



Comox Valley Water Treatment Project

Connecting over 50,000 people to clean and safe water—an essential need for everyday life

— Category: Water Resources

The completion of Comox Valley Regional District's (CVRD) largest infrastructure project, Comox Valley Water Treatment Project, has provided a vital source of clean drinking water for the communities of Courtenay, Comox, and K'ómoks First Nation. Stantec, as prime consultant to the Aecon design-build team, worked in partnership and collaboration with CVRD and the local community to deliver a new water treatment plant and conveyance system which supplies 75 MLD of treated water from Comox Lake.



DELIVERING CLEAN WATER FOR A STRONGER COMMUNITY

The Comox Valley Regional District (CVRD) provides regional water supply to 50,000 residents in the Courtenay, Comox, and the K'omoks First Nation (KFN) communities. Since 2014, the unfiltered system suffered from numerous boiled water advisories with approximately 140 days of boil water notice. To resolve concerns from the public and the BC Ministry of Health, CVRD immediately commenced planning for the construction of new water treatment facilities—the Comox Valley Water Treatment Project.

A modern water treatment system for Comox Valley is now in operation, meeting all regulatory standards and removing the need for turbidity-related boil water advisory notices. The new treatment facilities were delivered in a record time, providing Comox Valley residents with a reliable source of clean water as soon as possible. Even with the construction for the design-build contract starting shortly before the onset of the COVID-19 pandemic, the Stantec/Aecon team were able to deliver the project within the 30 months schedule. Improvements were made to all components of the Comox

“The Comox Valley Regional District and Aecon / Stantec Design Build Team have worked hand in hand as an integrated team since 2019 to deliver the largest capital infrastructure project completed by the CVRD. The professionalism and dedication of the Stantec team combined with their technical expertise have been instrumental to the success of this critical project to our community.” —**Charlie Gore, Manager, Capital Project - Comox Valley Regional District**

Valley water treatment system and now includes three-levels of treatment, reducing turbidity and removing the risk of viruses and bacteria in drinking water. The improvements include a new lake intake accessing cooler, higher quality raw water, a new lake shore raw water pump station and transmission main, a new direct filtration water treatment plant, and a treated water transmission main. The treatment plant includes filtration, ultra-violet, and chlorination disinfection—putting it in line with provincial requirements.

The Comox Valley Water Treatment System now provides a secure supply of reliable, high-quality drinking water for decades to come.

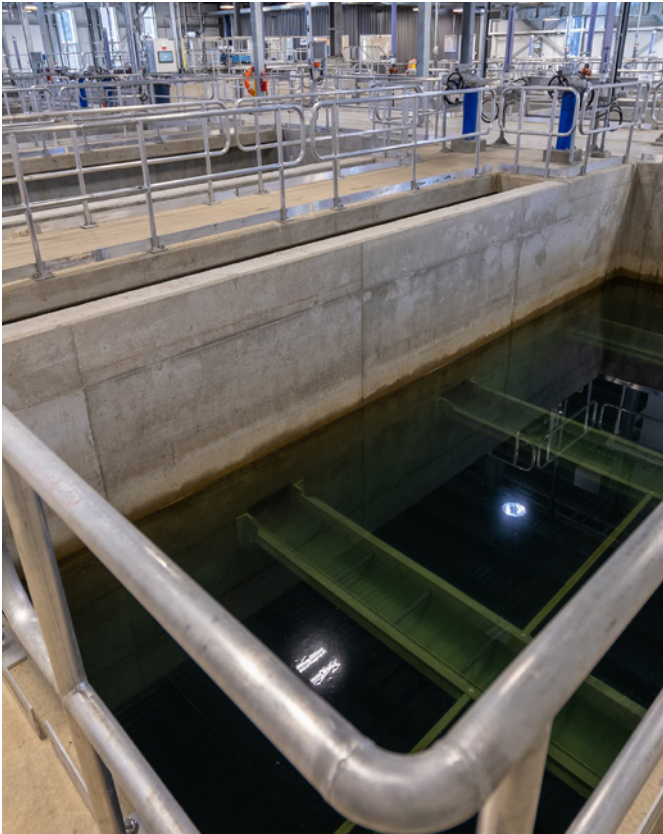
Project objectives

The primary objective of the Comox Valley Water Treatment project is to provide a safe, reliable source of drinking water for the local community that meets provincial surface water treatment objectives guidelines, removing the need for recurring turbidity-related boil water notices. The new water treatment system will aid in fostering long term health and economic growth of the community.

Comox Valley resides on traditional K'omoks First Nation territory; as such, inclusion and partnership with the K'omoks First Nation was a key priority in this project.

Navigating a tight schedule and COVID-19

Clean water is an essential need in every-day life. With the local community suffering from recurring boil water notices, this project was a key priority for Comox Valley Regional District and key stakeholders. An accelerated



schedule was set to deliver the \$126M project in 30 months. In addition to the accelerated schedule, on March 18, 2020, British Columbia declared a provincial State of Emergency due to the COVID-19 pandemic. This presented many additional challenges and restrictions in the completion of this project, heavily impacting the labour force and supply chain for major equipment and materials.

Collaboration and partnership were key to delivering the new water treatment system within the tight 30-month schedule. Support from the project owner, Comox Valley Regional District, and deep collaboration from start to finish made this achievable. The Aecon/Stantec integrated design-build team worked closely with the CVRD team including O&M staff, KFN, BC Hydro, Island Health throughout the entire project.

