



2021 Annual Water Report

EXECUTIVE SUMMARY

The Town of Oliver operates an extensive Municipal and Rural water system that consists of seven ground water well sites, two surface water sources, and six reservoirs. The water system covers the Town of Oliver itself and a substantial portion of area 'C' of the Regional District of Okanagan-Similkameen. The Town provides domestic water to approximately 2,393 residential and 174 commercial/ industrial connections, which all have water meters to record consumption. Irrigation water is also provided to 601 connections irrigating approximately 5,200 acres of farmland with 1,025 acres of that pumping their own water from the Town's irrigation canal, excluding 455 acres of non-farm land that is also irrigated from this system.

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1.0 INTRODUCTION

The *British Columbia Drinking Water Protection Act* requires that each municipal government that supplies or distributes domestic drinking water must provide a water quality report that is reviewed by the local Drinking Water Officer (Interior Health Authority) and published for public access. This report has been prepared for the community of the Town of Oliver, and in accordance with the requirement in the *Drinking Water Protection Act*.

1.1 HISTORY

In 1918, the Provincial Government, led by “Honest John Oliver”, the Premier at that time, purchased over 22,000 acres of land in the South Okanagan to develop an irrigation canal system to convert 8,000 acres of desert land on each side of the Okanagan River into viable agricultural land. This land would then be for sale, at a reasonable cost, designated to the soldiers returning from World War I. This land arrangement was known as the “The Soldiers’ Land Act.” This project then became SOLP (South Okanagan Lands Project)

Construction of the irrigation system, including the intake dam at the base of McIntyre Bluff, began in 1918. Over the next seven years, the canal, known as “The Ditch”, had an overall length of approximately 40 concrete-lined kilometres measuring 5.6m across the top, and 1.5m deep, delivering 6.5m³ of water per second. The SOLP designed the canal to transport irrigation water from one side of the Valley to the other. To accomplish this, a 2.1m diameter siphon made out of wood stave pipe had to be built underground, which ran approximately 590m long directly beneath the center of Oliver, connecting the north and south parts of the canal.

Over the next forty years, the canal was maintained and run by the provincial government employees (SOLP) until the spring of 1964, as the province decided it was removing itself from the irrigation business. Premier W.A.C. Bennet passed the canal to the Oliver and Osoyoos Fruit Growers’ Association, which volunteered itself to become the cornerstone of the South Okanagan Lands and Irrigation District (SOLID). The district operated and maintained the canal system until 1989 when it was divided into two municipal governments: the Town of Oliver and the Town of Osoyoos. The Town of Oliver was given the responsibility to maintain and operate the canal, which is still a major contributor to the rest of the 100 billion liters of water that Oliver and Osoyoos delivers annually to the parched desert area of the valley.

Today, the Town of Oliver provides domestic water to approximately 2,393 residential (including rural), and 174 commercial and industrial connections. Irrigation water is provided

to 601 connections, irrigating approximately 5,200 acres of farmland with 1,025 acres of that pumping their own water from the Town's irrigation canal. 455 acres of non-farm land is also irrigated from this system. The change in the non-farm arable area from previous years is due to a change in the new Water Regulations Bylaw 1351 where customers previously received a half acre with the payment of their parcel tax.

2.0 WATER SYSTEM OVERVIEW

The Town of Oliver's water system is broken down into seven individual systems, which over time have been inter-connected to provide a more sustainable water supply system as a whole. Each system is defined, or known by, the area and the wells that support it:

(Please See Appendix A: Town of Oliver Water System Map)

- System 1 – also referred to as Rural North – Buchanan Road Pumphouse
- System 2 & 2B – Black Sage Area – Black Sage and Miller Road Pumphouses
- Municipal System – also referred to as System 3 – Rockcliffe and Tucelnuit Pumphouses
- System 4 - 7 – also referred to as Rural South – Fairview and Miller Road 13 Pumphouses

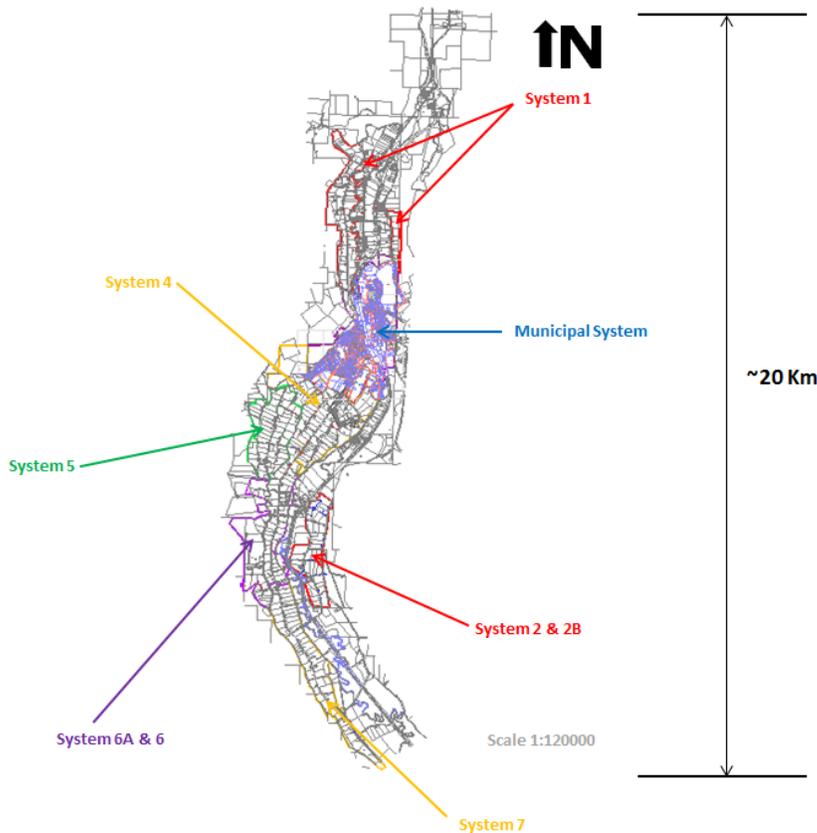


Figure 1: Town of Oliver's 7 Water System Overview

As of 2014, the Town of Oliver uses groundwater for all of its domestic water connections. Therefore, the canal surface water system is providing irrigation only, with the addition of low-pressure users who pump out of the canal using their own private pump houses. Each system is twinned with the exception of System 2 (Black Sage). This system is groundwater only, and there are no current plans to complete the twinning of System 2.

As part of the water distribution system, the Town maintains approximately 143 kilometres of water main. The distribution system consists of Asbestos Concrete (AC), Polyvinyl Chloride (PVC), Cast Iron (CI), and High Density Polyethylene (HDPE) material, with pipe sizes ranging from 50mm to 600mm in diameter.

The age of the water mains ranges from new to approximately 50 years old. The age of the pipe does not necessarily reflect the need to replace it as the various material types and installation conditions make for different average life expectancies. Normal operating pressures range from 60psi to 120psi for standard pressurized services.

2.1 DOMESTIC SYSTEM

The domestic water system storage capacity is 1,025,000 US gallons (US GAL) (3880 cubic metres (m³)) between four reservoirs. Existing Municipal reservoirs consist of a 360,000 US GAL (1360m³) reservoir and a newer (constructed in 2010) 500,000 US GAL (2470m³) reservoir. The other two reservoirs still in use are located in System 6 & 6A; Road 13 reservoir at 150,000 US gallons (568m³) and Hester Creek reservoir at 15,000 US gallons (57m³).

2.1.1 SYSTEM 1 DOMESTIC

System 1, also known as "Rural North," supplies domestic water to approximately 161 accounts. System 1 has an irrigation main, and a domestic main that runs approximately 4.5km from the edge of town N. to the end of Sportsman Bowl Road. Buchanan pump station, which is located adjacent to 1748 Buchanan Road and near the east side of the Okanagan River, supplies both irrigation surface water to System 1 and domestic ground water to System 1 and into Municipal System 3. Buchanan pump station has one domestic ground water pump with a total 125 horsepower (hp) that has a pumping capacity of 1,000 gallons per minute (gpm).

2.1.2 SYSTEM 2 & 2B DOMESTIC

System 2, also known as "Black Sage" area, supplies domestic and irrigation water to approximately 52 accounts. System 2 is unique having been separated into two areas, System 2, and 2B. System 2B, along with every other system, is twinned. Whereas System 2 is the only system that does not have separate water sources for both irrigation and domestic water. System 2 and 2B have two domestic pump stations within its boundary, Black Sage pump station, and Miller Well pump station. The Black Sage pump station is located approximately 154m W. from Ryegrass Road between Miller Road and Watters Road. The Black Sage well supplies groundwater to both domestic and irrigation services in System 2 and 2B utilizing three pumps with a total 235hp, and a pumping capacity of 2,600gpm. The Miller Well, located on the west end of Miller Road, approximately 67m E. of the Okanagan River, supplements up to 500gpm of domestic groundwater to System 2 and 2B during the peak demand season, along with Systems 4 thru 7, via Reservoir 13.

2.1.3 MUNICIPAL SYSTEM DOMESTIC

The Municipal System, also known as System 3, supplies domestic groundwater to approximately 2400 accounts. The Municipal System utilizes two pump stations, and one

booster station to supply its users within the Town boundary, Rockcliffe pump station, Tucelnuit pump station, and the Airport Booster station. Rockcliffe is located between the parcels of 781 and 715 Skagit Avenue. Rockcliffe has one pump at 150hp, and a pumping capacity of 1,500gpm. Tucelnuit pump station is located on the SE corner of Merlot Avenue, and Lakeside Drive, W of the Tucelnuit Elementary School. Tucelnuit utilizes two pumps having a total pumping capacity of 1,750gpm. The Airport Booster station is located on the NE corner of the intersection of Airport Street, and Road 1. The Airport Booster is typically set to supply water from within the Municipal boundaries to the rural area south, but can also be used to intake water from the rural area south, and supply the Municipal System depending on demands or if there was a maintenance malfunction of another pump.

