increased construction activity occurring at major projects.

Forecasted expenditures for the current GVWD capital program remain within the annual Capital Cash Flow planned for 2023.

Table 1 provides a summary of the 2023 actual capital spending to September 30, 2023 compared to the prorated Capital Cash Flow.

| Water Total | er Total 2023 Cash Flow Actual Expenditures to | | % of 2023 Prorated |
|------------------|--|--------------------|--------------------|
| | To September 30, 2023 | September 30, 2023 | Cash Flow |
| Water Mains | \$ 197,914,000 | \$ 121,286,436 | 61% |
| Pump Stations | \$ 34,164,000 | \$ 13,944,868 | 41% |
| Reservoirs | \$ 26,479,000 | \$ 14,581,391 | 55% |
| Treatment Plants | \$ 18,014,000 | \$ 2,956,809 | 16% |
| Others | \$ 23,405,000 | \$ 7,006,909 | 30% |
| Total | \$299,976,000 | \$159,776,413 | 53% |

Table 1 – Capital Spending Summary to end September 2023

ALTERNATIVES

This is an information report. No alternatives are presented.

FINANCIAL IMPLICATIONS

Capital expenditures are funded internally (pay-as-you-go) and through debt service costs (interest and principal payments). As capital expenditures are incurred, short term financing is secured and converted twice per year to long term debt through the Municipal Finance Authority.

CONCLUSION

Forecasted expenditures for the current GVWD capital program remain within the annual Capital Cash Flow approved for 2023.

Attachments

- 1. Capital Project Update September 30, 2023
- 2. GVWD Capital Project Status Information

Metro Vancouver Water Services - Capital Project Update As of September 30, 2023



| | Project Name | Primary Driver | Project Location | Ye | ears | Approved Capital Budget | Current Estimated Total Project Cost | % Complete |
|----|---|-----------------------|---------------------------|--------------------------|--------------------------|----------------------------|--|------------------------------------|
| | | | | 2023-2027 Capital Plan | | | | |
| | | | | 2023 2024 2025 2026 2027 | 2028 2029 2030 2031 2032 | | | |
| w | ater Mains | | | | | | | |
| | Angus Drive Main | Growth | Vancouver | | | 30,700,000 | 30,700,000 | 96% |
| | Annacis Main No. 2 - Queensborough Crossover Improvement | Maintenance | New Westminster | | | 1,200,000 | 1,200,000 | 0% Likely not re Queensbord |
| | Annacis Main No. 2 and Barnston Island Main Online Chlorine and pH Analyzers | Upgrade | Regional | | | 750,000 | 1,200,000 | 5% Projected co |
| | Annacis Main No. 3 Annieville Channel Crossing Scour Protection | Maintenance | Surrey | | | 850,000 | 850,000 | 100% Construction to be transfe |
| | Annacis Main No. 3 BHP Potash Facility Pipe Protection Annacis Main No. 5 (North) | Maintenance Growth | Surrey New Westminster | | | 600,000 69,100,000 | 600,000 81,100,000 | Cancelled BHP have w 3% |
| | Annacis Main No. 5 (South) | Growth | Surrey | | | 12,350,000 | 80,950,000 | 20% |
| | Boundary Road Main No. 2 & No. 3 Decommissioning | Maintenance | Burnaby | | | 1,250,000 | 500,000 | 100% |
| | Burnaby Mountain Main No. 2 | Maintenance | Burnaby | | | 600,000 | 15,600,000 | 0% |
| | Central Park Main No. 2 (10th Ave to Westburnco) | Maintenance | Burnaby | | | 4,750,000 | 35,250,000 | 1% |
| | Central Park Main No. 2 (Patterson to 10th Ave) | Maintenance | Burnaby | - | | 109,100,000 | 113,150,000 | 45% |
| | Clayton Langley Main No. 2 | Resilience | Surrey | | | 1,900,000 | 10,200,000 | 1% |
| | Douglas Road Main No. 2 (Flow Meter 169) Replacement | Maintenance | Burnaby | | | 2,000,000 | 2,000,000 | 4% |
| | Douglas Road Main No. 2 (Vancouver Heights Section) | Maintenance | Burnaby | | | 21,450,000 | 21,450,000 | 95% Tie-ins delay |
| | Douglas Road Main No. 2 Still Creek | Maintenance | Burnaby | | | 60,000,000 | 60,000,000 | 59% |
| | Douglas Road Main Protection | Maintenance | Burnaby | | | 1,500,000 | 1,500,000 | 5% |
| | Haney Main No. 4 (West Section) | Growth | Port Coquitlam | | | 1,900,000 | 141,800,000 | 1% |
| | Improvements to Capilano Mains No. 4 and 5 | Maintenance | Dist of North Van | | | 1,700,000 | 1,700,000 | 6% |
