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SERVICES AND SOLUTIONS FOR A LIVABLE REGION

To: Liquid Waste Committee

From: Theresa Gregonia, Division Manager, Operations and Maintenance Wastewater Treatment, Liquid Waste Services
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Date: January 7, 2022 Meeting Date: January 19, 2022

Subject: **November 14 - 16, 2021 Wet Weather Event – Operational Responses**

RECOMMENDATION

That the Liquid Waste Committee receive for information the report dated January 7, 2022, titled "November 14 – 16, 2021 Wet Weather Event – Operational Responses".

EXECUTIVE SUMMARY

This report summarizes Metro Vancouver's operational response to the extreme storm event in the Lower Mainland and Fraser Valley from November 14 to 16, 2021. The event resulted in record-breaking wet weather flows entering the regional wastewater system and the highest number of breaks and spills in the GVS&DD system during a single event. Operations and Maintenance (O&M) staff responded to the event to minimize infrastructure damage and quickly restore service to normal operating conditions. This event demonstrates the importance of managing Inflow and Infiltration as well as continuing upgrading the region's wastewater treatment plants (WWTPs) and sewer collection system, to increase capacity, and ensure reliable operations under extreme conditions.

PURPOSE

To inform the Liquid Waste Committee of impacts from the November 14 to 16, 2021 extreme wet weather events on Metro Vancouver's wastewater treatment plants and sewer collection system.

BACKGROUND

The weather phenomenon labeled as an "atmospheric river" brought strong winds, and continuous heavy rains to the Lower Mainland and Fraser Valley from November 14 to 16, 2021. A number of rain gauges in the Fraser Sewerage Area recorded a 50-year return period rain event (up to 190 mm over 48 hours) which resulted in a record-breaking wet weather flows entering Metro Vancouver's wastewater system. The capacity and resiliency of our wastewater treatment plants and collection system were tested in response to this extreme weather event. The event was so significant that Metro Vancouver activated its Emergency Operations Centre (EOC), our highest level of emergency response.

WET WEATHER EVENT – OPERATIONAL RESPONSE

O&M staff responded to minimize damage and quickly restore reliable wastewater treatment and collection system service during the storm. The operational response required close collaboration between O&M staff, staff from other divisions and departments, and environmental regulators.

Upgrades and improvement projects are critical to ensure our facilities are resilient to extreme weather events. These investments will ensure we can continue protecting public health and the environment, and maintain regulatory compliance under extreme conditions. The high likelihood of a similar event due to climate change means that we must implement mitigation measures in preparation.

Sewer Collection System

The collection system experienced 25 spills and six associated system breaks due to excessive system pressures. There were approximately 50% more spills from this event than any previous event and a larger number of system repairs needed. Operations staff methodically attended to high priority locations to address each issue one by one.

The Fraser Sewerage Area had the highest number of impacted locations. Issues included overflows at chronic sites, sewer hatches being blown off due to the high internal liquid pressure, massive cracks appearing in some of our large sewers, and high-volume overflows in public locations. This storm resulted in the highest number of breaks and spills in the GVS&DD system caused by a single event. Additional response activities included sandbagging the Langley Pump Station to protect it from rising lake water, responding to high volumes of sewage discharging out of a manhole located at a major intersection in the City of Surrey which impacted local businesses, and manually operating our system to optimize flow conveyance. Metro Vancouver is grateful to municipal staff who assisted with the response to critical issues in the Fraser Sewerage Area.

Responding to this event required collaboration between the operations and construction groups from Liquid Waste and Water Services. These teams quickly dispatched resources to triage overflows and perform critical repairs.

A large number of technical staff supported the disaster response. Engineers attended repair sites in person to see the issues first hand and to work closely with the repair crews on specialized repairs. This was a great showing of commitment and teamwork in action. Many staff put their normal work aside and put in long hours, which contributed to a great response. Many others contributed too, including administrative staff, dispatch, contractors, and maintenance mechanics.

Wastewater Treatment Plants

The Annacis Island WWTP operated at peak capacity and treated more than its authorized effluent discharge flow of 1,050 million liters per day (MLD). Operations staff manually observed the critical bypass gates and water levels in the various tanks to minimize bypassing of untreated wastewater. The new infrastructure (five primary sedimentation tanks, six secondary clarifiers, two solids contact tanks and one influent pump) and ongoing upgrade projects on secondary clarifiers and trickling filters were instrumental in maintaining good effluent quality. As a result, the final effluent quality

met the daily discharge limits for Total Suspended Solids (TSS) and Carbonaceous Biochemical Oxygen Demand (cBOD).