2.1.4 SYSTEM 4 - 7 DOMESTIC

System 4 - 7, also known as "Rural South," supplies domestic ground water to approximately 483 accounts. The Systems utilizes the Miller Well pump station, 6A Domestic Booster station, and the Airport Booster station. Miller Well pump station also aids in a supplement supply of domestic groundwater to System 2 during peak demands, and the Road 13 Reservoir. The Miller Well pump has 125hp, and a pumping capacity of 1,000gpm. 6A Domestic Booster feeds Hester Creek Reservoir (6A), while the Airport Booster has the option to alternate between the Municipal System and Rural South to have a continuous loop in the system, and so that each pump is working in its most efficient phase.

2.2 IRRIGATION SYSTEM

Surface water, specifically Okanagan River, is still the primary source for the irrigation water system, but also includes Buchannan well, Fairview well and Black Sage oxbow. The canal system runs from McIntyre Dam (where the diversion is complete with a fish screen to divert fish back to the Okanagan River) north of Town to Road 18, south of Town, where it continues past Road 22 as a piped system. The irrigation system in System 2B is supplied by the Black Sage oxbow, with the remainder of System 2 not being twinned. The Town maintains multiple water licences to allow these surface water diversions. There are five additional irrigation pump stations that pump along the canal: Mud Lake, Rockcliffe, Fairview, Hester Creek, and Mount Kobau.

In January 2016, the irrigation canal siphon located at Gallagher Lake was damaged by a large rock fall event. Following the rock fall, the Town of Oliver engaged Golder Associates to conduct a geotechnical assessment of the area to determine the actions required to enable safe access to the site for repair of the siphon; T&A Rockworks carried out rock scaling. A pipe repair was then completed from within the pipe, during which time a 1.2m (outer diameter)

pipe was grouted into place. This allowed the siphon to operate during the irrigation season with a 32% reduction in supply capacity. While this flow has been sufficient for 2016, 2017, 2018, 2019, 2020 and 2021 so far, it may not be adequate during warmer, drier seasons in the future and hinders the Town from incorporating new customers.

The 2021 irrigation season started on April 14th and ended on October 26th. Crews began filling the canal and turning on spray fillers April 6th. The canal diversion was shut down on October 26th. All Town irrigation systems were shut down and winterized by the beginning of November.

The Town has started working on re-routing this portion of the canal (damaged siphon) with the help of provincial funding and borrowing. In late 2020, tendering and project construction started in the latter half of 2020. There are hopes that this project will be fully complete by early 2022.

Heavier creek flows on many creeks the last few years (2017 & 2018) on the west side of the valley had staff continuing to monitor; Hester, Tinhorn, Reid & Park Rill Creeks as the heavier flow can have an affect on our irrigation system, similar to the 2017 debris run-off into the canal. As in the last two years, staff spent extra time monitoring, working with contractors and periodically removing extra material in creeks or keeping culverts clear that could potentially damage the Town's irrigation infrastructure.

2.2.1 SYSTEM 1 IRRIGATION

System 1 utilizes two pump stations for its irrigation supply, Mud Lake and Buchanan. Mud Lake pump station intakes water from the canal utilizing two pump units at a combined 200hp, and having a pumping capacity of 5,000gpm. Mud Lake is located 90m W of Buchanan Drive. Buchanan irrigation pump is 50hp, and has a capacity of 500gpm. System 1 covers 420 acres of agriculture that is pressure irrigated, excluding low-pressure users in the area.

2.2.2 SYSTEM 2&2B IRRIGATION

As mentioned earlier, System 2 is the only system that is not twinned, having pumps that supply groundwater for both domestic and irrigation uses with a combined 235hp, and having a pumping capacity of 2,600gpm. However, System 2B has its own irrigation pump which is called Black Sage Irrigation pump that intakes from the Black Sage oxbow located 65m S of Road #9, and 100m E of the Okanagan River. This pump has 150hp with a capacity of 1,540gpm. System 2 and 2B provide pressurized irrigation water to approximately 405 acres of agriculture land.

2.2.3 SYSTEM 4-7 IRRIGATION

The second canal pump station is Rockcliffe Irrigation in System 4. This station utilizes three pumps having a combined 500hp, and a pump capacity of 9,100gpm. Rockcliffe supplies pressurized irrigation to approximately 916 acres of agriculture. This pump station is located between the properties of 824 and 760 of Road 2. System 4 also includes a 25,000 US GAL (94m³) irrigation water reservoir, called System 4 Irrigation Reservoir.

The third canal pump station along the system is Fairview Irrigation pump station, which is located in System 5 on the NE corner of Road 5 and the canal intersection. Fairview utilizes two pumping units with a combined horsepower of 300hp, and having a pumping capacity of 4,400gpm. Fairview Irrigation supplies pressurized irrigation to approximately 467 acres. Another Fairview Irrigation well in System 5, which used to be part of the domestic water system, was changed over to supply the irrigation system when the nitrate levels exceeded the Canadian Drinking Water Standards. Its primary use now is to supply water in the shoulder seasons or low demand portions in the irrigation year but it can also help supplement peak demands. System 5 includes a 50,000 US GAL (189m³) irrigation water reservoir, called Fairview Irrigation Reservoir.

Hester Creek Irrigation pump station is located in System 6 at the NE corner of the W end of Road 11 and the canal intersection. Hester Creek pump station utilizes two pumping units having a combined horsepower of 175hp, and a pumping capacity of 4,000gpm. Hester Creek Irrigation pump station delivers pressurized irrigation to approximately 426 acres of land. System 6 also contains a booster pump station that has two 15hp pumps, and is utilized during the peak season.

Mt Kobau Irrigation pump station is the most southern in the water system, in System 7, located at the west end of Road 18. Mt Kobau has two pumping units that have a combined total of 150hp, with a capacity of 4,000gpm. Mt Kobau provides pressurized irrigation to approximately 545 acres of land.

3.0 WATER QUALITY, SAMPLING, AND MONITORING PROGRAM

In the past the Town of Oliver utilized two sources of water, surface water (Okanagan River) and groundwater (well water); the surface water is now restricted to irrigation water only. Groundwater is now the **only source** of water used for domestic purposes, and the only source that is **thoroughly monitored** and sampled for quality purposes.

3.1 SAMPLING AND MONITORING

The Town of Oliver works closely with CARO Analytical Services out of Kelowna, BC to monitor drinking water quality in accordance with the *BC Drinking Water Protection Act*, and *Guidelines for Canadian Drinking Water Quality (GCDWQ)*. The Town's staff submits weekly samples from various sampling sites throughout the domestic system for bacteriological testing for Total Coliforms, and E-Coli Bacteria. In conjunction with these submittals, the Town also conducts their own in-house 'presence/absence' tests. The Town also monitors the Nitrate levels in the drinking water sampling six times a year in February, April, June, August, October, and December. Once a year, usually mid-summer, the Town will commence a full spectrum test on the domestic water system. The spectrum analyzes all physical parameters and characteristics of The Town of Oliver's drinking water. The water results are then compared to the *GCDWQ* to ensure compliance.

- *(Please See Appendix A: The Town of Oliver Water System Map for Sampling Sites)*
- *(Please See Appendix B: 2021 Full Spectrum Results and GCDWQ)*
- *(Please See Appendix C: 2021 Weekly Water Sampling Result Table)*

There are seven test stations located in the Municipal boundaries. The Rural Area north of Town has one test station and there are six testing sites (excluding wells) south of Town. When any sample result shows the presence of Total Coliform or E-Coli, the Interior Health Environmental Health Officer is consulted and standard protocols are initiated with a flushing of the contaminated system and a resampling of water where contamination was located. Resampling occurs immediately for lab testing and in-house 'presence/absence' samples are also taken to identify coliforms.

4.0 WATER CONSUMPTION

4.1 TOTAL CONSUMPTION

The water works system is twinned in Oliver which means that the groundwater used for domestic purposes and surface water is used for irrigation purposes, each having their own piping system. System 2 is not twinned, as it uses groundwater for both irrigation and domestic purposes. The Town of Oliver consumed 3,494,867,733 US GAL of water in 2021. That is 13,229,513,500 liters (L) of water or 13,229,514 m³ of water.

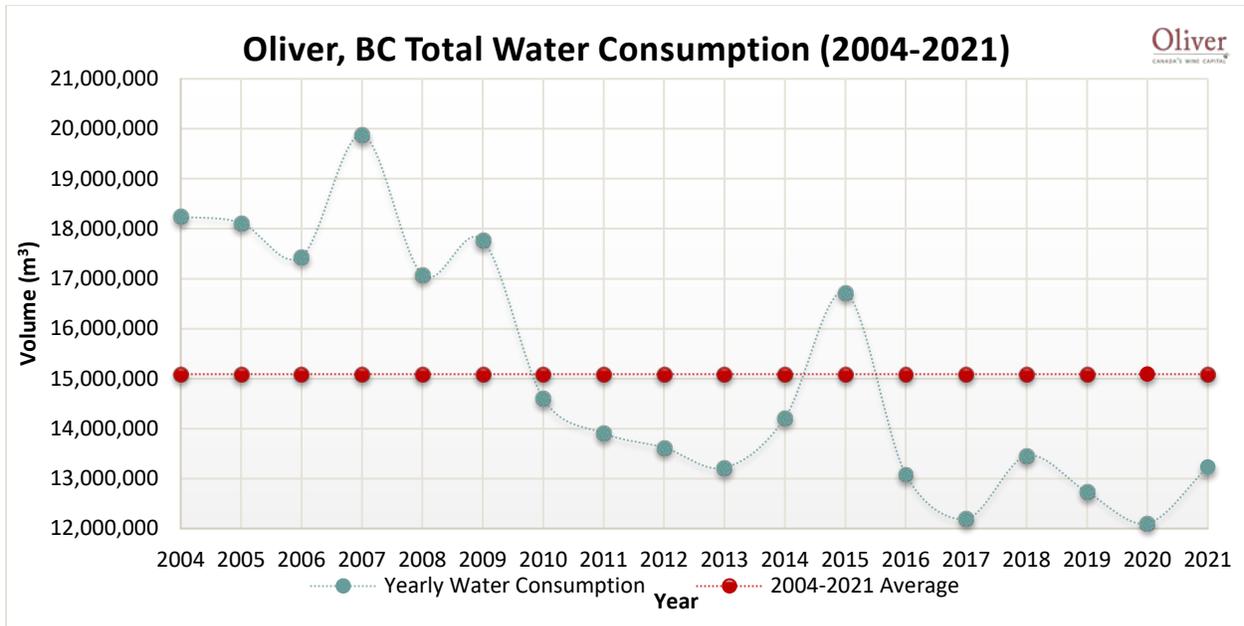


Figure 2: Total Water Consumption 6 Year Trend

As shown in *Figure 2*, Oliver consumed 4.88% more water than the previous year (2020). The seventeen-year average is 3,937,060,656 US GAL. In 2021, Oliver consumed 11.2% less than the seventeen-year average. Water demand is influenced by population and irrigation usage, population has been slightly increasing each year in Oliver and surrounding area. The 2016 Census reported Oliver’s population as 4,928, however, the Town of Oliver’s water system extends beyond its borders making it difficult to define how many people it actually serves; it is estimated to be over 6,000 people.