| | Kennedy Newton Main | Growth | Surrey | | | 140,450,000 | 166,350,000 | 65% |
| | Lulu Island - Delta Main - Scour Protection Phase 2 | Maintenance | Richmond | | | 3.550.000 | 3.550.000 | 0% Not vet regi |
| | Lynn Valley Road Main, Seymour Main No. 3 & Seymour Main No. 4 Aerial Crossings Rehabilit | Maintenance | Dist of North Van | | | 4.200.000 | 4.200.000 | 10% |
| | Maple Ridge Main West Lining Repairs | Maintenance | Maple Ridge | | | 3.500.000 | 5,900,000 | 4% |
| | Newton Reservoir Connection | Growth | Surrey | | | 850.000 | 28.050.000 | 0% |
| | Palisade Outlet Works Rehabilitation | Maintenance | Electoral Area A | | | 400,000 | 11 200 000 | 2% |
| | Port Mann Main No. 2 (South) | Growth | Surrey | | | 33 600 000 | 50 100 000 | 98% |
| | Port Mann No. 1 South Section Decommissioning | Maintenance | Con/Surrey | | | 850,000 | 850,000 | 0% |
| | Port Mondy Main No. 1 Christmas Way Relocation | Maintenance | Coquitlam | | | 3 350,000 | 3 350,000 | 0% |
| | Port Moody Main No. 2 Devideov Truck Rd Relocation | Maintenance | Coquitlam | | | 2,330,000 | 2,330,000 | 0% |
| | Port Moody Main No. 3 Scott Creek Section | Maintenance | Coquitlam | | | 2,700,000 | 53.600.000 | 2% |
| | Queensborough Main Royal Avenue Relocation | Maintenance | New Westminster | | | 7,500,000 | 7,500,000 | 20% Pattullo Bric |
| | Rehabilitation of AN2 on Queensborough Bridge | Maintenance | New West/Delta | | | 3,850,000 | 3,850,000 | 50% |
| | Relocation and Protection for MOTI Expansion Project Broadway | Maintenance | Vancouver | | | 8,900,000 | 8,900,000 | 80% |
| | Relocation and Protection for MOTI George Massey Crossing Replacement | Maintenance | Delta/Richmond | | | 450,000 | 2,450,000 | 0% |
| | Relocation and Protection for Translink Expansion Project Surrey Langley SkyTrain | Maintenance | Surrey | | | 600,000 | 6,600,000 | 0% MOTI procu |
| | Sapperton Main No. 1 New Line Valve and Chamber | Upgrade | New Westminster | | | 3,850,000 | 3,550,000 | 95% |
| | Sapperton Main No. 2 North Road Relocation and Protection | Maintenance | Coquitlam | | | 6,500,000 | 6,500,000 | 20% |
| | Scour Protection Assessments and Construction General | Resilience | Dist of North Van | | | 4,000,000 | 4,000,000 | 26% |
| | Seymour Main No. 5 III (North) | Resilience | Dist of North Van | | | 7.900.000 | 750.600.000 | 3% |
| | South Delta Main No. 1 - Ferry Road Check Valve Replacement | Maintenance | Delta | | | 600.000 | 600.000 | 39% |
| | South Surrey Main No. 1 Nickomekl Dam Relocation | Maintenance | Surrey | | | 7 100 000 | 7 100 000 | 0% |
| | South Surrey Main No. 2 | Growth | Surrey | | | 2 000 000 | 197,000,000 | 1% |
| | South Surrey Main No. 2 Nickomekl Dam Prebuild | Growth | Surrey | | | 2,000,000 | 2 000 000 | 1% 0% |
| | South Surrey Sunnly Main (Serventine River) Bridge Support Modification | Maintenance | Surrey | | | 1 350 000 | 1 350 000 | 20% |
| | Tilbury Junction Chamber Valves Replacement with Actuators | Upgrade | Richmond | | | 5,600,000 | 5,600,000 | 83% Tie-ins delay |
| | Tilbury Main North Fraser Way Valve Addition | Maintenance | Burnaby | | | 3,100,000 | 3,100,000 | 14% |
| | Water Chamber Improvements and Repairs | Maintenance | Burnaby | | | 2,000,000 | 2,000,000 | 10% |
| | Water Meter Upgrades | Upgrade | Regional | | | 22.400.000 | 22,400,000 | 57% |
| | Water Optimization - Flow Meters (Non-billing) Phase 1 | Upgrade | Regional | | | - | 17.700.000 | 0% |
| | Water Optimization - Flow Meters (Non-billing) Phase 2 | Upgrade | Regional | | | 3,000.000 | 21.600.000 | 0% |
| | Water Optimization - Instrumentation | Upgrade | Regional | | | 1.500.000 | 11,800,000 | 6% |
| | Water Optimization Automation & Instrumentation | Upgrade | Regional | | | 9 550 000 | 9 550 000 | 89% |
| | Whalley Kennedy Main No. 2 | Growth | Surrey | | | 2 900 000 | 118 200 000 | 0% |
| | Whalley Main | Growth | Surrey | | | 31 800 000 | 31 800 000 | 96% |
| та | tal Water Mains | 0.0401 | Juncy | | - | 658 250 000 | 2 185 050 000 | 3070 |
| 10 | | | | | - | 030,330,000 | 2,103,030,000 | |
| D | imn Stations | | | | | | | |
| FU | mp stations | | | 1 | 1 | | | |