At the height of the storm, Lulu Island WWTP experienced a BC Hydro power interruption for 4.5 hours due to a fallen tree. On November 15, the plant recorded its highest ever flow of 194 MLD, with an average flow of 130 MLD. It was the first time in the plant's history that it operated with all four trickling filters in service.
High flow events during the fall and winter are common occurrences at the Iona Island WWTP. The Iona Island WWTP treated 1,505 MLD (98% of its capacity) on November 15 and fully met the effluent quality requirement.

Lions Gate WWTP treated 278 MLD on November 15. Due to high flows, strong winds, and high tide, the water level in the chlorine contact tank increased beyond its normal levels resulting in approximately 22,000 L of treated primary effluent spilling to the ground.

The most challenging plant operation during this extreme weather event was Northwest Langley WWTP. The plant received incoming flow beyond the capacity of its secondary treatment (35 MLD). Excess wastewater was pumped to emergency storage tanks and a lagoon. The Ministry of Environment and Climate Change Strategy authorized the plant to bypass flow in excess of 35 MLD to prevent the overflowing of the Equalization Pond. The blended effluent from the Equalization Pond and secondary treatment maintained effluent quality compliance.

Drainage System (Still Creek, Burnaby Lake and Brunette River)
The drainage system also encountered very high flows during the extreme wet weather event. The drainage team cleared a major debris blockage in the Cariboo Dam, which is the structure that regulates Burnaby Lake. The effort took many hours and ingenuity to accomplish. The materials removed from the trash racks were enough to fill several dump trucks. Longer term protection against damage from branches, logs and floating soil/vegetation upstream of Burnaby Lake is being planned.

Continued Municipal Effort Needed to Manage Inflow and Infiltration
This event generated high inflow and infiltration across the regional system with the Fraser Sewerage Area experiencing the highest rainfall and wet weather flows. A preliminary assessment of wet weather flows expressed as a peaking factor determined by the ratio of peak wet to dry weather flow highlight problematic catchment areas. For example, estimated peaking factors for areas upstream of sanitary sewer overflow points along the North Surrey Interceptor ranged between 8 and 10; far in excess of expectations. In comparison, secondary treatment capacity at our wastewater plants is designed for 2 times average dry weather flow.

Sanitary Sewer Overflow working groups have recently been formed to help Metro Vancouver and member municipalities target inflow and infiltration mitigation to prevent overflows. New modeling tools and monitoring information are enhancing the ability for staff to target key areas needing dedicated overflow prevention efforts.

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

FINANCIAL IMPLICATIONS

There are no financial implications.

CONCLUSION

This report summarizes Metro Vancouver's operational response to the extreme storm event that affected the Lower Mainland and Fraser Valley from November 14 to 16, 2021. The event resulted in record-breaking flows of wastewater entering the regional wastewater system. Metro Vancouver activated the Emergency Operations Centre, our highest level of emergency response, to manage the operational response.

Operations and Maintenance staff responded to the event to minimize infrastructure damage and quickly restore service to normal operating conditions. It is important to acknowledge the experienced and dependable staff who worked tirelessly during these extraordinary times to maintain regulatory compliance and worker safety, while protecting infrastructure, public health and the environment.

The completion of major wastewater projects and other improvement projects related to the mitigation of sewer overflows are important to maintain system resiliency.

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To: Liquid Waste Committee

From: Carol Nicolls, Communications Specialist, External Relations
Larina Lopez, Division Manager, Corporate Communications, External Relations

Date: December 7, 2021 Meeting Date: January 19, 2022

Subject: **2021 "Our Ocean Thanks You" Campaign Results**

RECOMMENDATION

That the Liquid Waste Committee receive for information the report dated December 7, 2021, titled "2021 'Our Ocean Thanks You' Campaign Results".

EXECUTIVE SUMMARY

Microfibres from laundry are one of the largest sources of microplastics pollution in the ocean, where they may be harmful to aquatic life. In 2021, Metro Vancouver launched a new campaign ("Our Ocean Thanks You") to ask residents to reduce microfibres by washing in cold water. The campaign ran from September 13 to October 31 and included social media, YouTube, television, digital billboards, Google adwords and a campaign website. The campaign performed well, with strong media placement results that delivered 10.6 million impressions, 2,173 engagements, 671,000 video views, 3,025 clicks for more information, 3,457 website visits, and reached 359,000 residents through online tactics. In 2022, the campaign will continue to focus on washing in cold water, while providing additional actions to reduce microfibres on the campaign website. A post-campaign survey will be conducted in 2022 and will help assess how the campaign is reaching residents and influencing behaviour.