Irrigation technology has seen improvements over the years for ground crops, orchards and vineyards; this has had a significant change on the water demand and peak demand decreases. Irrigation practices and water conservation through these practices have been the major influence on the change in water demand; this includes the final twinning stages of the water system in 2014. The other major contributing factor for irrigating is weather and precipitation. In 2021, The South Okanagan was declared, by the government of BC, a drought level 4. In 2015, The South Okanagan was declared, by the government of BC, a drought level 4. In 2016, the South Okanagan did not reach a drought level 4, instead it had a normal snowpack season, and was considered a “dry” year, but did not see the same level of drought as 2015. In 2017, above normal snowpack and late winter/early spring precipitation caused unsuspected flooding throughout the region. In 2018, the Okanagan was in a valley wide emergency state due to flooding again. The snow back in March was 85% above normal, and then April rains came along with high temperatures. The melt increased and creeks that have been dry for years started flowing again. Agriculture development over the years had

changed the lay of the land and the natural watercourses, causing the spring runoff to flow through vineyards and orchards damaging crops. The spring flooding caused Oliver's agriculture season to be a wet one, and the large amount of precipitation influenced the irrigation demand. Oliver's maximum residential domestic water demand was on June 30, 2021. See Figure 3. Oliver had a maximum daily water demand peak at 27,938.75m³, while minimum daily demand occurred on January 25, 2021 at 2101.36 m³.

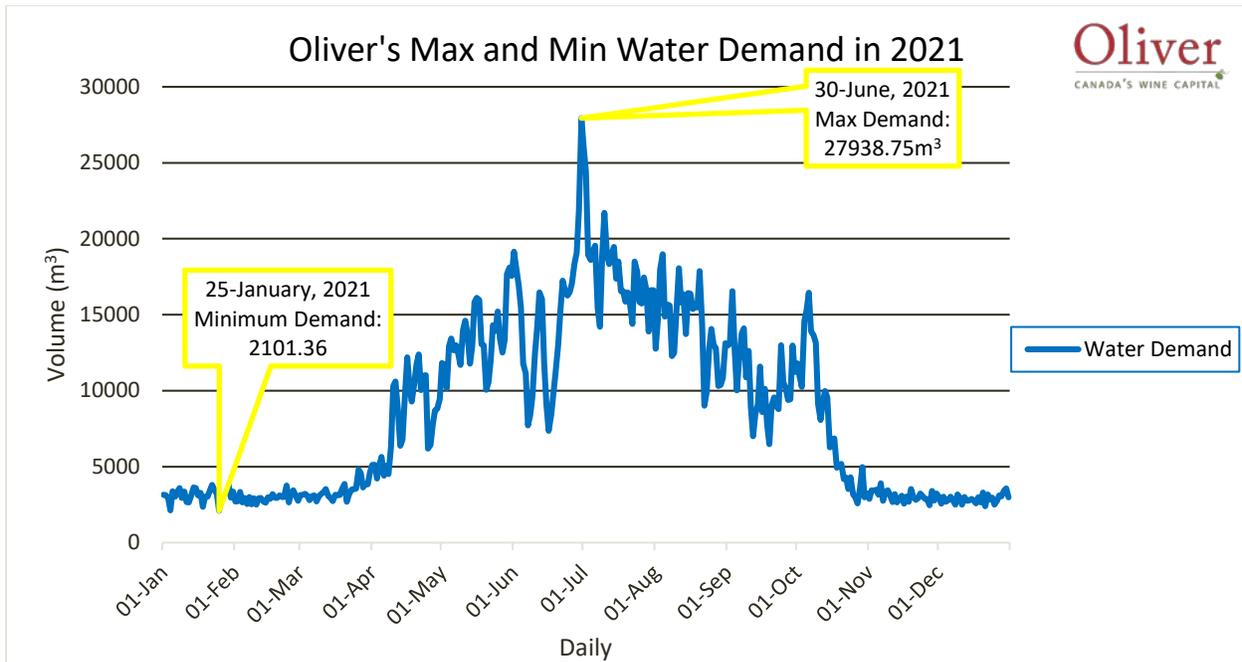


Figure 3: Oliver's 2021 Max and Min Domestic Water Demand

4.2 BREAKDOWN OF CONSUMPTION

The Town of Oliver consumed 801,631,941 US GAL (3,034,507m³, 3,034,506,996L) of groundwater in 2021. This amount is 22.94% of the total consumption. The remaining 77.06% is surface water, which is primarily used for irrigation, having a total consumption of 2,693,235,792 US GAL (10,195,007m³, 10,195,006,504L). See Table 1 below for the breakdown of percentages.

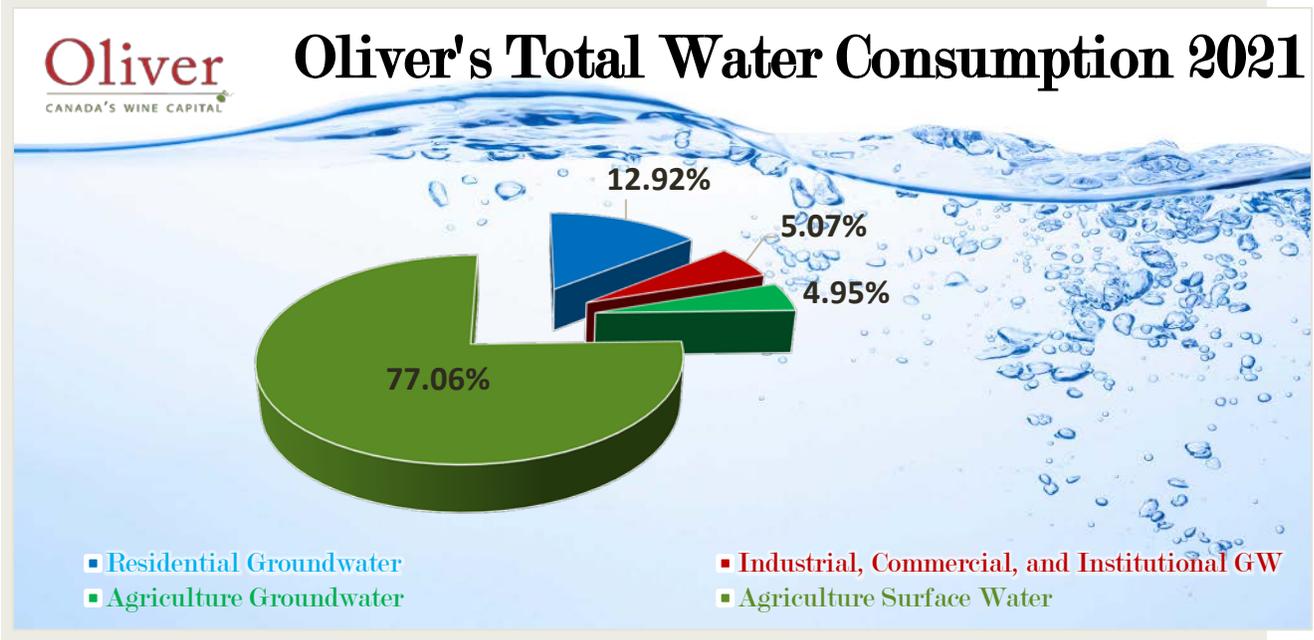


Figure 4: Oliver's Total Water Consumption 2021

WURC CALCULATIONS	US GAL	CUBIC METERS	PERCENTAGE
TOTAL GW USED	801631941.15	3034505.57	22.94%
TOTAL SW USED	2693235792.31	10195001.70	77.06
TOTAL RES GW	451636960.52	1709631.07	12.92%
TOTAL RES SW	0.00	0.00	0.00%
TOTAL ICI GW	177113866.93	670448.60	5.07%
TOTAL ICI SW	0.00	0.00	0.00%
TOTAL AG GW	172881069.44	654425.73	4.95%
TOTAL AG SW	2693235792.31	10195001.70	77.06%
TOTAL WATER	3494867733.46	13229507.27	100.00%

Table 1: Oliver's Groundwater Breakdown: Groundwater (GW), Surface Water (SW), Residential (RES), Industrial, Commercial, Institutional (ICI), and Agriculture (AG).

According to the OBWB, an average person in the Okanagan uses 675L of water each day. That is twice more water than the Canadian average of 329L per day. On average, Oliver domestic system used approximately 934L of water per person per day in 2021, which is 605L above the Canadian average. See Figure 5.

