To: Water Committee

From: Tim Burton, Lead Senior Engineer, Engineering and Construction, Water Services
Vanessa Anthony, Program Manager, Community Engagement, External Relations

Date: January 2, 2024 Meeting Date: January 10, 2024

Subject: **Cleveland Dam Safety Enhancements Program**

RECOMMENDATION
That the Water Committee receive for information the report dated January 2, 2024 titled "Cleveland Dam Safety Enhancements Program".

EXECUTIVE SUMMARY
Metro Vancouver remains dedicated to enhancing public safety for those enjoying nature around Capilano River Regional Park and has completed a number of upgrades to the Cleveland Dam as well as along the Capilano River downstream of the dam. These include installing an interim public alarm system, enhancing the reliability of the Cleveland Dam mechanical and control systems, adding more warning signage along the river, launching a safety educational website, transitioning to Alertable (an emergency mass public alert system), and completing two phases of public engagement.

Design of the long-term public warning system is currently underway with new alarm sites being informed through onsite surveying along the Capilano River to determine patterns of public river uses. Another phase of engagement will take place in 2024 prior to installation and commissioning of new locations in 2025.

PURPOSE
To inform the Water Committee of the current status of the Cleveland Dam Safety Enhancements Program.

BACKGROUND
Pursuant to the Board's authorization of the Cleveland Dam Public Warning System and Enhancements Project, this report is to update the Water Committee on its current status and next steps.

Program History and Context
In January 2021, the Cleveland Dam Safety Enhancements Program (the "Program") began work to improve public safety within Capilano River Regional Park and along the Capilano River downstream of the Cleveland Dam. The Program is expected to be complete in 2026 and involves the installation of interim and long-term public warning systems along the river, enhancing the reliability of the Cleveland Dam mechanical and control systems, installation of new river safety signage and an educational website, transitioning to a new emergency mass public-alert system, and

implementation of three phases of public engagement to help inform all of these safety enhancements.

Timeline

- Spring 2021: Installation of the interim public warning system, warning signage, and new fencing along the river
- Spring – Summer 2021: Phase 1 public engagement
- Spring 2021: Installation of new lower outlet fixed cone valves to improve control of water releases
- Spring 2021: Design and installation of new dam emergency override safety feature for the spillway gate
- Summer 2022 – Summer 2023: Onsite River User survey
- Spring 2023: Transitioned to Alertable, a new emergency mass public-alert system
- Spring 2023: Launched river safety educational campaign and website
- 2024: Design of long-term public warning system
- 2024: Phase 2 public engagement
- 2025 – 2026: Installation of long-term public warning system

Capilano River Interim and Long-Term Public Warning System

The public warning system along Capilano River is being completed in two stages: interim and long-term. The interim stage, which includes the installation of six visual and audible alarms, is currently operational. This system is designed to warn the public of hazardous conditions within the Capilano River in the event of an unintended release of water from the dam.

The long-term stage includes evaluating the effectiveness and reliability of the interim system in alerting the public and river users. Part of this work included a comprehensive public safety risk assessment and extensive onsite surveys and interviews with people visiting the area or accessing the river.

The purpose of the survey was to collect a statistically valid sample to help determine locations for the long-term public warning system alarms and additional warning signage. The onsite survey collected information on the following:

- Who the river users are, through collecting demographic data
- Where the river users are from and where they recreate in the river
- What times of day, week, and season that river users access the river
- What activities river users are participating in

The long-term public warning system is scheduled for design in 2024, with installation scheduled to begin in 2025 and be complete in 2026.

Cleveland Dam Mechanical and Control System Upgrades

Since 2017, Metro Vancouver staff have been working on several significant upgrades to the Cleveland Dam's mechanical, electrical, and control systems. This initiative was expanded in January 2021 with the objective of improving the dam's operational performance and reliability. Milestones completed to date under this initiative include the replacement of the large diameter lower outlet

valves, enhancements to key operational components of the spillway gate, and enhancements to associated monitoring and control systems.

