

Naramata's Energy Efficient Water Treatment

The Regional District of Okanagan-Similkameen's (RDOS) improved their water supply with new water treatment infrastructure and a plan for decoupling irrigation and municipal water systems.

Background

Naramata is an unincorporated community in the [Regional District of Okanagan / Similkameen RDOS](#). It has approximately 900 households and 450 hectares of irrigated agricultural lands. Water is taken from two creeks (Robinson and Naramata) and a lake then chlorinated and treated.

The existing distribution system services 782 domestic connections and 450 hectares of irrigation with a maximum daily usage of 31 million litres (eight million gallons). Eighty-six percent of the water is used for irrigation. Meeting these consumption needs is challenging, given that:

- no source alone provides enough water to meet domestic and agricultural needs;
- storage reservoirs don't provide enough capacity; and
- existing pumps and piping don't provide the required flow to meet peak demands.

In 2004 public health issues worried about the quality of water provided to community members, supplied from creeks. A new treatment facility was required, and treating lake water was recognized as the most optimal public health decision

Engagement

"We used an interactive review with staff and public – the Naramata Water Advisory Committee," explains Engineering Services Manager, Andrew Reeder. "There is not policy set for this, it's just good practice."

Results

Geothermal heat exchanger

Reeder recognized that energy could be saved by using a heat exchanger to tap the latent heat of treated water. This water could be used to heat the facility in winter months, and cool it in summer months. Now the exchanger has been installed, Reeder is proud to report that, "100% of the water that goes through the exchanger is utilized and treated and consumed. Nothing is wasted."

Pumping System

When Naramata looked at ways to build the water treatment plant the water operations staff found a better way to pump water. Typically water is pumped from below to the top of the reservoir so the water cascades down to the other users. Instead they made a 'mid-level reservoir' and converted that into a treatment plant. The water is pumped from there. The result is less energy used by not moving more water than necessary. By building the treatment plant mid-level, they are only pumping to the zones that need it resulting in huge energy savings



Naramata built ultra-violet water disinfection facilities based on performance as well as energy and cost efficiencies.

UV Equipment

At the new treatment facility the water is exposed to high intensity Ultra-Violet (UV) rays. These rays deactivate harmful viruses and organisms. The UV system doesn't use chemicals and is energy efficient.

Initially, Naramata issued an RFP to look at energy efficiency as well as the initial capital costs of the UV equipment itself.

They used a life cycle cost analysis to pick the UV equipment. They chose Wedeco equipment – which cost the most to purchase, but was cheaper to install and had the lowest energy consumption. The pay back will be about two years.

As a result, the tender process required the contractor to use the UV equipment. A Novation Agreement was drafted which married the vendor of the UV equipment with the contractor so they became responsible for the equipment and its warranty.

Progressive Split of Water System

The RDOS also recognized the opportunity to decouple their irrigation and municipal water systems. 86% of water treated to drinking quality was being used wastefully for irrigation. Treating and pumping this water from the Lake to fields would waste energy, and require excessive chemical use.

Through a life-cycle-cost analysis the region was able to see the long-term benefits of replacing older pipes with two new pipes while using the same trench. This will reduce pumping costs, because it's gravity fed through creek irrigation – the new water sources. They determined what pipes needed to be replaced first and what new pipes would give us the greatest savings. The Asset Management Plan helped determine the timing of the pipe replacements and dueling of the irrigation and domestic pipelines.

The plan is to split the pipes over the next 40 years. Eventually, all residential homes will receive treated water while agricultural land will receive untreated upland creek water.

Andrew Reeder liked the flexibility of the design, "If we ever have to do additional treatments than the cost would be lower, more affordable if there are further treatments."

Less shipping

Another innovation on-site is generating its own chlorine. This is to eliminate spill risks but a side result is not having to ship chlorine from far away.

Policy Framework

Naramata was careful to work with good analysis and assessment information right from the start.

Funding

Naramata is collecting a tax to split the water system. The Improvements project was financed by Provincial Federal grants.

Source(s):

Find out more information on designing for low carbon infrastructure.

Contact:

Andrew Reeder: info@rdos.bc.ca