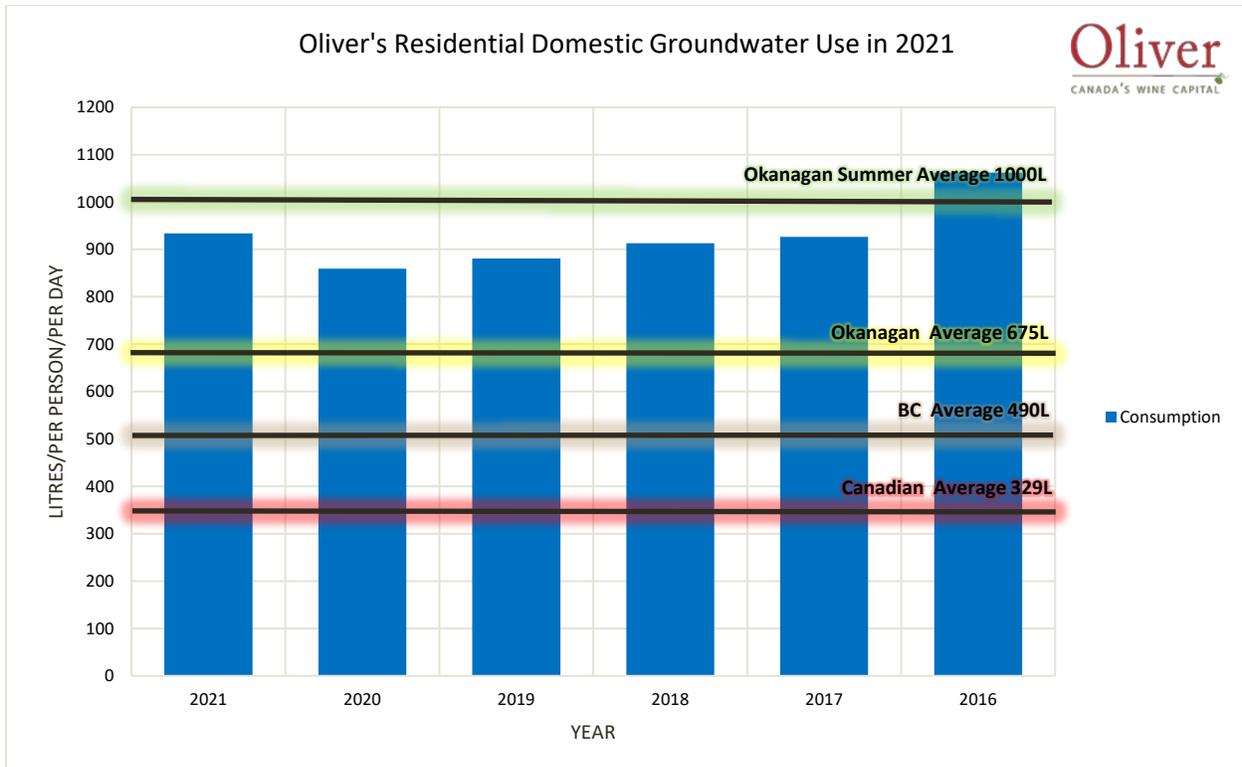


Figure 5: Oliver (2016-2021) vs OBWB Estimated Averages (1996-2006)

During the summer months the average consumption rate exceeds the Okanagan summer average of 1,000L (1m³) with Oliver using 1329L per person per day while the pumps are in Summer Mode (April to October). However, when the pumps are in Winter Mode (November-March), Oliver used 374L per person per day, which is below the Okanagan average of 675L. These numbers are approximate values and estimates, if a person would like to know their household usage from year to year - take the volume consumed on your monthly water bill, convert it to liters, and divide it by the number of people in the household and the number of days in the month, you will get your answer in liters per person per day. Once you have your results, you can compare your usage each year to your previous years along with the Canadian, BC, Okanagan, and Okanagan Summer Averages. See Below and Figures 5-7.

1. Total Volume of Water used from Water Bill (cubic meters) = $x(m^3)$

2. Convert $x(m^3)$ to (liters (l)) = $x(m^3) \times 1000 = x(l)$

3. Divide $x(l)$ by number of persons in household (pp) = $\frac{x(l)}{(\# \text{ of persons})}$

4. Then Divide that result $\left(\frac{x(l)}{pp}\right)$ by the number of days the water bill is accounting for (pd) = $\frac{(x(l)/pp)}{(\# \text{ of days})}$

5. This answer is your final result = $x(l/pp/pd)$

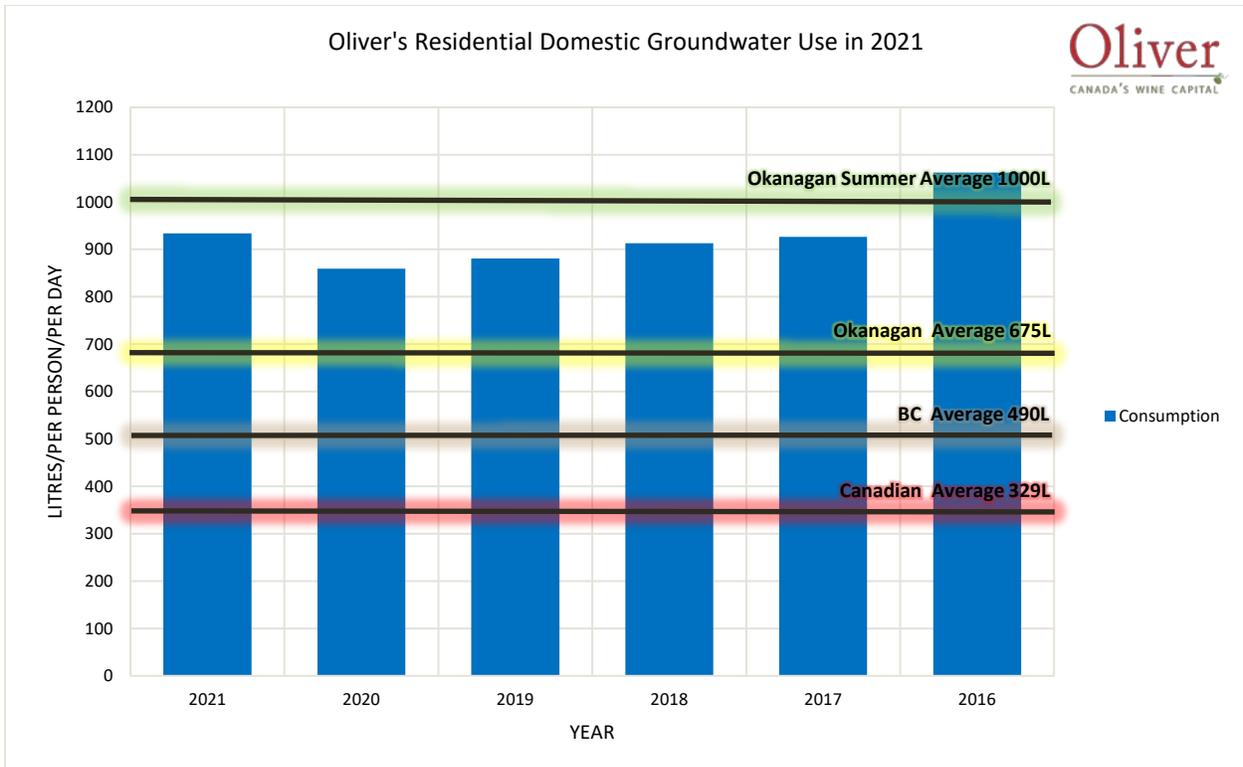


Figure 6: Oliver's (April-October 2016-2021) average vs OBWB Estimated Averages (1996-2006)

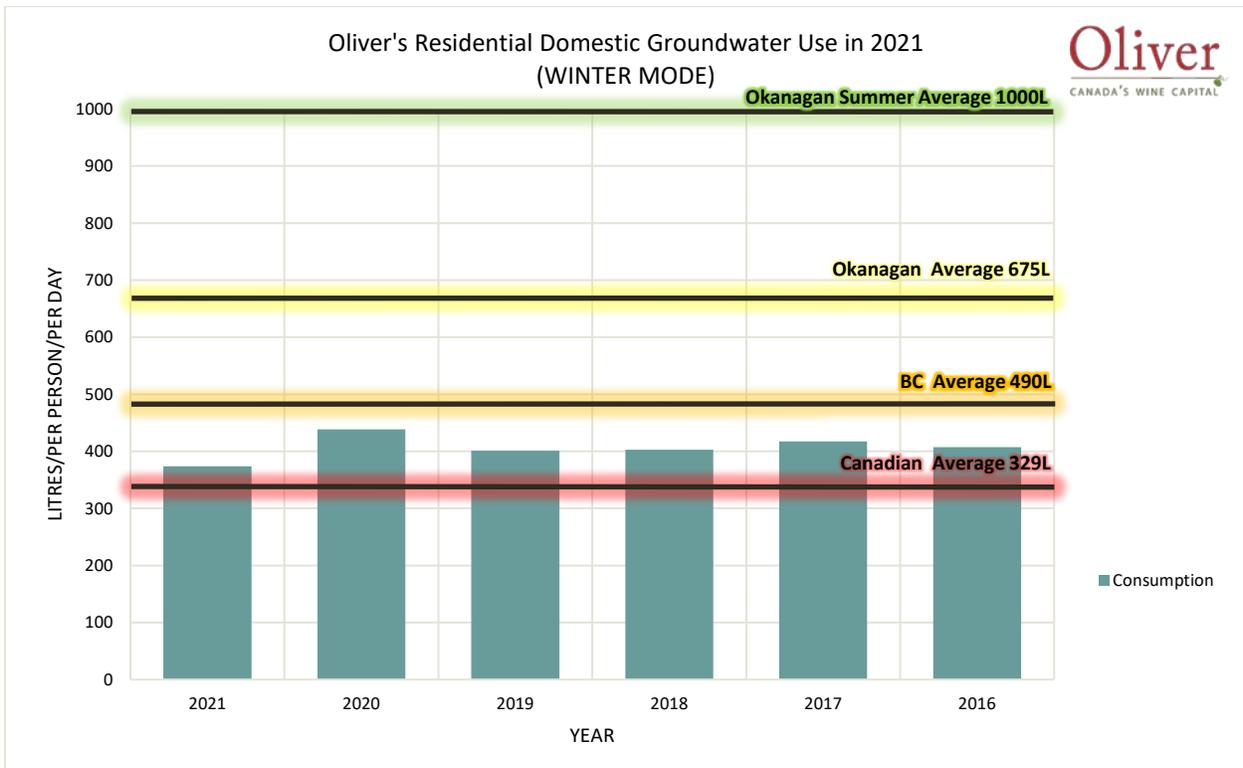


Figure 7: Oliver's (November - March 2016-2021) average vs OBWB Estimate Averages (1996-2006)