PURPOSE

To update the Liquid Waste Committee on the 2021 regional "Our Ocean Thanks You" campaign to reduce microfibres generated through laundry.

BACKGROUND

Microfibres from laundry are one of the largest sources of microplastics in the ocean. Microfibres are tiny fibre pieces — less than 5 mm in size — that are shed from fabrics when they are washed. The majority of microplastics in Metro Vancouver wastewater are microfibres from synthetic material, according to joint Metro Vancouver/Ocean Wise research. While wastewater treatment plants can capture up to 95% of incoming microfibres, the remaining microfibres that end up in the ocean may be harmful to fish and other aquatic life. In September 2021 Metro Vancouver launched a new regional campaign to reduce microfibres generated through laundry, called "Our Ocean Thanks You."

This report provides a summary of the campaign results, as identified in the 2021 Liquid Waste Committee Work Plan.

"OUR OCEAN THANKS YOU" - 2021 CAMPAIGN

The 2021 regional "Our Ocean Thanks You" campaign ran from September 13 to October 31 and asked residents to reduce microfibres by washing their laundry in cold water.

Campaign Approach
Based on primary research conducted prior to the campaign, the campaign focused on reaching parents with children under 18 with the request to wash laundry in cold water. This demographic does the most laundry and was also open to doing a simple action that fit into their existing routines. New creative materials developed for the campaign featured local aquatic wildlife thanking residents for switching to cold water (see Attachment).

Engagement with Members
Prior to launch, campaign details and creative materials were shared with members' communication staff and the campaign was presented for feedback to the REAC Liquid Waste Subcommittee. All materials are available for download on the Metro Vancouver website and members can request custom, co-branded materials. The media buy included all member jurisdictions, ensuring that the campaign ads appear across the region. Seven members shared the campaign on social media, one member used materials in digital billboards, and another in their online newsletter.

External Campaign Supporters
Ocean Wise provided support to the campaign, acting as a third-party validator of campaign messaging. They were featured in the campaign's microplastics explainer video, supported the campaign through social media, and their logo was featured on the campaign website. The campaign will look at ways to expand the role of external supporters in 2022.

Results
The campaign performed well overall, with strong media placement results that generated 10.6 million impressions, along with a solid amount of earned media and website traffic.

Digital Media and Website
Most elements of the media buy performed strongly, particularly the shorter 10-second videos featuring the salmon and orca. Specific results include:

- digital components delivered over 2 million impressions, just over half of which came from Facebook and YouTube;
- the campaign reached 359,000 residents through digital channels;
- social media generated 2,173 engagements (likes, shares, saves, comments);
- video ads received almost 671,000 views through Facebook, Instagram, YouTube and digital TV placements, with a high completion rate;
- Google Search terms, banners and digital TV placements generated 3,025 clicks for more information; and
- 3,457 people visited the campaign webpage (switchtocold.ca) from September 13 to October 31.

The three videos (one long and two short) are a key element for the online platforms used during the campaign and the high number of completed views shows that they resonated with the target audience. The shorter videos performed best on most platforms and will be used more widely in next year's campaign.

Television and Out-of-home Placements
The public service announcement (PSA) video aired 1,604 times on Telus and Shaw, reaching an estimated 160,000 residents, while digital billboards delivered over 8 million impressions.

Earned Media
The campaign generated five digital/print media stories through two radio stories, the Vancouver Sun, the Province, and the Georgia Straight for a combined audience reach of 5.4 million. This earned media provided an equivalent ad value of $46,669.

PLANS FOR 2022 CAMPAIGN
The campaign will run again in 2022 using existing creative. The campaign will continue to focus on one action to reduce microfibres (washing in cold water), with additional ways to reduce microfibres available on the website. A regional survey will be conducted after next year's campaign and will help gauge the extent to which the campaign is reaching residents and influencing their behaviour. The campaign benefitted from Ocean Wise's support in 2021 and will look for ways to increase support from third-party validators next year, including working with additional similar organizations. An overview of the campaign and its results will be presented at the Canadian Water and Wastewater Association's National Water and Wastewater Conference in January 2022.