The design was completed six (6) months after the Notice to Proceed, through 4 formal stage gate reviews at 30%, 60%, 90%, and 100% design. Early work packages and major equipment procurement were issued simultaneous with the design package to facilitate construction start. Stantec's multi-disciplinary team fast tracked the design management, scheduling, and risk and cost management. Digital design utilizing virtual reality (VR) 3D design was used for all disciplines to accelerate the design process. This allowed an in depth and efficient review process while reducing costs and risks.

Under the COVID restrictions, several safety measures were implemented including social distancing, masks, and on site Covid policies to provide a safe environment while maintaining the design and construction schedule. The project was completed on schedule and on budget with zero environmental and safety incidents, and zero cases of COVID-19 despite the challenges brought on by the global pandemic.

UTILIZING INNOVATIVE ENGINEERING FOR SUSTAINABLE SOLUTIONS

Key statistics

Over 50,000

local residents supplied with safe reliable drinking water

96%

more energy efficient with the low energy press dewatering system

99%

of process water is recycled

Record delivery time

of only 30 months from design to completion through COVID Pandemic and supply chain disruption

Clean water for future generations

The Comox Valley Water Treatment Project is the largest infrastructure project in Comox Valley Regional District's history. The completion of this system connects over 50,000 residents to clean and safe water. The new water treatment has eliminated turbidity-related boil water notices and removed the risk of viruses and bacteria in the drinking water. Built with future growth of the region in mind, the new water treatment system provides robustness and flexibility for raw water quality variation to accommodate future treatment that may be needed. These communities now have access to a secure supply of reliable, high quality drinking water for generations to come.

Within the Comox Valley communities are active people who enjoy taking in the natural beauty of the area. The Comox Valley Water Treatment Project included several innovative design features to preserve the beauty of the area while remove noise concerns for residents,

including an underground pump station at Comox Lake. High-rate filters were utilized to compact the footprint needed for the facility and backwash water is recycled to preserve water resources. An alternative intake site in Comox Lake was selected to reduce the length of the intake, while also achieving the desired depth for water extraction. The tunneled intake into the lake avoided environmental impact on the surrounding lake and fisheries habitat.





SUSTAINABILITY, REGENERATIVE DESIGN, AND AESTHETICS

To enhance the outcome of the community's high-profile project, the design criteria for the Comox Valley Water Treatment Plant considered sustainability, regenerative design, and aesthetics.

Designing a sustainable water treatment facility with regenerative designs is critical to ensuring infrastructure that is conducive in minimizing our environmental footprint while constructing facilities that will service a growing community. A regenerative design throughout the facility restores, renews, and revitalizes the natural environment.

The architectural design of the facility incorporates the use of glu-laminated wood beams and roof structure in the visitor area of the operations building. The result is an aesthetically pleasing facility that integrates with the surrounding forest environment. The site incorporates landscaping, porous pavers to control runoff and an outdoor lunch and seating area for staff. With many hiking and biking trails in the area, water from the plant is supplied to a local trail head interpretive centre for public use.

Many sustainable aspects were integrated into the design of the Comox Valley Water Treatment system. Low carbon concrete construction was utilized to reduce our environmental impact. Natural light with light tubes and LED lighting reduces the need for electricity. Energy efficiency was emphasized in the selection of all aspects of the process equipment, such as the low energy press dewatering system used to dewater residual solids. This equipment **reduced the energy requirement by 96%** in comparison to other dewatering options such as centrifuges. To preserve water resource, **99% of process**

water is recycled from the water treatment system. The process design was optimized to reduce chemical requirements for water coagulation. Heat recovery was incorporated into the HVAC systems to reduce operating costs and environmental emissions.

Stantec work closely with regulators including Island Health and the Department of Fisheries and Oceans to design and construct the facility to meet dual objectives of protecting public health and minimizing impacts to the natural environment during construction. The regulators worked collaboratively with the Stantec design team to expedite approvals for this important community project.





Design with community in mind

Throughout the project, Stantec worked in close collaboration with the K'ómoks First Nation (KFN) community to design the facility. The success of this project is largely due to the deep-rooted partnerships with the local communities; starting with the K'ómoks First Nations as the project resides on KFN territory. The Comox Valley Water Treatment Project kick-off and grand opening included KFN ceremonies with the community. KFN artwork and community facilities have been incorporated into many aspects of the design. Stantec's **commitment to reconciliation and Indigenous collaboration** was deeply integrated throughout the delivery of the Comox Valley Water Treatment project.

This deep partnership with the K'ómoks First Nation on this project meets shared long-term planning and environmental protection goals for the CVRD and KFN. It also included employment opportunities goals for First Nations people, apprentices and under-represented population which were far

exceeded by the project team. Local First Nation artists participated in many design elements showcased throughout the facilities. A totem pole, carved canoe and carved board room doors were all constructed by local First Nation artists. These items complement the overall facility while showcasing world class talents of local artists in the region.

The project was designed **100% by Stantec local technical expertise and employed a workforce almost entirely local (99%) to Vancouver Island**. A \$3 million spend was committed with Indigenous businesses and finished with an actual spend of \$3.8 million. The project team exceeded on all Target Group commitments, and in most cases doubling, tripling, and quadrupling the hours commitments.

The completion of the Comox Valley Water Treatment project provides many benefits to the local community, in addition to a safe and reliable supply of drinking water. Residents now have access to multiple community facilities, First Nation arts, trail access with potable water taps, lake water supply to a new hatchery project, employment opportunities, and local capacity building.

Target Groups	Commitment Hours	Total Hours
Indigenous Peoples	10,000	24,656
Apprentices	15,000	42,721
Under-represented Populations	10,000	46,935



Design with
community in mind