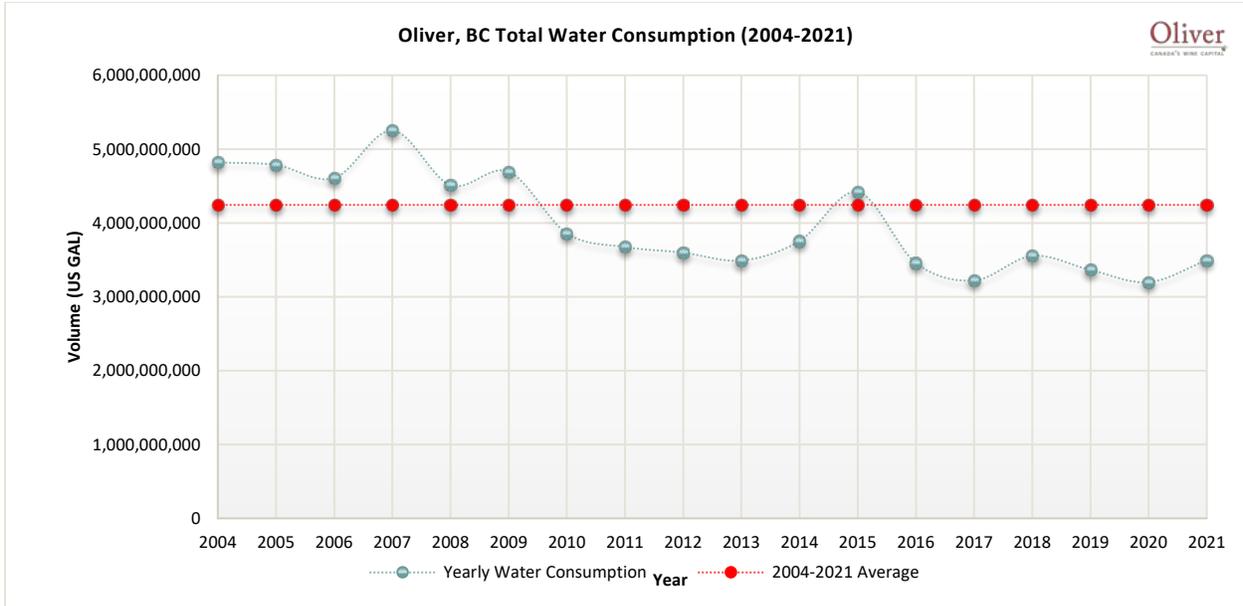


Figure 8: Oliver's Total Groundwater Consumption Trend (2004-2021)

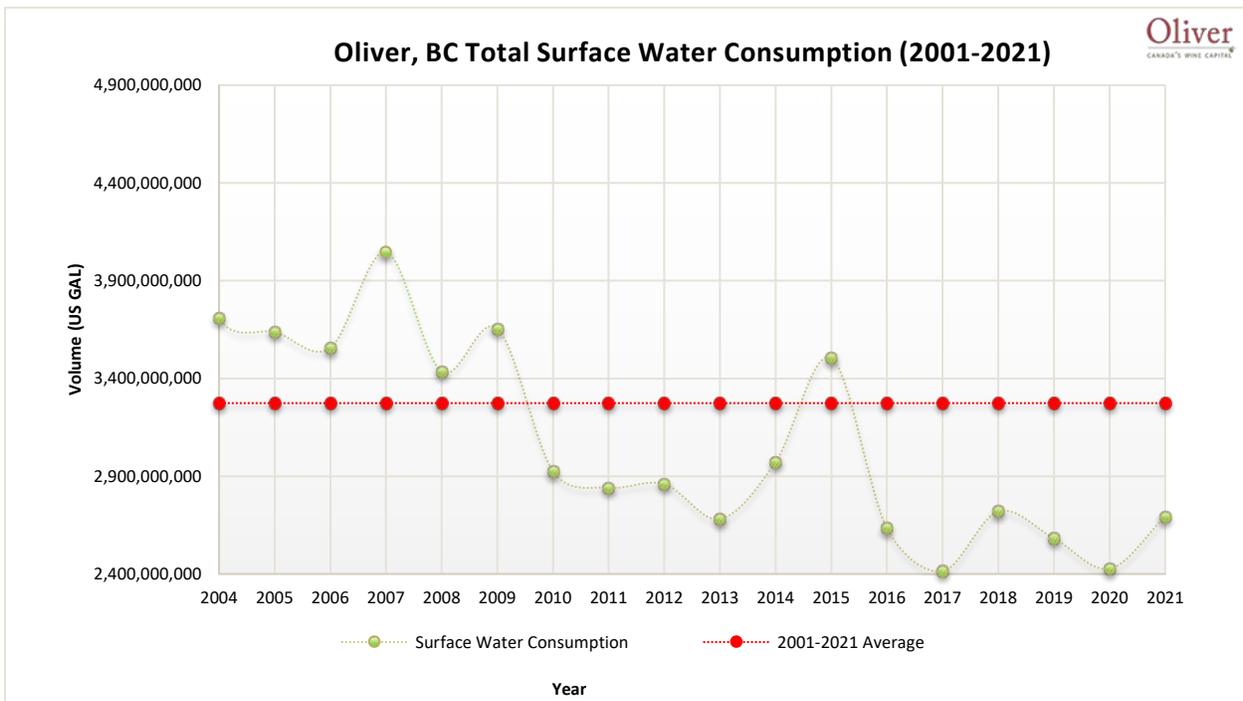


Figure 9: Oliver's Total Surface Water Consumption Trend (2004-2021)

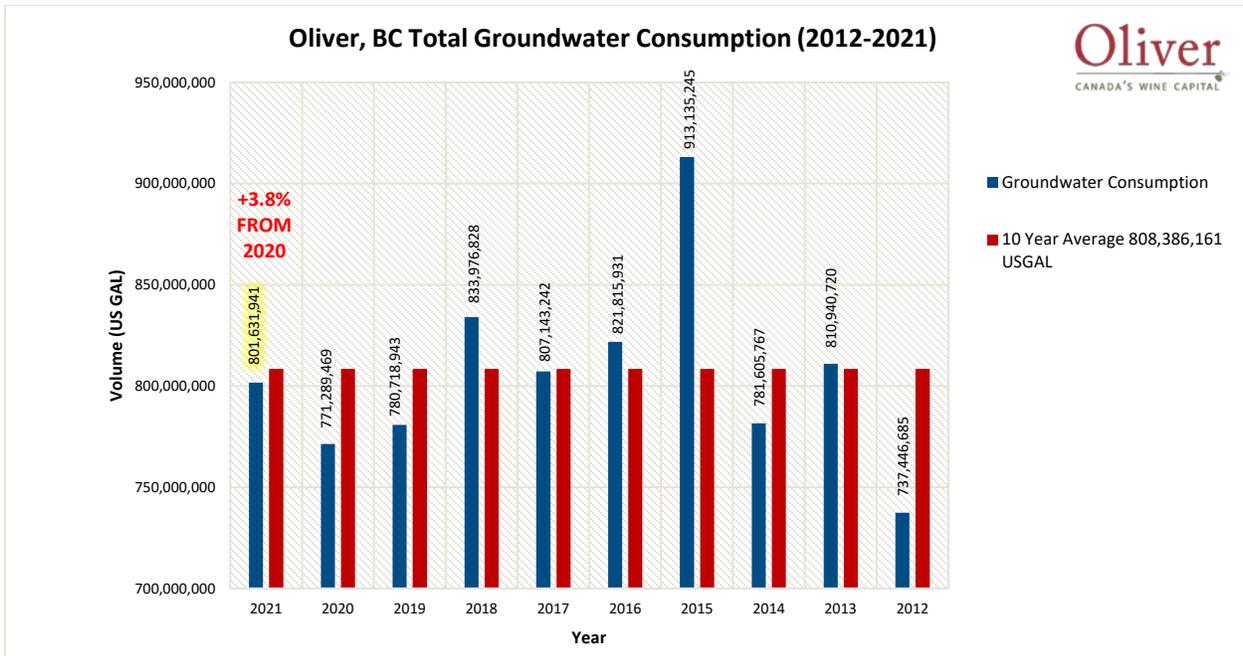


Figure 10: Oliver's Groundwater Consumption (2012-2021)

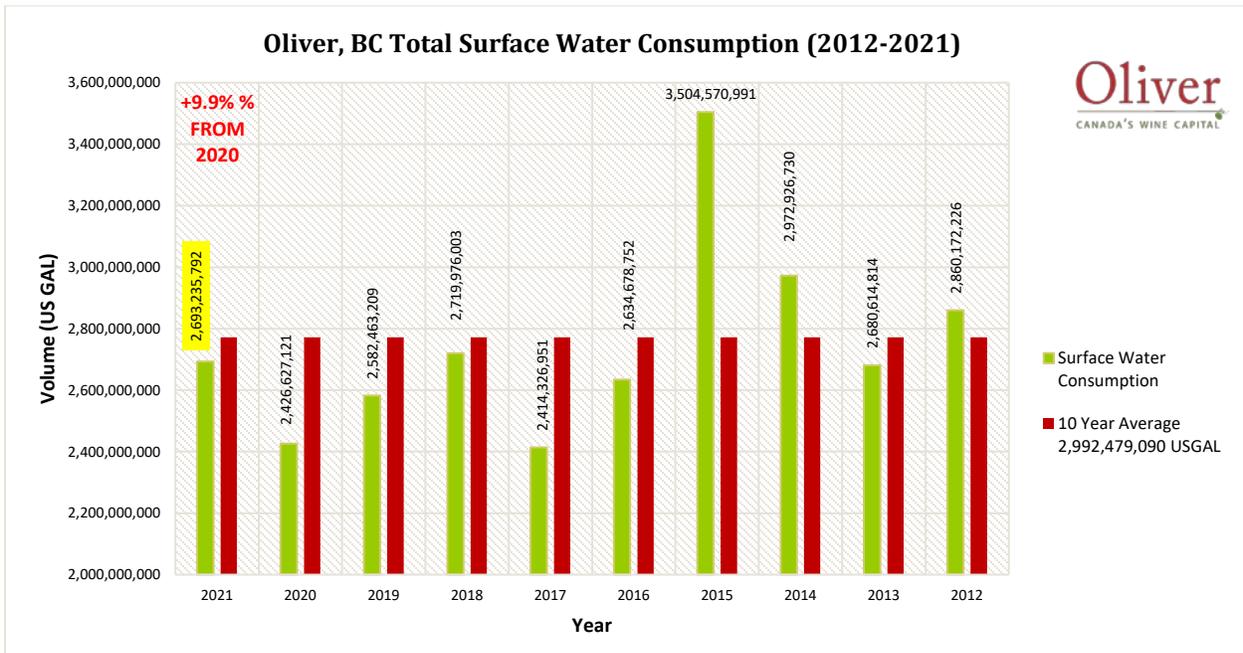


Figure 11: Oliver's Surface Water Consumption (2012-2021)