OTHER MICROPLASTICS PROJECTS
Metro Vancouver has been working with Ocean Wise since 2016 to develop standardized methods to quantify and track microplastics in wastewater. Additional work with Ocean Wise and the University of British Columbia is planned to better understand microplastics in the urban watershed. Metro Vancouver is also part of the Microfiber Partnership, an Ocean Wise-led initiative that brings together researchers, the apparel industry, and government to look for solutions to marine microfibre pollution.

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

FINANCIAL IMPLICATIONS
The 2021 "Our Ocean Thanks You" campaign had a budget of $195,000. These costs are included in the 2021 Liquid Waste Communications Program Budget managed by the External Relations Department.

CONCLUSION
This is the campaign's first year in market, tackling a topic that is new to many residents. Research conducted during the development of the campaign showed that most residents were unaware that their laundry produced microfibres and that this contributed to microplastics in the ocean. It will likely require additional time for campaign messaging to fully reach and be understood by its target audience. This campaign also targets a busy demographic – parents – who have little time to take on extra activities. In 2022 the campaign will continue to focus on a single, simple action that is readily achievable (switching to cold water), but may consider expanding this message to include additional actions in future years. Next year's post-campaign survey will be helpful in assessing campaign uptake

and informing its future direction. For 2022, Metro Vancouver will also explore additional external supporters for the campaign.

Attachment:
Sample of Campaign Materials

Reference:
Campaign website: switchtocold.ca

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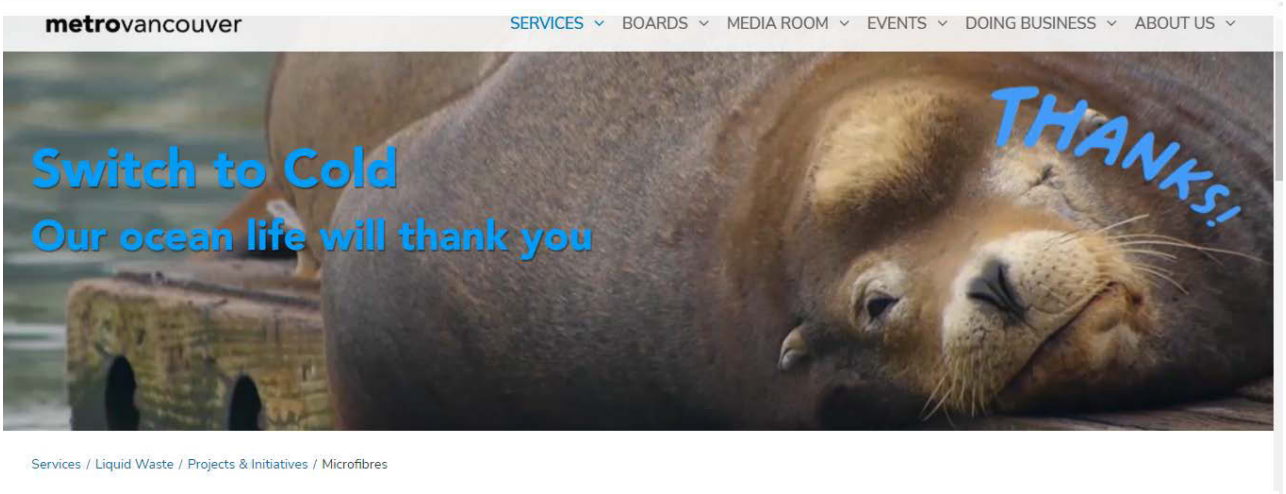
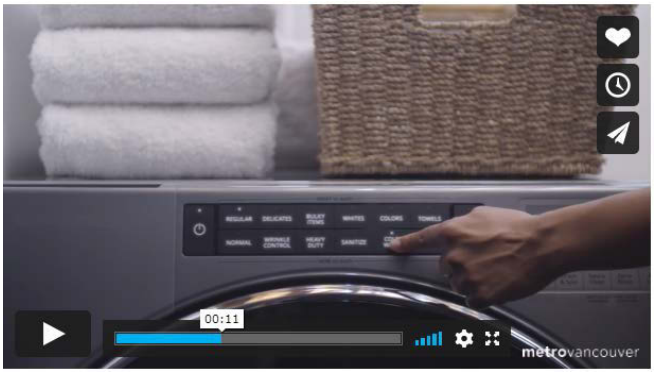
Sample of Campaign Materials



Campaign website - switchtocold.ca



Video - Our Ocean Thanks You

Digital billboard

Social media posts