The two lower level outlet valves are crucial for controlling the release of water from the Cleveland Dam into the Capilano River during high flows, typically fall and winter heavy rain storm events. The valves can also be used for the conveyance of spring freshet flows to minimize fisheries impacts at the dam spillway and for providing downstream flow releases in later summer – fall drought periods to encourage adult salmon upstream migration. The original valves were installed in 1954 at the time of the dam construction and were at the end of their useful lifespan. In 2021, new 1400 mm diameter stainless steel valves were installed, offering improved control of discharge flows compared to their predecessors. Plans are in place to further enhance these valves with the use of upgraded flow containment hoods which will permit even more reliable control of both low and high flow releases (see Attachment 1).

Emergency Override Safety Feature

In 2021, work began to enhance the automatic control, power systems, and spillway gate performance monitoring of the Cleveland Dam. A notable milestone of this initiative included the addition of an emergency override safety feature on the spillway gate. Staff have also commissioned a detailed reliability analysis of the dam. Findings will assist with prioritizing equipment upgrades over the next several years ensuring increased reliability and safety. The reliability assessment is anticipated to be completed by mid-2024, followed by detailed design of any recommended control and safety system and associated equipment upgrades for the dam's outlets (the spillway gate, the upper outlets, and the lower outlets).

Alertable - Emergency Mass Public-Alert System

In 2023, Metro Vancouver transitioned to Alertable, a third-party app that notifies users if there is an emergency at Cleveland Dam, Seymour Falls Dam, or in Electoral Area A. Following engagement with member jurisdictions and the North Shore Emergency Management group, Metro Vancouver learned that there are advantages and efficiencies in aligning to use one mass notification system for cross-jurisdictional incidents. The app is commonly used by other emergency organizations in BC, and is a centralized source for emergency notifications. When Metro Vancouver sends an alert during an emergency, Alertable users will receive a message on their electronic device with clear and direct instructions on how to stay safe and what actions to take next. Alertable has replaced Metro Vancouver's previous web-based voice, text, and email message system.

River Safety Education Initiative

As part of its commitment to improve public safety in and around the Capilano River, Metro Vancouver developed a new public awareness campaign and website to help educate people about the risks of being around the river and how to stay safe. The program launched in spring 2023 in conjunction with Emergency Preparedness Week.

The new website provides information about Cleveland Dam and the Capilano River, educational videos, information on what to do in case of an emergency, and safety tips such as: stay on designated trails, monitor the river for changes in water levels, and be ready for varying weather conditions with appropriate attire (see Attachment 2).

Communications, Engagement, and Ongoing Collaboration
Metro Vancouver is committed to providing notifications in advance of any dam activities or atmospheric weather-related events that may result in increased river flows. Engagement with First Nations, North Shore municipalities, the public, and river users began in 2021, continued in 2022, and a third phase is being planned for 2024 to provide an update and hear from the community on the long-term public warning system. Metro Vancouver meets regularly with staff from North Shore municipalities, First Nations and emergency management organizations, and will continue to work closely and collaboratively through to the Program's completion.

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

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

CONCLUSION
Since 2021, Metro Vancouver has taken a number of measures to enhance public safety downstream of the Cleveland Dam including installing an interim public alarm system, making upgrades to the dam's mechanical and control systems, installing new river safety signage, implementing a river safety awareness campaign, and enhancing emergency mass communications by transitioning to Alertable. Design of the long-term public warning system is currently underway with additional public engagement planned for 2024 ahead of installation in 2025.