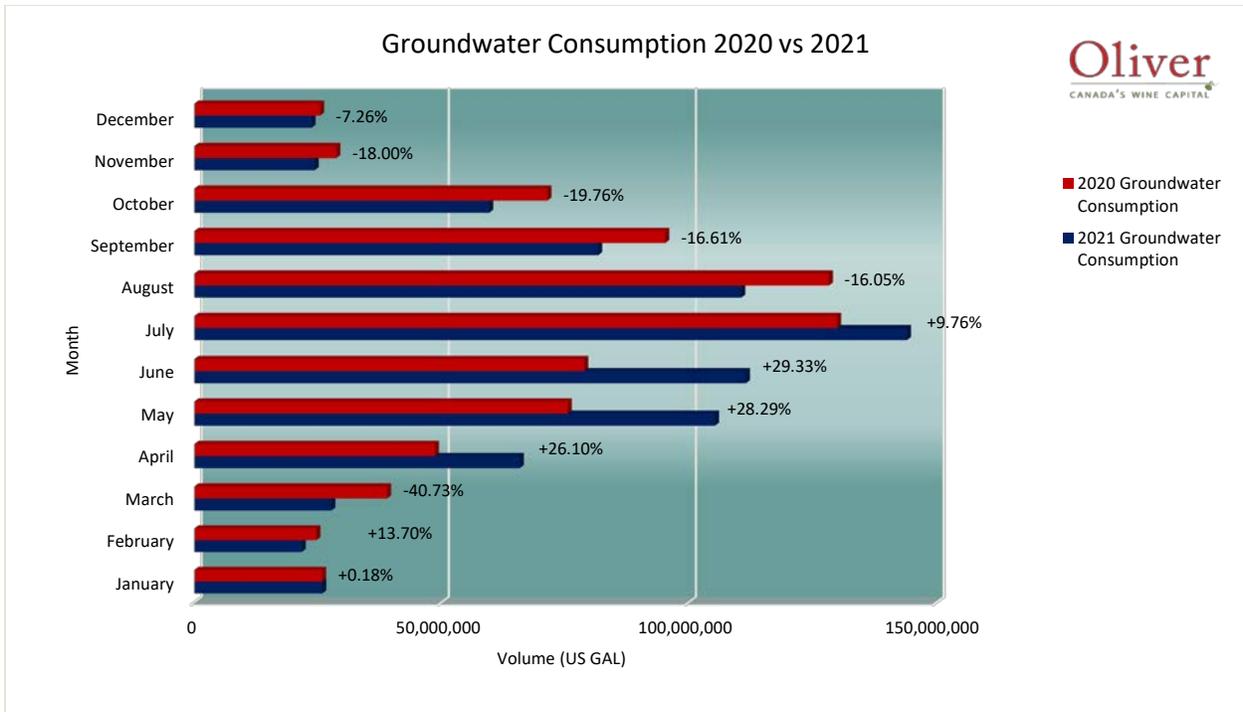


Figure 12: Groundwater Demand Percentages in 2021 Compared to the Previous Year 2020

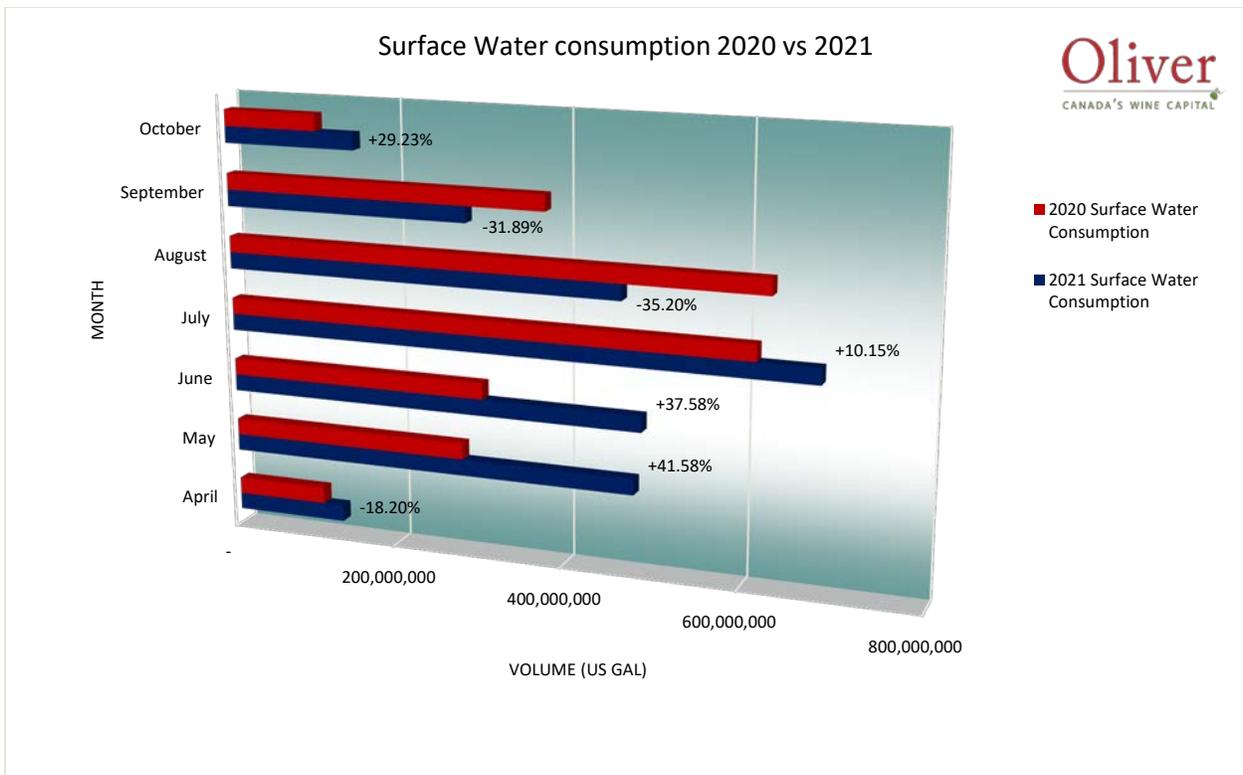


Figure 13: Surface Water Demand Percentages in 2021 Compared to the Previous Year 2020

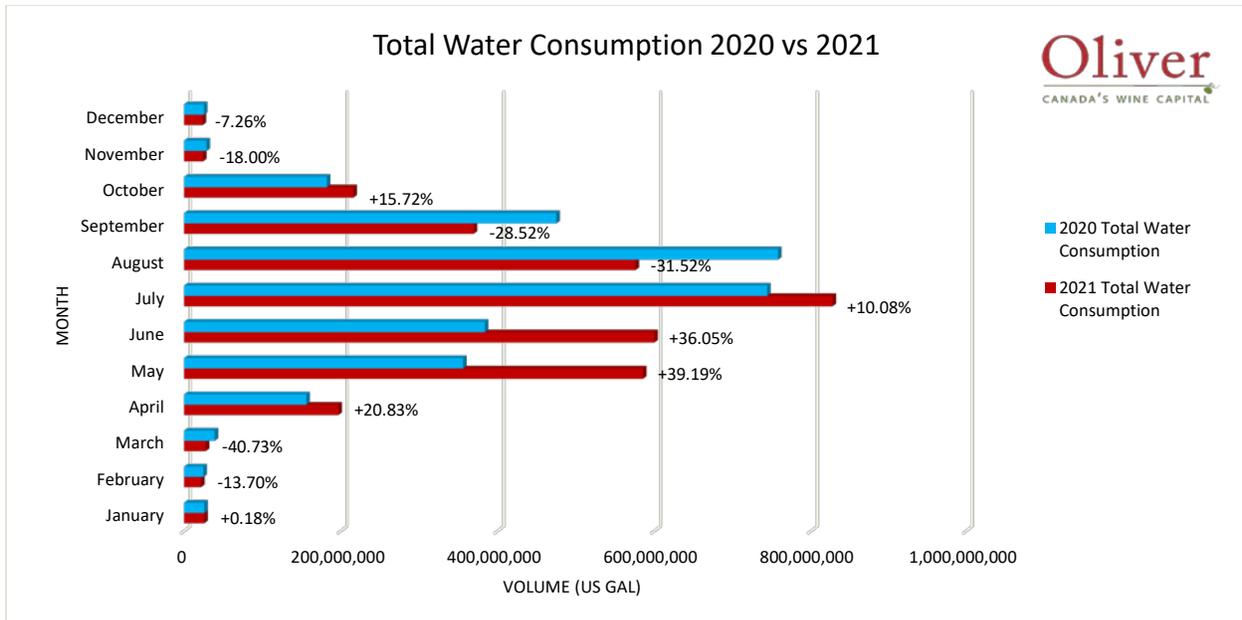


Figure 14: Total Water Demand Percentages in 2021 Compared to the Previous Year 2020

- (Please See Appendix D: 2021 Pumping Data Table)
- (Please See Appendix E: Groundwater and Surface Water Consumption Data Tables)

4.3 WATER CONSERVATION

The Town of Oliver works closely with the OBWB and its *Okanagan Water Wise* program called “Make Water Work”, to spread a valley wide awareness on water conservation in the Okanagan. The program acts as a campaign where residents take water conservation survey pledges. OBWB will bring awareness in 2021 with more Radio Ads, Facebook Ads, Billboards, other social media support, yard signs, posters, and magnets linking the Make Water Work website www.makewaterwork.ca.

