ACWA
Advancing Canadian Wastewater Assets
An Urban Alliance initiative

VILLAGE

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Let's Solve Water

UNIVERSITY OF CALGARY

What is water reuse?

Water reuse generally refers to the use of reclaimed water. Reusing wastewater as part of sustainable water management provides alternative water sources for human and environmental uses. By using new technologies to treat the existing wastewater more thoroughly, wastewater can be turned into a reliable and safe water supply for many uses.

Is treated wastewater safe?

Yes. An advanced physical-chemical-biological treatment system was used, and monitored for optimal performance. The water used to make this beer met the pathogen reduction requirements and the Canadian Water Drinking Guidelines. An accredited laboratory tested the water after treatment to ensure independent verification of its quality.

Wastewater treatment plants disinfect water to remove pathogens, including viruses. SARS-CoV-2, which causes COVID-19, is an enveloped virus that research shows is particularly susceptible to disinfection.

The "Yuck Factor"

Emotional responses to water reuse are associated with uncertainty, even though our rational scientific understanding tells us it is no different than any other treated water. Can we overcome the "yuck factor" and make using reclaimed water into potable water acceptable? Singapore does. The space station does. Tell us -- what do you think?

Why is reusing water important?

Changing climate and growing global populations mean water authorities around the world are looking at treatment options to produce reclaimed water to meet declining fresh water supplies and achieve water security and sustainability. According to United Nations Water (UN-Water), reclaimed water may help address challenges associated with food production and industrial development. Advanced treatment to produce reclaimed water helps environmental sustainability and protects receiving waters from contaminants.

How was the water treated?

Municipal wastewater was treated in a full-scale Biological Nutrient Removal treatment plant, and then additional advanced treatment was done using ultrafiltration, followed by advanced oxidation (ozone + ultraviolet treatment), then reverse osmosis.

This multi-barrier process was monitored for the full duration of water production to ensure it met criteria specified by Alberta Health Services. Additional laboratory testing confirmed no presence of disinfection byproducts. Other jurisdictions have developed multi-barrier treatment approaches to similar water reuse projects, including Germany, Sweden, Singapore and the United States. This is the first project of this kind in Alberta, which allowed policy makers to test and verify a water reuse framework.

Our story

Three partners, who are committed to advancing how water is used, came together for this innovative project:

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ACWA is a globally unique research facility where researchers, municipalities and industry can de-risk and advance wastewater treatment technologies. It is part of the University of Calgary, whose vision is to be a global intellectual hub in Canada's most enterprising city.

VILLAGE

Village Brewery is a Calgary craft brewery dedicated to gathering people around community. From the beginning, 10% of Village Brewery's bottom line goes directly back into the community to support artists and craftspeople. It takes a Village to raise a beer and a beer to raise a Village.

xylem
Let's Solve Water

Xylem (XYL) is a leading global water technology company committed to developing innovative technology solutions to the world's water challenges.

Water is essential to life and the focus of two of the United Nations Sustainable Development Goals. ACWA, Village Brewery and Xylem share an aligned innovation vision to help grow stronger, more resilient communities. Each of us has a connection to water and an opportunity to contribute.

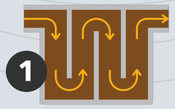
Water reuse for a higher purpose.

TRANSFORMING WASTEWATER TO POTABLE WATER AND BEER.

With extreme climate changes, dwindling groundwater supplies, and urbanization communities are facing water scarcity challenges around the globe. Water utilities are seeking opportunities to build resilience into their processes to generate a more sustainable future.

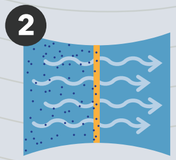
As a leader in resiliency and potable reuse solutions, Xylem partnered with ACWA and Village Brewery to demonstrate the ability of an alternate potable reuse treatment approach to make high quality water and beer. This approach offers utilities flexibility to leverage wastewater as a resource in their resiliency and sustainability efforts to ensure this high quality water for future generations.

The Treatment Process



CONVENTIONAL WASTEWATER TREATMENT PROCESS

This consists of mechanical and biological treatment to separate solids and remove organic matter, phosphate, nitrates and microorganisms (bacteria, viruses, parasites).

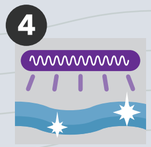


ULTRAFILTRATION (UF) MEMBRANE

Clarifies the water by removing solids through a semipermeable membrane and improves the quality of the water by removing large pathogens.

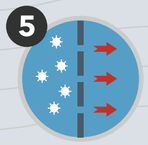
OZONE OXIDATION

Ozone is produced on-site and on-demand, then transferred to the water to be treated. This reacts with the organic micro-pollutants transforming them into non-hazardous contaminants and eliminates unwanted pathogens.



ULTRAVIOLET (UV) DISINFECTION

A light-based disinfection procedure that can remove 99.9999% of viruses and pathogens from the water and irradiate other contaminants.



REVERSE OSMOSIS (RO)

Salts, remaining organic compounds and microorganisms are removed by passing the water through a semipermeable RO membrane.

WATER TESTING

Water is tested to ensure it meets the highest water quality standards as set out by Alberta Health Services.

The Brewing Process

MASHING

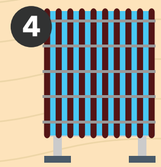
Grinded malt is added in water and breaks down starch to sugar and complex proteins to simple nitrogen compounds, at different temperatures from 35°C to 78°C.

LAUTERING

The mash is moved to the lauter tun that extracts liquid, called wort, from the grain. The grain is then sparged with water to get as much of the extract as possible.

BOILING

Hops are added and boiled for flavor and aroma.



CHILLING

Wort is cooled as quickly as possible in a plate cooler.

FERMENTATION

Yeast is added to turn sugar into carbon dioxide and alcohol.

FILTERING AND PACKAGING

After fermentation, beer is sent through our centrifuge and filters to our bright beer tank. This is where our beer is carbonated to spec and then sent through the canning process with limited oxygen exposure. Cans are then stored in a cold room before shipping.

BEER TESTING

Beer is tested to ensure it meets the standards for human consumption.

Drink moderately and enjoy.

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