Attachments
1. Installation of the Flow Containment Hood on one of the Lower Level Outlets
2. Screenshot from Metro Vancouver's River Safety Campaign Website

References
1. River Conditions Change – Be Aware When You're There Video
2. Cleveland Dam Safety Enhancements Program | Metro Vancouver
3. Emergency Notifications | Metro Vancouver
4. Seymour and Capilano River Levels | Metro Vancouver

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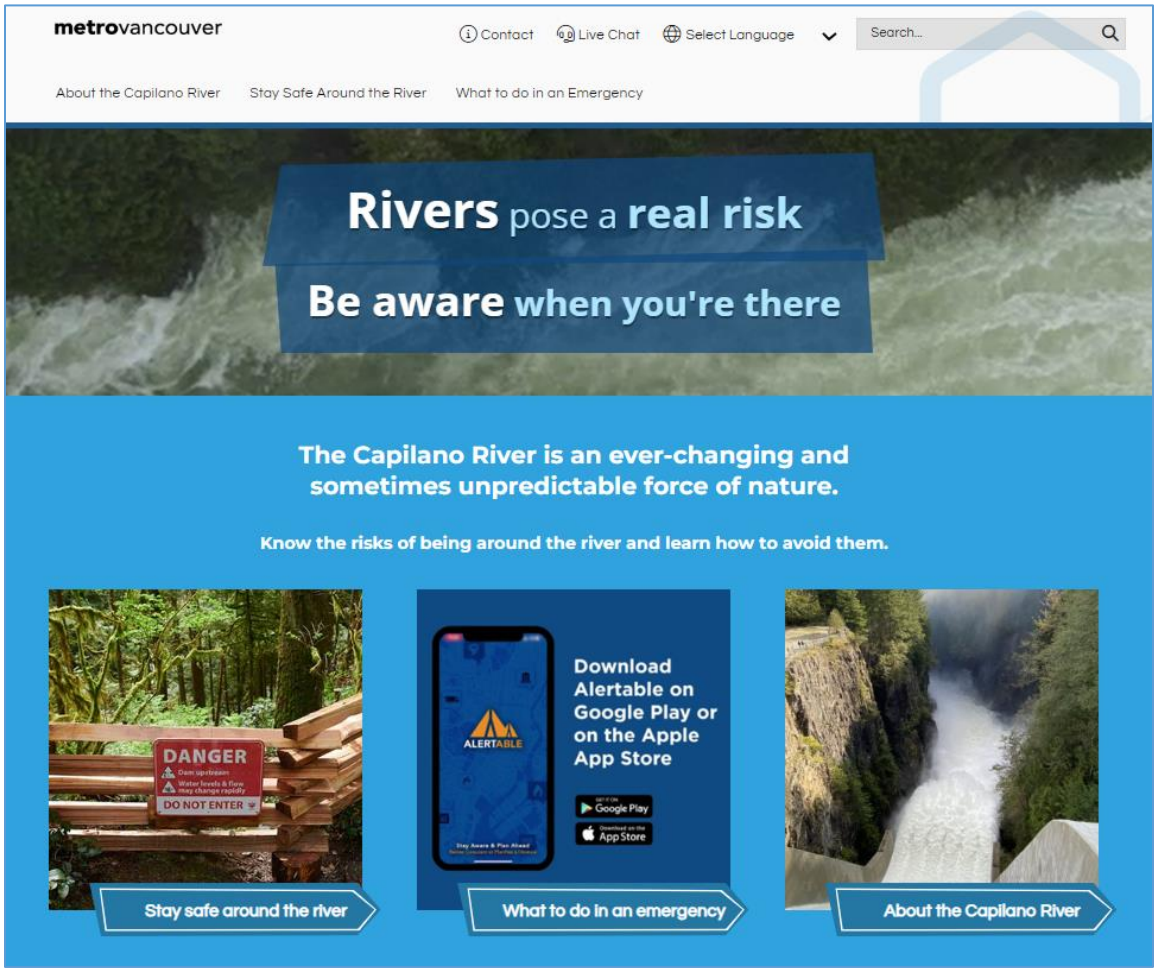
ATTACHMENT 1

Installation of the Flow Containment Hood on one of the Lower Level Outlets

ATTACHMENT 2

Screenshot from Metro Vancouver's River Safety Campaign Website