5.0 STAFF

According to EOCP (Environmental Operator Certification Program), Oliver’s Water Distribution System is classified as Class III. In 2021 Oliver’s operations has four certified Water Distribution Operators on staff; two Level I, two Level II, and one Level III.

The Town of Oliver is also classified as a Level I Water Treatment facility (at multiple locations). We currently have three Operators with Level I and two working on receiving their Level I.

All Operators are required to keep up with their education and to maintain 2.4 certified education units (CEU’s) every two years, monitored by the EOCP. Various accredited courses were put on at the Town regarding safe work practices.

6.0 CAPITAL PROJECTS AND IMPROVEMENTS

6.1 PROJECTS COMPLETED IN 2021

The Town of Oliver continues to make minor and major improvements to the Town's water system every year and works with the Interior Health Authority (IHA) to prioritize some of these goals. Here are the main projects that were completed or started in 2021:

Outfall Culvert Repair (Road 11)

- This project started in late 2020 and was completed in early 2021. It involved pulling a slightly smaller pipe (HDPE) through an existing culvert pipe that was damaged from 2017 flooding materials (rock & debris). This 'Hester Creek Spillway' is tied to the canal system and to Hester Creek itself, so it serves two purposes and is critical to the Town's infrastructure.

Hillside St. Water Main Looping

- This project involved joining a dead end domestic water mainline, for 70m, to another existing domestic water mainline for the purpose of better water quality and better fire flows to that area.

Black Sage Domestic Water Mainline Repair

- The Town experienced an event (Fall of 2020) that damaged some large diameter pipe located at our Black Sage Wells that resulted in an insurance claim. The pipe was originally installed in 2014 but specific problem created some separation in some joints in a manifold style pipe layout that was built specifically for proper chlorine contact time before the first customers. Engineering, contractors, staff and insurance were all involved to get the pipe fixed and financed in time for the 2021 spring season which would affect system #2 and #2B.

Canal Lining Rehabilitation Continued

- Town staff worked with contractors to overlay 340m section of existing irrigation canal floor and walls located next to the Oliver Readi-mix cement concrete and aggregate mine. The work was completed in time for the early April canal diversion fill.

Drain Pipe Replacement from Reservoir (small section)

- Town staff were able to remove many wooden boards and debris from a drain pipe coming from the Town's two main reservoirs. The pipe was inspected and everything was fine and the original pipe was wood stave that was covered in concrete many years ago.

Station Street Mainline Upgrades – PH 2

- This project is the second phase upsizing/upgrading sewer and water pipe, as well as improving the beautification of Station Street, north of the previous Phase 1 project. All upgraded pipe was installed in 2021 and road and boulevard improvements will continue in 2022.

System #5 Reservoir Communication Improvements

- We improved the communication between our System #5 irrigation reservoir and the Fairview Irrigation Pumphouse with a wireless system. We also made improvements to fencing and access to reservoir equipment and access hatch.

6.2 CONTINUING PROJECTS INTO 2022

Gallagher Siphon Re-route

- This large scale project started in late 2020 with the hiring process for a contractor and is slated to finish in the spring of 2022. This project will consist of replacing a section of large diameter (siphon) pipe and open canal, to re-route away from rock fall areas that continually damage the canal system next to Gallagher Lake itself.

Okanagan St. Rehabilitation (sewer & water)

- Designs started in 2021 but the town is replacing sewer pipe in the Okanagan Avenue area near Similkameen Avenue. This means a section of water mainline has to be replaced/upgraded in the construction process which the work is slated for 2022.

Canal Lining Rehabilitation Continued

- The Town is planning to rehabilitate another 250m of canal concrete wall and floor north of our Mud Lake Pumphouse.

Water Meter Replacements

- This project started in 2020 and scheduled for several years in order to complete some necessary change outs. The water meters are coming to the end of their useful life and our Finance Department is looking at upgrading to new replacement meters that have less moving parts, are less susceptible to any damages and have longer battery life.

Kootenay Street Service Upgrades

- Pre-designing future infrastructure upgrades and road improvements on Kootenay Street.

Explore PH Location & Testing

- The Town will research data and look at our current capacity of our domestic water system. If future capacity is required, the Town will start looking for new locations for a pumphouse and could undertake some drilling.

Control Panel – Fairview Irrigation

- The Town needs to do some updating for the control panel which includes wiring to devices and instruments. This will also include some programming and commissioning.

6.3 LONG TERM IMPROVEMENT PLANS

The Town has a 5 year budgeted capital plan for known upgrades and new infrastructure and/or projects. These projects include canal rehabilitation on an annual basis:

Projects for 2023

- Booster Station 6A
- Water Meter Replacements Continued
- Canal Lining Rehabilitation Continued
- Kootenay Street Rehabilitation – Water Upgrades
- Okanagan Street Rehabilitation – Water Upgrades
- School Avenue Rehabilitation – Water Upgrades
- W2: Park Drive Looping

2024

- Water Meter Replacements Continued
- Modify Turnouts on Canal System
- Okanagan Street & School Avenue Water Upgrades
- Canal Lining Rehabilitation Continued
- Sawmill Road Extension Water Upgrades
- W1: Okanagan River Xing at Sawmill Road
- W4: Tuc-el-nuit Back-up Power
- Upgrade Trash Racks on Canal
- Black Sage PH Site

2025

- Water Meter Replacements Continued
- Canal Lining Rehabilitation Continued
- Pine and Spruce Ave. Upgrades
- W3: Main Street North Looping
- W4: Tuc-el-nuit PH Back-up Power

2026

- Canal Lining Rehabilitation Continued
- Sawmill Rd- Walnut to Oak Upgrades
- W3: Main Street North Looping
- Canal Intakes Rockcliffe Irr. & Mud Lake

7.0 EMERGENCY RESPONSE PLAN

The Town of Oliver has an *Emergency Response Plan* pertaining to any natural disaster, and the water system. The *Emergency Response Plan* identifies a number of potential emergencies that could occur and provides a systematic approach on how the Town will respond to the emergency.

8.0 CROSS CONNECTION CONTROL PROGRAM

Cross connection is an actual or potential connection between a potable water supply and a non-potable source, where it is possible for a contaminant to enter the drinking water supply. The Town's Cross Connection Control Program continues to work towards addressing the potential for the water system to be compromised by service connections, which could introduce contaminated water into the domestic water system. The program is used to monitor Backflow devices and cross connections through the FAST Program (Facility

Assessment & Survey Technology) by the Town staff, focusing on premise isolation for commercial and industrial customers. In 2021, there were 300 testable backflow assemblies in service (including agricultural devices) being tracked.

9.0 CONCLUSION

The Town of Oliver works hard to maintain water quality and quantity for their residents as well as numerous customers in the Regional District of Okanagan Similkameen Area 'C'. Efforts are made to ensure appropriate water usage and to educate the public whenever possible. Without these ongoing efforts, the area would not be the robust agricultural community that it is today. If you have any comments regarding this report or other information that you would like to see included, please email works@oliver.ca or request a customer concern form at the Town Hall.

APPENDIX B: 2021 FULL SPECTRUM

No Spectrum Analysis completed in 2021.