ATTACHMENT 1

Comment

equired. MOTI may not relocate ough Main.

costs adjusted for escalation.

ion completed by LWS. Funding in account

sferred to LWS. withdrawn from the project.

yed due to scheduling conflicts.

quired, biannual bathymetric survey

wned project

idge replacement project owned by MoTI.

urement to select Project Co underway

ayed due to railway permitting nts.

Metro Vancouver Water Services - Capital Project Update As of September 30, 2023



| | Project Name | Primary Driver | Project Location | Years | Approved Capital Budget | Current Estimated Total Project Cost | % Complete |
|---|--|-------------------|---------------------|---|----------------------------|--|------------------------------|
| | | | | 2023-2027 Capital Plan | | | |
| | Barnston/Maple Ridge Pump Station - Back-up Power | Resilience | Pitt Meadows | 2023 2024 2025 2026 2027 2028 2029 2030 2031 20 | 14,000,000 | 26,000,000 | 3% Delayed descalation |
| | Burnaby Mountain Pump Station No. 2 | Maintenance | Burnaby | | 1,300,000 | 102,700,000 | 1% Scope of v |
| | Cape Horn Pump Station No. 3 | Growth | Coquitlam | | 29,050,000 | 301,550,000 | 2% |
| | Capilano Raw Water Pump Station - Back-up Power | Resilience | Dist of North Van | | 55,000,000 | 81,000,000 | 25% Board app |
| | Capilano Raw Water Pump Station Bypass PRV Upgrades | Maintenance | Dist of North Van | | 3,200,000 | 3,800,000 | 10% Projected |
| | Central Park WPS Starters Replacement | Maintenance | Burnaby | | 11,000,000 | 20,000,000 | 10% Delayed de |
| | Grandview Pump Station Improvements | Resilience | Surrey | | 3,500,000 | 4,500,000 | 15'% Projected |
| | Newton Pump Station No. 2 | Growth | Surrey | | 72,550,000 | 82,550,000 | 24% |
| | Pebble Hill Pump Station Seismic Upgrade | Resilience | Delta | | - | 3,500,000 | 0% Projected |
| | Westburnco Pump Station - Back-up Power | Resilience | New Westminster | | 24,500,000 | 48,800,000 | 3% Projected |
| | Westburnco Pump Station No. 2 VFD Replacements | Maintenance | New Westminster | | 2,550,000 | 3,050,000 | 20% |
| 1 | Total Pump Stations | | | | 216,650,000 | 677,450,000 | - |
| | P | | | | | | |
| | Reservoirs Burnaby Mountain Tank No. 2 | Resilience | Burnaby | | 3 350 000 | 36 750 000 | 2% Projected |
| | Burnaby Mountain Tank No. 2 | Resilience | Burnaby | | 3,400,000 | 30,730,000 | 2% Projected |
| | Cane Horn Reservoir Condition Assessment and Structural Renair | Maintenance | Coguitlam | | 500.000 | 2 500 000 | 270 0% Projected |
| | Capitano Energy Percovery Escility 66" PPV Perlacement | Maintenance | City of North Van | | 500,000 | 2,500,000 | 0% Projected |
| | Capilano Energy Recovery Facility Operational Ungrades | Maintenance | Dist of North Van | | - | 1 800,000 | 49/ |
| | Capital Dark Deservoir Structural Improvements | Maintenance | Burnaby | | 1,800,000 | 2,800,000 | 4% |
| | | Posilionce | Surroy | | - 25 750 000 | 25 750 000 | 0% |
| | Dechlorination for Receiver Overflow and Underdrain Discharges | Maintenance | Burnaby | | 23,730,000 | 23,730,000 | 55% 6% |
| | | Growth | Surroy | | 56 550 000 | 58 850 000 | 45% Projected |
| | Grandview Reservoir Unit No. 2 | Growth | Surrey | | | 36,830,000 | 43% Projected |
| | Hellings Tank No. 2 | Growth | Delta | | 43 900 000 | 15 950 000 | 15% Project wa |
| | Kersland Reservoir No. 1 Structural Improvements | Maintenance | Vancouver | | 5 500,000 | 5 500 000 | 90% |
| | Pebble Hill Reservoir No. 3 Seismic Ungrade | Resilience | Delta | | 500,000 | 12 500 000 | 4% Projected |
| | Pehble Hill Reservoir Seismic Ungrade | Resilience | Delta | | 12 350 000 | 12,350,000 | 95% |
| | Reservoir Isolation Valve Automation | Resilience | Regional | | 6 450 000 | 6 450 000 | 22% |
| | Reservoir Sampling Kiosks - Multi Location | Upgrade | Regional | | 500.000 | 1,300,000 | 0% |
| | Reservoir Structural Preliminary Assessments | Maintenance | Regional | | 3.200.000 | 3,200,000 | 2% |
| | Sasamat Reservoir Refurbishment | Maintenance | Vancouver | | 400.000 | 2,900.000 | 0% |
| | Sunnyside Reservoir Units 1 and 2 Seismic Upgrade | Resilience | Surrey | | 8.000.000 | 21.000.000 | 50% |
| | Vancouver Heights System Resiliency Improvements | Resilience | Burnaby | | 2,500,000 | 2,500,000 | 6% |
| 1 | Total Reservoirs | | · | | 177,350,000 | 280,100,000 | - |
| | | | | | | | - |
| 1 | Treatment Plants | | | | | | |
| | Coquitlam Intake Tower Seismic Upgrade | Resilience | Coquitlam | | 2,500,000 | 60,550,000 | 8% Constructi priorities. |
| | CWTP CO2 System Improvements | Maintenance | | | | 3 750 000 | 0% |
| | CWTP Mobile Disinfection System | Ungrade | Regional | | 750.000 | 2 900 000 | 0% |
| | CWTP Ozone Back-up Power | Besilience | Coguitlam | | | 10 300,000 | 0% |
| | CWTP Ozone Generation Llogrades for Llnits 2 & 3 | Ungrade | Coquitlam | | 7 500 000 | 7 500 000 | 85% Delay due |
| | CWTP Ozone Sidestream Pipe Heat Trace and Insulation | Maintenance | Coquitlam | | 900,000 | 900,000 | 23% |
| | CWTP Ozone Sidestream Pump VED Replacement | Maintenance | Coquitlam | | 1 400 000 | 1 400 000 | 17% |
| | CWTP Temporary Water Supply | Maintenance | Coq/P.Coq | | 2,000,000 | 3,000,000 | 0% Constructi |
| | Online Chlorine and nH Analyzers | Ungrade | Regional | | 2 500 000 | 6 000 000 | priorities. |
| | SCEP Additional Pre-Treatment | Upgrade | Dist of North Van | | - | 130,000,000 | 0% |
| | SCFP Centralized Compressed Air System | Maintenance | Dist of North Van | | 1 900 000 | 1 900 000 | 13% |
| | SCFP Clearwell Baffle Replacement | Maintenance | Dist of North Van | | 600.000 | 12,900,000 | 0% |
| | SCFP Clearwell Membrane Replacement | Maintenance | Dist of North Van | | 600,000 | 17,800,000 | 2% |
| | SCFP Floc Tank Baffle Replacement and Ladder Installation to Improve Accessibility | Maintenance | Regional | | 800,000 | 9 800 000 | 0% |
| | SCFP OMC Building Expansion | Maintenance | Dist of North Van | | 800.000 | 4.100.000 | 5% Projected |
| | SCFP Polymer System Upgrade | Maintenance | Dist of North Van | | 4,650.000 | 4,650.000 | 40% |
| | SCFP SCADA/ICS Controller Upgrade | Maintenance | Burnaby | | 1,400,000 | 2,400,000 | 0% |
| | | | · · · | | | ,, | |
| 1 | Total Treatment Plants | | | | 28,300,000 | 286,850,000 | |

Others

_

Comment

lue to property selection. Costs adjusted for

work refined.

proved additional funds on award of tender costs adjusted for escalation.

lue to re-zoning. Cost adjusted for

costs adjusted for escalation.

costs adjusted for escalation. costs adjusted for escalation.

costs adjusted for escalation.

costs adjusted for escalation.

costs adjusted for escalation. as delayed by 1 year (in service by 2030) and cost reduced due to change in scope.

costs adjusted for escalation.

tion delayed after review of project Projected cost adjusted for escalation

to operational requirements.

ion delayed after review of project Projected cost adjusted for escalation

costs adjusted for escalation.