APPENDIX C: 2021 WEEKLY WATER SAMPLING

2020 WEEKLY CHLORINE RESIDUAL & COLIFORMS SAMPLING
(Target 0.2 to 1.50 - Chlorine Residual)

DATE	RURAL NORTH				BLACK SAGE				RURAL SOUTH														MUNICIPAL					
	System #1 Surface Water Source				System #2 Groundwater Source				System #4 Ground Water Source				System #5 Groundwater Source				System #6 Groundwater Source				System #7 Groundwater Source				Groundwater Source			
	Chlorine Residual	Sample Location	Coliform Total	Coliform Ecoli	Chlorine Residual	Sample Location	Coliform Total	Coliform Ecoli	Chlorine Residual	Sample Location	Coliform Total	Coliform Ecoli	Chlorine Residual	Sample Location	Coliform Total	Coliform Ecoli	Chlorine Residual	Sample Location	Coliform Total	Coliform Ecoli	Chlorine Residual	Sample Location	Coliform Total	Coliform Ecoli	Chlorine Residual	Sample Location	Coliform Total	Coliform Ecoli
Jan 6	0.17	Mike's	<1	<1								0.05	5A Booster	<1	<1									0.05	Hillside	<1	<1	
Jan 14	0.19	Mike's	<1	<1												0.05	6A Booster	<1	<1						0.20	Meadows	<1	<1
Jan 20	0.25	Pinehill	<1	<1						0.44	Snowbrush	<1	<1												0.24	Vineyard	<1	<1
Jan 27	0.32	McGowan	<1	<1														0.09	Fruitvale	<1	<1				0.28	Wolfcub	<1	<1
Feb 3	0.10	Mike's	<1	<1												0.18	6A Booster	<1	<1						0.18	Sawmill	<1	<1
Feb 10	0.13	McGowan	<1	<1						0.18	Snowbrush	<1	<1												0.19	Granby	<1	<1
Feb 18	0.26	Pinehill	<1	<1														0.06	Fruitvale	<1	<1				0.32	Fairview	<1	<1
Feb 24	0.16	Mikes	<1	<1												0.09	6A Booster	<1	<1						0.14	Hillside	<1	<1
Mar 2	0.29	Pinehill	<1	<1									0.18	5A Booster	<1	<1									0.40	Meadows	<1	<1
Mar 9	0.25	McGowan	<1	<1						0.16	Snowbrush	<1	<1												0.35	Vineyard	<1	<1
Mar 16	0.16	Mikes	<1	<1														0.06	Fruitvale	<1	<1				0.21	Wolfcub	<1	<1
Mar 25*	0.26	Pinehill	<1	<1												0.11	6A Booster	<1	<1						0.16	Sawmill	<1	<1
Mar 30	0.11	McGowan	<1	<1								0.09	5A Booster	<1	<1										0.34	Granby	<1	<1
Apr 6	0.22	Mikes	<1	<1					0.20	Snowbrush	<1	<1													0.22	Fairview	<1	<1
April 14	0.14	Pinehill	<1	<1														0.12	Fruitvale	<1	<1				0.13	Hillside	<1	<1
April 20	0.19	McGowan	<1	<1	0.21	Ryegrass	<1	<1								0.08	6A Booster	<1	<1						0.34	Meadows	<1	<1
April 27	0.17	Mikes	<1	<1	0.24	Blacksage	<1	<1					0.11	5A Booster	<1	<1									0.14	Vineyard	<1	<1
May 4	0.35	Pinehill	<1	<1	0.41	Ryegrass	<1	<1	0.13	Snowbrush	<1	<1													0.29	Wolfcub	<1	<1
May 11	0.20	McGowan	<1	<1	0.20	Blacksage	<1	<1										0.09	Fruitvale	<1	<1				0.25	Sawmill	<1	<1
May 19	0.17	Mikes	<1	<1	0.25	Ryegrass	<1	<1								0.11	6A Booster	<1	<1						0.34	Granby	<1	<1
May 25	0.10	Pine	<1	<1	0.29	Blacksage	<1	<1					0.16	5A Booster	<1	<1									0.15	Fairview	<1	<1
June 1	0.09	McGowan	<1	<1	0.26	Ryegrass	<1	<1	0.14	Snowbrush	<1	<1													0.00	Hillside	<1	<1
June 8	0.34	Mikes	<1	<1	0.20	Blacksage	<1	<1										0.13	Fruitvale	<1	<1				0.18	Hillside	<1	<1
																									0.28	Meadows	<1	<1
June 15	0.25	Pinehill	<1	<1	0.17	Ryegrass	<1	<1					0.10	5A Booster	<1	<1									0.36	Vineyard	<1	<1
June 22	0.27	McGowan	<1	<1	0.30	Blacksage	<1	<1	0.14	Snowbrush	<1	<1													0.21	Wolfcub	<1	<1
June 29	0.25	Mikes	<1	<1	0.30	Ryegrass	<1	<1										0.13	Fruitvale	<1	<1				0.21	Sawmill	<1	<1
July 6	0.18	Pinehill	<1	<1	0.27	Blacksage	<1	<1								0.14	6A Booster	<1	<1						0.26	Granby	<1	<1
July 13	0.21	McGowan	<1	<1	0.25	Ryegrass	<1	<1					0.16	5A Booster	<1	<1									0.19	Fairview	<1	<1
July 20	0.15	Mike's	<1	<1	0.23	Blacksage	<1	<1	0.25	Snowbrush	<1	<1													0.21	Hillside	<1	<1
July 27	0.18	Pinehill	<1	<1	0.45	Ryegrass	<1	<1										0.15	Fruitvale	<1	<1				0.23	Meadows	<1	<1
Aug 4	0.15	Mikes	<1	<1	0.20	Blacksage	<1	<1					0.16	5A Booster	<1	<1									0.16	Vineyard	<1	<1
Aug 10	0.16	Pinehill	<1	<1	0.31	Ryegrass	<1	<1	0.21	Snowbrush	<1	<1													0.25	Wolfcub	<1	<1
Aug 17	0.24	McGowan	<1	<1	0.16	Blacksage	<1	<1										0.14	Fruitvale	<1	<1				0.21	Sawmill	<1	<1
Aug 24	0.36	Mikes	<1	<1	0.32	Ryegrass	<1	<1										0.17	6A Booster	<1	<1				0.22	Granby	<1	<1
Aug 31	0.19	Pinehill	<1	<1	0.26	Blacksage	<1	<1					0.17	5A Booster	<1	<1									0.21	Fairview	<1	<1
Sept 8	0.28	McGowan	<1	<1	0.18	Ryegrass	<1	<1	0.32	Snowbrush	<1	<1													0.26	Meadows	<1	<1
Sept 14	0.32	Mikes	<1	<1	0.18	Blacksage	<1	<1										0.16	Fruitvale	<1	<1				0.16	Hillside	<1	<1
																									1.15	New Town R	<1	<1
Sept 21	0.17	Pinehill	<1	<1	0.33	Ryegrass	<1	<1								0.15	6A Booster	<1	<1						0.15	Vineyard	<1	<1
Sept 28	0.21	McGowan	<1	<1	0.27	BlackSage	<1	<1					0.16	5A Booster	<1	<1									0.40	Wolfcub	<1	<1
Oct 5	0.16	Mikes	<1	<1	0.23	Ryegrass	<1	<1	0.26	Snowbrush	<1	<1													0.15	Sawmill	<1	<1
Oct 13	0.19	Pinehill	<1	<1	0.27	BlackSage	<1	<1										0.17	Fruitvale	<1	<1				0.22	Granby	<1	<1
Oct 19	0.16	McGowan	<1	<1		BlackSage	<1	<1										0.15	Fruitvale	<1	<1				0.18	Fairview	<1	<1
Oct 26	0.26	Mikes	<1	<1									0.16	5A Booster	<1	<1									0.06	Hillside	<1	<1
Nov 2	0.26	Pinehill	<1	<1					0.17	Snowbrush	<1	<1													0.12	Meadows	<1	<1
Nov 9	0.26	Mikes	<1	<1														0.13	Fruitvale	<1	<1				0.24	Vineyard	<1	<1
Nov 16	0.19	McGowan	<1	<1					0.15	Snowbrush	<1	<1													0.21	Wolfcub	<1	<1
Nov 24*	0.22	Pinehill	<1	<1														0.15	6A Booster	<1	<1				0.15	Sawmill	<1	<1
Nov 30	0.20	Mikes	<1	<1									0.23	5A Booster	<1	<1									0.27	Granby	<1	<1
Dec 7	0.22	Pinehill	<1	<1					0.26	Snowbrush	<1	<1													0.21	Fairview	<1	<1
Dec 14	0.26	McGowan	<1	<1														0.11	Fruitvale	<1	<1				0.17	Hillside	<1	<1
Dec 21	0.27	Mikes	<1	<1														0.14	6A Booster	<1	<1				0.22	Meadows	<1	<1
Dec 31	0.20	Pinehill	<1	<1									0.17	5A Booster	<1	<1									0.10	Tuc El Nuit	<1	<1

*March 23 samples did not make it due to Purolator - too many deliveries during COVID-19
*Nov. 23 samples were not picked up by Purolator

APPENDIX D: 2021 PUMPING DATA

APPENDIX E: 2021 GROUNDWATER AND SURFACE WATER CONSUMPTION DATA

Town of Oliver

Groundwater Consumption Data

US GALLONS															
YEAR	January	February	March	April	May	June	July	August	September	October	November	December	YTD	10 YR Average	Average
2021	25,841,686	21,679,210	27,670,223	65,785,664	105,278,837	111,539,990	144,023,757	110,585,662	81,648,387	59,604,827	24,297,510	23,676,188	801,631,941	808,386,161	969,957,714
2020	25,795,469	24,648,672	38,939,523	48,618,456	75,490,661	78,829,209	129,972,821	128,329,944	95,213,591	71,385,016	28,671,338	25,394,770	771,289,469	808,386,161	969,957,714
2019	23,543,266	28,561,243	28,581,167	50,920,567	109,979,293	132,432,802	119,129,918	119,860,386	69,368,736	46,730,582	27,035,693	24,575,289	780,718,943	808,386,161	969,957,714
2018	25,693,865	23,678,138	32,157,774	48,096,882	102,453,177	117,372,052	157,067,454	138,706,689	81,652,713	55,774,737	27,718,659	23,604,690	833,976,828	808,386,161	969,957,714
2017	27,531,385	26,935,811	32,381,863	33,127,917	69,692,881	105,839,743	156,311,916	147,447,499	92,667,928	64,715,211	25,437,142	25,053,945	807,143,242	808,386,161	969,957,714
2016	26,495,703	25,304,817	29,968,727	64,556,558	114,449,576	105,588,928	126,590,568	139,721,723	84,497,704	52,219,628	26,892,706	25,529,293	821,815,931	808,386,161	969,957,714
10 Yr Average	26,985,601	25,552,821	32,086,767	51,148,173	91,187,855	107,433,881	141,947,585	138,608,595	89,208,717	63,139,295	27,410,448	25,486,716	808,386,161		
Average	30,669,400	29,091,554	35,054,837	64,083,435	109,708,283	129,188,980	174,111,435	165,180,905	108,441,821	72,125,572	31,795,228	28,922,554	969,957,714		

CUBIC METERS															
YEAR	January	February	March	April	May	June	July	August	September	October	November	December	YTD	10 YR Average	Average
2021	97,821	82,065	104,743	249,026	398,524	422,225	545,189	418,612	309,073	225,629	91,976	89,624	3,034,506	3,050,929	3,671,688
2020	97,646	93,305	147,402	184,041	285,763	298,401	492,000	485,781	360,422	270,222	108,533	96,130	2,919,647	3,050,929	3,671,688
2019	89,121	108,116	108,191	192,755	416,317	501,312	450,956	453,721	262,589	176,894	102,341	93,028	2,955,341	3,050,929	3,671,688
2018	97,262	89,631	121,730	182,066	387,827	444,301	594,565	525,062	309,089	211,130	104,926	89,353	3,156,944	3,050,929	3,671,688
2017	104,218	101,963	122,579	125,403	263,816	400,647	591,705	558,149	350,786	244,974	96,290	94,839	3,055,368	3,050,929	3,671,688
2016	100,297	95,789	113,444	244,373	433,239	399,697	479,197	528,904	319,858	197,673	101,800	96,639	3,110,910	3,050,929	3,671,688
10 Yr Average	97,424	92,691	114,203	198,982	363,729	402,805	524,635	498,689	328,333	234,603	101,194	93,640	3,050,929		
Average	116,096	110,123	132,697	242,582	415,291	489,033	659,083	625,277	410,497	273,025	120,358	109,484	3,671,688		