Metro Vancouver Water Services - Capital Project Update As of September 30, 2023



| Project Name | Primary Driver | Project Location | Years | s | Approved Capital Budget | Current Estimated Total Project Cost | % Complete |
|---|-------------------|---------------------|-----------------------------|--------------------------|----------------------------|--|----------------------------------|
| | | | 2023-2027 Capital Plan | | | | |
| | | | 2023 2024 2025 2026 2027 20 | 2028 2029 2030 2031 2032 | | | |
| Beach Yard Facility - Site Redevelopment | Maintenance | Dist of North Van | | | - | 45,500,000 | 0% |
| Capilano Hydropower | Opportunity | Dist of North Van | | | 4,250,000 | 156,250,000 | 1% Project curr |
| Capilano Mid-Lake Debris Boom | Resilience | Dist of North Van | | | 750,000 | 750,000 | 97% |
| Capilano Raw Water Pump Station VFD Upgrades | Maintenance | Dist of North Van | | | 1,800,000 | 3,700,000 | 0% |
| Capilano Reservoir and Seymour Reservoir Dam Safety Boom Replacement | Maintenance | Dist of North Van | | | 3,700,000 | 8,000,000 | 0% Dam safety |
| Capilano Reservoir Boat Wharf | Resilience | Dist of North Van | | | 850,000 | 850,000 | 100% |
| Capilano Watershed Bridge Replacements - Crown Creek and Capilano River | Maintenance | Dist of North Van | | | - | 1,300,000 | 0% |
| Capilano Watershed Security Gatehouse | Maintenance | Dist of North Van | | | 4,700,000 | 5,700,000 | 20% Board appro |
| CLD & SFD Fasteners Replacement & Coating Repairs | Maintenance | Dist of North Van | | | 2,350,000 | 2,350,000 | 83% |
| Cleveland Dam - Lower Outlet HBV Rehabilitation | Maintenance | Dist of North Van | | | 4,900,000 | 4,900,000 | 78% |
| Cleveland Dam Drumgate Seal Replacement | Maintenance | Dist of North Van | | | 300,000 | 1,300,000 | 22% |
| Cleveland Dam East Abutment Additional GV Series Pump Wells | Upgrade | Dist of North Van | | | 750,000 | 800,000 | 97% |
| Cleveland Dam Lower Outlet Trashrack Replacement and Debris Removal | Maintenance | Dist of North Van | | | - | 7,700,000 | 0% |
| Cleveland Dam Power Resiliency Improvements | Resilience | Dist of North Van | | | 1,700,000 | 1,700,000 | 4% |
| Cleveland Dam Public Warning System and Enhancements | Maintenance | Dist of North Van | | | 10,000,000 | 10,000,000 | 31% |
| Cleveland Dam Seismic Stability Evaluation | Resilience | Dist of North Van | | | 800,000 | 800,000 | 2% |
| Cleveland Dam Spillway Resurfacing | Maintenance | Dist of North Van | | | - | 7,800,000 | 0% |
| Facilities O&M Documentation Development | Resilience | Regional | | | 2,000,000 | 2,000,000 | 2% |
| Lake City HVAC Upgrade | Resilience | Burnaby | | | 900,000 | 1,200,000 | 0% |
| Lower Seymour Conservation Reserve Learning Lodge Replacement | Upgrade | Dist of North Van | | | 5,050,000 | 5,050,000 | 88% Will be com |
| Microbiology Laboratory Expansion | Maintenance | Burnaby | | | - | 5,550,000 | 0% |
| Newton Rechlorination Station No. 2 | Maintenance | Surrey | | | - | 6,050,000 | 0% Project dela Station Proje |
| Pitt River Rechlorination Station Reconstruction | Maintenance | Pitt Meadows | | | - | 6,000,000 | 0% |
| Rechlorination Station SHS Storage Tank Replacement | Maintenance | Regional | | | 1,200,000 | 1,200,000 | 62% |
| Rechlorination Station Upgrades | Maintenance | Regional | | | 5,000,000 | 21,800,000 | 5% |
| Rice Lake Dams Rehabilitation | Maintenance | Dist of North Van | | | 3,000,000 | 3,000,000 | 1% |
| Scour Protection - General | Maintenance | Regional | | | 2,000,000 | 2,000,000 | 93% |
| Seymour Falls Boat Wharf | Resilience | Dist of North Van | | | 800,000 | 800,000 | 95% |
| Seymour Falls Dam Public Warning System | Maintenance | Dist of North Van | | | 10,000,000 | 10,000,000 | 0% |
| Seymour Falls Dam Seismic Stability Assessment | Resilience | Dist of North Van | C C | | 1,800,000 | 14,150,000 | 0% |
| Seymour Lake Debris Boom | Resilience | Dist of North Van | | | 800,000 | 800,000 | 88% |
| Seymour Reservoir Mid-Lake Debris Boom | Resilience | Dist of North Van | | | 2,300,000 | 2,300,000 | 91% |
| South Fraser Works Yard | Maintenance | Regional | | | 71,000,000 | 71,000,000 | 74% |
| Total Others | | | | | 142,700,000 | 412,300,000 | |

Grand Total Water Services

1,223,350,000 3,841,750,000

Comment

rently on hold. Supportive studies are

booms will be more expensive than first

roved additional funds on award of tender.

nplete in 2023

ayed to coordinate with Newton Pump nject.

Metro Vancouver

Water - Project Delivery - Capital Project Update

As of September 30, 2023



| Project Name | Primary Driver | Project Location | Years | Approved Capital Budget | Current Estimated Total Project Cost | % Comment Complete |
|--|-------------------|---------------------|---|----------------------------|--|--|
| | | | 2023-2027 Capital Plan | | | |
| | | | 2023 2024 2025 2026 2027 2028 2029 2030 2031 2032 | | | |
| | | | | | | |
| Water Mains | | | | | | |
| Annacis Water Supply Tunnel | Growth | New West/Surrey | | 482,100,000 | 482,100,000 | 25% |
| Cambie-Richmond Water Supply Tunnel | Resilience | Richmond/Van | | 62,800,000 | 647,800,000 | 6% |
| Coquitlam Water Main | Growth | Coquitlam | DD DD DD | 293,700,000 | 1,656,700,000 | 5% Procurement delay has resulted in later start of construction of South Section (Robson to |
| Pitt River Water Supply Tunnel | Resilience | P.Coq/P.Meadows | | 25,250,000 | 595,250,000 | 1% |
| Lulu-Delta Water Supply Tunnel | Maintenance | Richmond | | 5,000,000 | 441,000,000 | 0% |
| Second Narrows Crossing 1 & 2 (Burrard Inlet Crossing Removal) | Maintenance | Burnaby | | 2,000,000 | 27,000,000 | 0% |
| Second Narrows Water Supply Tunnel | Resilience | Burnaby/DNV | | 468,550,000 | 468,550,000 | 87% |
| Stanley Park Water Supply Tunnel | Maintenance | Vancouver | | 340,000,000 | 340,000,000 | 6% |
| Total Water Mains | | | | 1,679,400,000 | 4,658,400,000 | |
| | | | - | | | |
| Treatment Plants | | | | | | |
| Coquitlam Lake Water Supply | Growth | Coquitlam | | 160,750,000 | 4,117,050,000 | 1% Protracted engagement for regulatory and permitting. Completion of project construction is anticipated to be the late 2030s due to delays in engagement. |
| Total Treatment Plants | | | | 160,750,000 | 4,117,050,000 | |
| Grand Total Water - Project Delivery | | | - | 1,840,150,000 | 8,775,450,000 | |

ATTACHMENT 2

GVWD Capital Project Status Information

September 30, 2023

GREATER VANCOUVER WATER DISTRICT

Major GVWD capital projects are generally proceeding on schedule and within budget. The following capital program items and exceptions are highlighted:

Infrastructure Growth Program

- Annacis Water Supply Tunnel A 2.3 kilometre km long, 4.5 metre m diameter water supply tunnel is required under the Fraser River to meet growing water demand south of the Fraser and to provide increased system resiliency. Construction commenced in early 2022 and is scheduled to be completed by 2028.
- Annacis Main No. 5 (South) This project comprises approximately 3.0 km of 1.8 m diameter steel pipe connecting the south shaft of the Annacis Water Supply Tunnel to the Kennedy Reservoir in the City of Surrey. Detailed design is nearing completion and is expected to be complete in fall 2023.
- Annacis Main No. 5 (North) This project comprises approximately 2.8 km of 1.8 m diameter steel pipe connecting the north shaft of the Annacis Water Supply Tunnel in the City of New Westminster to the South Burnaby Main #2 in the City of Burnaby. Preliminary design has been completed, and detailed design is in progress and is expected to be complete by mid- 2024.
- Cape Horn Pump Station No. 3 Cape Horn Pump Station No. 3 with a back-up power system, will supplement the existing pump station No. 2 to deliver Coquitlam source water to meet growing demand in the areas south of the Fraser River. Detailed design commenced fall 2022 with completion anticipated in early 2025.
- Coquitlam Intake No. 2 (Coquitlam Lake Water Supply) A new intake, tunnel and filtration treatment plant are proposed at the Coquitlam Reservoir to increase the regional supply from this source and meet growing future demand. The Project Definition Report has been issued. The project is now in the permitting and regulatory phase, which focuses on engagement with First Nations, the City of Coquitlam, regulators and stakeholders to acquire a water license and purchase provinciallyowned land for the new treatment plant. Phase 2 site investigations is anticipated to be awarded in October 2023. Procurement for project management services, including treatment pilot testing, is anticipated to commence in the fourth quarter of 2023 with prequalification of consultants.

- Coquitlam Main No. 4 (Coquitlam Water Main) This 12 km long steel water main, consisting of the Central, South, Tunnel and Cape Horn Sections, will increase the transmission capacity from the Coquitlam source to the Cape Horn Pump Station and Reservoir in the City of Coquitlam. This project is required to optimize capacity of the existing Coquitlam transmission system and also provide additional transmission capacity for the Coquitlam Lake Water Supply project. Detailed design of the Central and Cape Horn Sections continues. Preliminary design of the Tunnel Section has been completed and detailed design is underway. Construction of the South Section has commenced.
- Fleetwood Reservoir Phase 1 of the Fleetwood Reservoir project includes a 13.6 ML reservoir, valve chamber, piping, access building and associated work located at Meagan Ann MacDougall Park in the City of Surrey. Construction commenced in August 2022 and is scheduled to complete in Q4 of 2024.
- Kennedy Newton Main This project comprises approximately 9.0 km of 1.8 m diameter steel water main between the Kennedy Reservoir and the Newton Reservoir in the City of Surrey and is divided into 3 phases. Construction of Phase 1, between 72nd Avenue and 84th Avenue, is complete. Construction of Phase 2, between 72nd Avenue and Newton Reservoir is nearing completion. Due to the complexity of the work within Phase 3, the installation work was divided into three separate sections. The construction for the first section (Scott Road) commenced in fall 2022 and it is substantially complete. The construction of section 2 (86th Ave) commenced spring 2023 and expected to be completed in early 2025. Construction of the last section is planned to commence in summer 2024 with completion by mid-2026.
- Newton Pump Station No. 2 This project, located at 6287 128th Street in the City of Surrey, consists of replacing the existing Newton Pump Station and includes full back-up power redundancy, connections to existing and future infrastructure, and installation of new outlets to the existing Newton Reservoir. The detailed design is complete and the construction of the new reservoir outlets is underway with the main pump station construction planned to commence in summer 2024.
- South Surrey Main No. 2 The South Surrey Main No. 2 project involves the installation of 12 km of 1 m diameter steel water main between the Newton Pump Station and the Grandview Reservoir. The route selection between the two points is nearly complete with the detailed design anticipated to commence in early 2024.

Infrastructure Maintenance Program

• **Douglas Road Main No. 2** – Still Creek Section - This project comprises approximately 2.5 km of 1.5 m diameter steel pipe with trenchless crossings of Highway 1, Still Creek and the BNSF rail line. The Project is being constructed in three phases, with the North Open Cut and the Trenchless Crossing Sections completed in spring of 2023. The design of the South Open Cut Section is complete with construction anticipated to commence in Fall of 2023.

- Douglas Road Main No. 2 Vancouver Heights Section This project comprises approximately 2.0 km of 1.5 m diameter steel pipe connecting the Vancouver Heights Reservoir to the Douglas Road Main No. 2 at Beta Avenue and Albert Street in the City of Burnaby. Construction is complete with final tie-ins and commissioning planned for fall 2024.
- Central Park Main No. 2 Patterson to 10th Ave This project comprises approximately 7.0 km of 1.2 m diameter steel pipe connecting the Central Park Pump Station in Burnaby to the existing Central Park Main in New Westminster at 10th Avenue. The water main is divided into three phases with the 500 m long Maywood Pre-build completed in December 2020. Construction of Phase 1 of the project commenced in October 2020 and it is substantially complete. Design of Phase 2 is underway and is expected to be complete in fall 2023. Construction of Phase 2 will be performed in two phases with the first phase (east of Kingsway) to commence in mid-2024.
- Central Park Main No. 2 10th Ave to Westburnco This project comprises approximately 5.0 km of 600 mm diameter ductile iron water main extending the previous phase, Patterson to 10th Ave, from 10th Ave to Westburnco Pump Station and Reservoir in the City of New Westminster. MV Construction will construct an approximately 500 m long pre-build section in spring 2024 to facilitate City street upgrades on 7th Avenue from 8th Street to 5th Street in summer/fall 2024. The remaining installation work will be tendered in late-2024 and is expected to take up to 18 months to install after contract award.
- Stanley Park Water Supply Tunnel This 1.4 km long steel water main, in a tunnel, will replace the existing Capilano Main No. 4 through Stanley Park which is at the end of its service life. The new water main will meet growing water demand and provide increased system resiliency. Detailed design is complete and work to finalize agreements with the Vancouver Park Board is on-going. The procurement phase for construction commenced in August 2023 with construction anticipated to start in mid to late 2024. Construction is scheduled to be completed by 2029.
- Capilano Reservoir and Seymour Reservoir Dam Safety Boom Replacement The aim of this
 project is to replace and upgrade the Dam Safety Booms for Seymour and Capilano Reservoirs. A
 contract for design work for the boom systems was awarded at the beginning of June 2023.
 Fabrication and installation of boom anticipated for 3rd quarter 2024.
- **Capilano Watershed Security Gatehouse** This project consists of constructing a new security gatehouse building near the entrance to the Capilano Water Supply Area. Construction is anticipated to complete by Q4 of 2025.
- Central Park WPS Starters Replacement This project includes upgrades at the Central Park Water Pump Station. Upgrades include replacing the existing fixed speed pump drives with adjustable speed drives and soft start motor controllers. The existing electrical equipment will be relocated from the pump station to a new above ground electrical prefabricated building and the HVAC and control systems will be upgraded as needed. Detailed design has been put on hold and is anticipated to restart in Q1 of 2024.

- Kersland Reservoir No. 1 Structural Improvements This project involves completing structural improvements to Unit 1 and installing a new balancing pipe between Unit 1 and Unit 2. Construction of the Unit 1 improvements were completed by Bennett Mechanical Ltd. in August of 2022 and the balancing pipe is scheduled to be installed by Metro Vancouver forces during the winter of 2023/2024.
- **Rechlorination Upgrades** This project is to upgrade the existing Cape Horn, Pitt River, and Clayton Rechlorination Stations. The required upgrades will include new buildings, modifications/additions of backup power systems, and replacement of existing process, mechanical and control systems. Preliminary design is currently underway. Detailed design is expected to start in Q4 of 2023.
- SCFP Polymer System Upgrade This project consists of installing new dry polymer systems for the Filter Aid Polymer and Wash Water Recovery processes at the Seymour Capilano Filtration Plant. Construction has started and is anticipated to complete by Q1 of 2024.

Infrastructure Resilience Program

- Second Narrows Water Supply Tunnel This project comprises a 1.1 km long, 6.5 m diameter water supply tunnel under Burrard Inlet, between North Vancouver and Burnaby, to increase the reliability of supply in the event of a major earthquake and provide additional long-term supply capacity. Construction commenced in 2019. Construction of the shafts, tunnel, and installation of the three steel water mains inside the tunnel and shafts are complete. Construction of the north and south valve chambers is in progress and construction is scheduled to be substantially complete by mid-2024. This will be followed by site restoration and final tie-ins and commissioning through 2027.
- Capilano Raw Water Pump Station Back-up Power This project consists of installing diesel generators to provide 8 megawatt of back-up power to the pump station. A portion of the equipment has already been delivered. Construction is underway and is anticipated to complete by Q4 of 2025.
- Coquitlam Intake Tower Seismic Upgrade The Coquitlam Intake Tower is located in the southeast corner of the Coquitlam Reservoir. Constructed in 1913, the tower provides the GVWD its primary intake of water from Coquitlam Reservoir. The Tower is a 27 m-high and 5.5 m diameter unreinforced concrete structure, founded on bedrock. Detailed design of the seismic upgrade is 95% complete. Completion of detailed design is expected in Q4 of 2023.
- Pebble Hill Reservoir No. 1, 2 and 3 Seismic Upgrade Pebble Hill Reservoir in south Delta is comprised of three units. Construction is scheduled to be completed in stages, taking only one unit out of service at any time. Construction of Unit 1 is complete. Unit 2 commenced in the fall of 2022 and achieved substantial completion in the summer of 2023. The contractor will return in the spring of 2024 to complete the roof topping system. A separate tender will be issued in the future for Unit 3.
- Westburnco Pump Station Back-up Power This project consists of installing diesel generators to provide 5 MW of back-up power to the pump station. Preliminary design was completed in 2019 and detailed design will resume in Q4 of 2023 after the project was put on hold.

- **Cambie-Richmond Water Supply Tunnel** This project comprises an approximately 1.1 km long 4.5 m diameter tunnel under the Fraser River between the City of Vancouver and the City of Richmond to increase the reliability of supply in the event of a major earthquake and provide additional long-term supply capacity. The project definition or conceptual design phase was completed in 2021. Preliminary design is scheduled to commence in early 2024 which will be followed by detailed design. Construction is anticipated to commence in 2028.
- **Clayton Langley Main No. 2** This project will install an emergency direct connection to the City of Langley. The new main will connect the 192 St main to the City of Langley's distribution system and will facilitate maintenance and repair of the primary service connection or provide an emergency supply in the event of a water main leak. Preliminary design is anticipated to be complete mid-2024.
- **Grandview Pump Station Improvements** This project is to increase the capacity and improve operations of the pump station by adding a 4th pump and by replacing the existing variable frequency drives. The HVAC system will also be replaced along with the transformer. Construction is anticipated to start by Q1 of 2024.
- **Reservoir Isolation Valve Automation** Several key reservoir isolation valves are to be automated so that utility system controllers can remotely isolate all of the water storage reservoirs in an emergency. Currently, 5 locations are classified as initial priority locations with a total of 12 manual valves to be automated. Detailed design is complete and procurement of the valves is anticipated to be completed by December 2023. Installation of the first isolation valve is planned for February 2024.
- Scour Protection This project involves design and construction of scour protection at the north bank of the Annacis Main No. 2 crossing under the Fraser River Annacis Channel. Detailed design is complete and all permits received. VFPA temporary workspace agreement in progress. Construction RFP is in progress and the work is planned to be complete by March 2024.

Infrastructure Upgrade Program

- Cleveland Dam Public Warning System This project involves design and construction of a permanent public warning system along Capilano River, downstream of the Cleveland Dam. Predesign has commenced, and construction is planned to be complete by end of 2024.
- **Coquitlam Ozone Upgrade** This project consists of upgrades to the ozone generators at the Coquitlam Water Treatment Plant. The generators for units 1, 2 and 3 have been replaced and units 1 and 2 are in service. Testing and commissioning of unit 3 is scheduled to complete in Q4 2023. Completion of the upgrades to the ozone control system will follow.
- Pitt River (Haney) Water Supply Tunnel This project comprises an approximately 1 km long 4.5 m diameter tunnel under the Pitt River between the City of Port Coquitlam and the City of Pitt Meadows to increase the reliability of supply in the event of a major earthquake and provide additional long-term supply capacity. The project definition or conceptual design is essentially complete and preliminary design is scheduled to commence in 2024. Construction is currently anticipated to commence in 2029.

- Water Meter Upgrades –This program involves upgrading or replacing 37 water meter sites. To date, 12 water meter sites have been constructed and commissioned. Of the remaining sites, 10 have been designed and are ready for construction, 15 sites are in design.
- Water Optimization This program involves installing additional flow and pressure meters at various locations to optimize operations, monitor performance, and eventually automate the entire transmission network. Network-wide, 143 locations for new meters and instrumentation have been identified under this program. The current phase of work includes 32 sites. Of these sites, 7 have been constructed and commissioned and another 25 are currently in the design phase.



| Subject: | Kennedy Newton Main Phase 3 - S | cott Road Section Completion Report |
|----------|---|---|
| Date: | October 16, 2023 | Meeting Date: November 8, 2023 |
| From: | Joel Melanson, Division Manager, I Ben Suleiman, Lead Senior Enginee | Engineering and Construction, Water Services r, Engineering & Construction, Water Services |
| To: | Water Committee | |

RECOMMENDATION

That the Water Committee receive for information the report dated October 16, 2023, titled "Kennedy Newton Main Phase 3 – Scott Road Section Completion Report".

EXECUTIVE SUMMARY

The Scott Road section of the Kennedy Newton Main consists of the installation of approximately 450 metres of 1.8 m diameter welded steel pipe along Scott Road, between 88 Avenue and 86 Avenue. Due to the significant impacts on traffic along this major transit corridor, the schedule, sequencing, and duration of construction were closely collaborated with the cities of Surrey and Delta and Translink's R6 Scott Road RapidBus upgrade project.

The installation work for this project was awarded in November 2022 and in July 2023, the water main installation work was completed ahead of schedule and on budget, while also successfully mitigating many of the construction impacts to the public and area businesses.

The completion of this section of the Kennedy Newton Main is an example of how careful project planning, strong member jurisdiction collaboration, and active engagement with the community can help alleviate the community impacts associated with these significant water infrastructure projects.

PURPOSE

To inform the Water Committee of the collaborative implementation process and successful completion of the Kennedy Newton Main Phase 3 – Scott Road Section.

BACKGROUND

Pursuant to the Board's authorization to award the construction of the Kennedy Newton Main Phase 3 – Scott Road Section, this report is to update the Water Committee on its successful completion.

PROJECT HISTORY / CONTEXT

The entire Kennedy Newton Main (KNM) project involves installing 8 kilometers of 1.8 m diameter water main between Newton Reservoir and Kennedy Reservoir in the City of Surrey. The new water main is required to meet the growing drinking water demand south of the Fraser River.

Planning for the 8 km long water main started in 2014 and is being delivered in three separate phases, spread out over several years. Construction of Phase 3, the last phase of the project, has been further split into three separate contracts in order to address constraints within the local construction industry and to promote participation in the procurement process. The Scott Road section was the first of these sections to be constructed. The new water main meets the latest seismic standards and facilitates the reliable supply of high-quality drinking water to help meet the needs of the region's growing population.

Planning for Success

The detailed design of the Kennedy Newton Main started in 2017 with the design services provided by Jacobs consulting engineers who also provided the traffic management strategies and construction oversight. Throughout the design phase of the project, Metro Vancouver (MV) and Jacobs worked closely with staff from the Cities of Surrey and Delta to select the best alignment route for the water main with the least overall impact on area residents, businesses, and commuters. To mitigate construction impacts, particularly along busy corridors such as Scott Road, the project team investigated alternate construction methodologies, including trenchless technologies, to select the least impactful and intrusive method. Following extensive studies and consultations with both member jurisdictions as well as with other major utilities such BC Hydro, Telus and Fortis Gas, an open cut methodology was selected.

To further reduce the impact on the community, construction at the intersection of Nordel Way, one of the busiest intersections in the lower mainland, was restricted to the summer months when traffic volumes are at their lowest.

To help ensure the work was completed on schedule and to encourage the selected contractor to adhere to the project timetable, MV introduced penalty and incentive clauses into the contract.

Contractor Qualification Process

Prior to initiating the construction procurement, the project team executed a contractor prequalification process. This process evaluated the expertise and references of interested contractors with experience in similar project settings. Inviting only the most qualified contractors to submit a tender increased the likelihood of success during implementation of the project.

The Contractor, Matcon Civil Constructors Inc., who was awarded the project had significant experience working on similar large regional infrastructure projects in urban settings and had a proven track record of successfully implementing community impact mitigation measures and completing work on schedule.

Agency Collaboration and Public Engagement

Concurrently with the Scott Road portion of the work, TransLink planned to execute their R6 Scott Road RapidBus upgrade project along Scott Road. At the request of the municipalities and TransLink and in an effort to minimize the overall disruption to the area where the two projects overlapped, MV negotiated with the Contractor to perform the RapidBus upgrades on behalf of TransLink. This collaboration allowed for a reduced overall construction timeline and helped ensure both projects could maintain their planned schedules. As a result of the overlapping scope between the two projects, cost efficiencies were realized.

A multi-tiered community engagement approach was implemented to understand the impacts caused by construction and to develop construction impact mitigation measures that were directly integrated into the construction contract. Construction impacts ranged from local and commuter traffic, to noise and vibration, dust, parking, and access. MV staff worked very closely with staff from the Cities of Surrey and Delta and Translink and engaged with local residents, businesses, and community organizations to address these impacts prior to and during construction. Engagement activities included a series of open houses, bi-weekly stakeholder meetings, weekly email updates to businesses, newspaper ads, radio ads, social media campaigns, signage, and newsletters.

A key component of the engagement program was the appointment of a dedicated community liaison to work with the impacted community to provide prompt and frequent information especially to the impacted businesses in the area of construction.

Project Delivery Excellence

Working as a team with other stakeholders, the Contractor developed a plan to successfully minimize the overall impact on the project. Once the plan was developed, all stakeholders proceeded with a common agenda, met weekly, and worked in a collaborative effort to deliver the project. As a result, the project experienced a number of successful highlights. Critical portions of the project were completed well ahead of schedule; for example, the Nordel Way / Scott Road intersection was completed almost twice as fast as originally scheduled. Furthermore, the overall project was able to maintain its original schedule despite adding a significant portion of TransLink's R6 Scott Road RapidBus upgrade project work.

This project is an example of how well projects can go when careful project planning combines with collaborative efforts between MV, member jurisdictions and a qualified contractor to reach a common goal of reducing impacts to the community.

ALTERNATIVES

This is an information report. No alternatives are presented.

FINANCIAL IMPLICATIONS

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

CONCLUSION

Metro Vancouver has successfully delivered one of the highest-risk sections of the Kennedy Newton Main project along Scott Road. The Scott Road Section was completed on budget, ahead of schedule, and while minimizing impacts to the public. The successful completion of this section illustrates the importance of careful project planning, close collaboration with member jurisdictions and other agencies, early stakeholder and community engagement, and using qualified contractors to implement these significant water infrastructure projects.

Attachment

1. Kennedy Newton Main Phase 3C – Scott Road Section

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ATTACHMENT 1



Kennedy Newton Main Phase 3 – Scott Road Section



| Subject: | Corrosion Control Program: Copper Pipes Protec | tion Monitoring Update |
|----------|---|--------------------------------|
| Date: | October 24, 2023 | Meeting Date: November 8, 2023 |
| From: | Inder Singh, Director, Interagency Projects & Qua | lity Control, Water Services |
| To: | Water Committee | |

RECOMMENDATION

That the Water Committee receive for information the report dated October 24, 2023, titled "Corrosion Control Program: Copper Pipes Protection Monitoring Update".

EXECUTIVE SUMMARY

The Corrosion Control Program: Copper Pipes Protection Monitoring Update report summarizes key corrosion control initiatives undertaken by Metro Vancouver. Metro Vancouver's untreated drinking water supply is naturally low in pH, making it corrosive to building plumbing systems. Corrosion control, through an increase in pH and alkalinity, has been implemented in Metro Vancouver over the past two decades. In June 2021, Metro Vancouver once again increased the pH of the drinking water to a target range of 8.3 to 8.5 and alkalinity to about 20 mg/L as calcium carbonate (CaCO₃) as a way to further protect copper pipes, fixtures and hot water tanks in buildings throughout the region.

Monitoring showed reduced copper concentrations in water samples collected from residences across the region, and continued compliance with the *Guidelines for Canadian Drinking Water Quality* (GCDWQ).

PURPOSE

To provide the Water Committee with an update on the status of Metro Vancouver's corrosion control program and monitoring outcomes.

BACKGROUND

Metro Vancouver provides high quality drinking water to a regional population of about 2.8 million. The source water originates from rainfall and snowmelt that is captured in mountain reservoirs, which contain little to no calcium or magnesium based minerals, thereby classifying the water as soft. The average untreated source water pH ranges from 6.4 to 6.7 with an alkalinity ranging from 1.7 to 3.3 mg/L as CaCO₃. This pH range is below the acceptable pH value of 7.0, as defined under the GCDWQ, and is therefore raised using natural minerals at both the Seymour Capilano Filtration Plant (SCFP) and Coquitlam Water Treatment Plant (CWTP). Attachment 1 depicts the pH scale.

In addition to benefiting public health, mitigating the corrosiveness of drinking water also provides aesthetic and economic societal benefits related to increased longevity of plumbing systems. Conveying water from the source to the consumer's tap is a complex process, with Metro Vancouver being responsible for the primary treatment and transmission of the bulk water supply, that is then delivered through member jurisdiction distribution systems to homes and businesses across the region. Corrosion related issues may be specifically associated with premise plumbing conditions, which is primarily the responsibility of the end-user.

Incremental increases in pH and alkalinity have been implemented over the past two decades to provide corrosion control benefits and compliance with the GCDWQ. Prior to the June 2021, adjustment, both the SCFP and CWTP provided treated water with pH ranging from 7.5 to 7.7, and alkalinity ranging from 10.1 to 11.3 mg/L as CaCO₃. Having reaffirmed previous consulting engineering assessment recommendations, and with completion of the remaining treatment facility upgrades, full implementation of corrosion control adjustments proceeded in June 2021, which increased the pH of the drinking water to a target range of 8.3 to 8.5 and alkalinity to about 20 mg/L as calcium carbonate (CaCO₃) The pH and alkalinity adjustments to the targeted levels have also been compared to best industry practices followed by other major utilities with similar source water quality.

SAMPLING PROGRAM

The following initiatives were implemented to help assess corrosion control effectiveness:

- 1) Member jurisdiction distribution systems enhanced sampling (21 sites) from February 2021 to current;
- 2) At-the-tap residential sampling (15 sites) from February 2021 to September 2021; and
- 3) Field Station sampling (1 site) from February 2021 to current.

Samples collected from the member jurisdiction distribution systems were analyzed for pH and alkalinity to determine the stability of these parameters, both prior to, and following the adjustments at the primary treatment plants. At-the-tap samples collected from residences throughout the region helped determine the changes in total copper concentration in drinking water. Also, a Field Station designed to monitor metal dissolution over a longer term was installed at a Metro Vancouver valve chamber. At-the-tap sampling is complete; however, the remaining initiatives are ongoing. Data collected up to July 2023 is presented in this report.

Distribution Systems Sampling

The average pH and alkalinity in the member jurisdiction distribution systems before and after the June 2021 adjustments was observed to increase from 7.7 to 8.0, and 10 to 22 mg/L as CaCO₃, respectively. These parameters appeared to stabilize after a period of approximately 14 months. This was expected given the complex nature of distribution systems due to the variety of pipe materials, biofilm, and water age that will affect the chemical stability of the water.

The target level for pH established at the treatment plants dropped in some member jurisdiction distribution systems, and consideration is being given to a further adjustment, while conducting continued monitoring to assess the change. The alkalinity target level was achieved across the region.

At-the-tap Sampling

At-the-tap sampling was conducted by volunteers recruited by Metro Vancouver living in singlefamily residences across the region, as shown on Attachment 2. All residences were confirmed to primarily contain copper plumbing, and sampling was based on Health Canada guidance protocol. This included collection of both a one-litre overnight stagnant sample (first-flush), and a running (flushed) sample. The samples were collected bi-weekly. The sampling initiative started in February 2021 and continued until September 2021 to assess the copper concentrations before and after the pH and alkalinity adjustments implemented in June 2021. A longer duration of sampling was not deemed practical given the inconvenience to the residents.

Total copper concentrations measured in stagnant and flushed samples are shown on Attachments 3 and 4, respectively. For both sample types, copper was observed to gradually decline and become less variable over a period of several months following the pH and alkalinity adjustment. This phenomenon is similar to the stabilization period observed for pH and alkalinity in the member jurisdiction distribution systems. Reduction of average total copper following the pH adjustment for the stagnant and flushed samples was 43 percent, and 49 percent, respectively. Both before and after the adjustment, total copper levels were well below the limits established in the GCDWQ.

Field Station Sampling

Attachment 5 shows the Field Station installation. This station provides additional corrosion control monitoring data collected under controlled conditions. The Field Station consists of chambers containing metal plates, through which water flow is regulated to achieve a specified stagnation period used to assess metal leaching potential. Samples were analyzed for both total and dissolved metals.

This station is helpful in monitoring trends in metal concentrations, and is not used to directly simulate at-the-tap samples from residences. Following the pH and alkalinity adjustment, there was a transition period of 8 months, during which concentrations of both total and dissolved copper, as well as the variability were significantly reduced.

ALTERNATIVES

This is an information report. No alternatives are presented.

FINANCIAL IMPLICATIONS

Any further minor adjustments of corrosion control parameters are not anticipated to significantly affect expenditures on treatment chemicals, and will be accommodated within the existing operating budgets. Continuous improvement initiatives are being implemented to ensure optimized chemical use in corrosion control processes.

CONCLUSION

Metro Vancouver's drinking water supply is naturally low in pH, making it corrosive to building plumbing systems. To manage corrosion, pH and alkalinity adjustments have been gradually implemented over the past two decades to ensure compliance with the GCDWQ. In June 2021, Metro Vancouver further increased the pH of the drinking water to a target range of 8.3 to 8.5, and alkalinity to about 20 mg/L as calcium carbonate (CaCO₃) as a way to further protect copper pipes, fixtures and hot water tanks in buildings throughout the region.

Prior to making the most recent adjustments, a metals sampling program was established to help assess the effectiveness in reducing copper concentrations in drinking water at homes and

businesses. Sampling was conducted in the member jurisdiction distribution systems, at select single-family residences and at a Field Station. It was determined that pH and alkalinity adjustments made to the source water require several months to stabilize in the member jurisdiction distribution systems. Significant reduction in copper concentrations were observed in at-the-tap samples collected from single-family residences. A 43 percent reduction in the average total copper concentration in overnight standing samples was observed for the residential sites. Both before and after the latest pH and alkalinity adjustments, copper concentrations were compliant with Health Canada standards; however, the reduction in corrosion helps provide economic societal benefits related to increased longevity of plumbing systems.

Attachments

- 1. The pH scale
- 2. Residential Sampling Sites
- 3. Residential Total Copper in Stagnant Samples
- 4. Residential Total Copper in Flushed Samples
- 5. Field Station Installation

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ATTACHMENT 2

Residential Sampling Sites





Residential Total Copper in Stagnant Samples



Residential Total Copper in Flushed Samples

ATTACHMENT 5

Field Station Installation

