2018

WATER

Submitted by:

Town of Osoyoos
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Town of Osoyoos
Annual Water Report

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1.0 Introduction to the Town Water Systems

The Town of Osoyoos operates water systems within its municipal boundary (Municipal Water System) and within Electoral area A (Water District Irrigation Systems) on the west side of Osoyoos Lake both north and south of the boundary. The service areas of both systems are illustrated on the following map (Page 3) . The municipal system provides service to the majority of residential, commercial and industrial lands within the municipal boundaries and is supplied by wells. The Water District system is primarily an irrigation water supply system using two intakes in Osoyoos Lake.

2.0 Municipal Water System

2.1 Water Supply Wells

A total of six wells supply groundwater to the Town's municipal water system. The water supply wells range in capacity from 18 L/sec (295 USgpm) to 75 L/sec (1200 USgpm) and are listed following.

Well No. 1	Jack Shaw Gardens
Well No. 3	Maple Drive
Well No. 4	Cottonwood Park
Well No. 5	Cottonwood Park
Well No. 6	Wye in Lacey Point Area
Well No. 8	Kingfisher Drive at 83rd Street



Wells No. 4 and No. 5

In addition, the Town has a drilled and capped a well (designated No. 7) north of Well No. 6 in the Lacey Point area. The Interior Health Authority has not approved Well No. 7 as a drinking water source at this time.

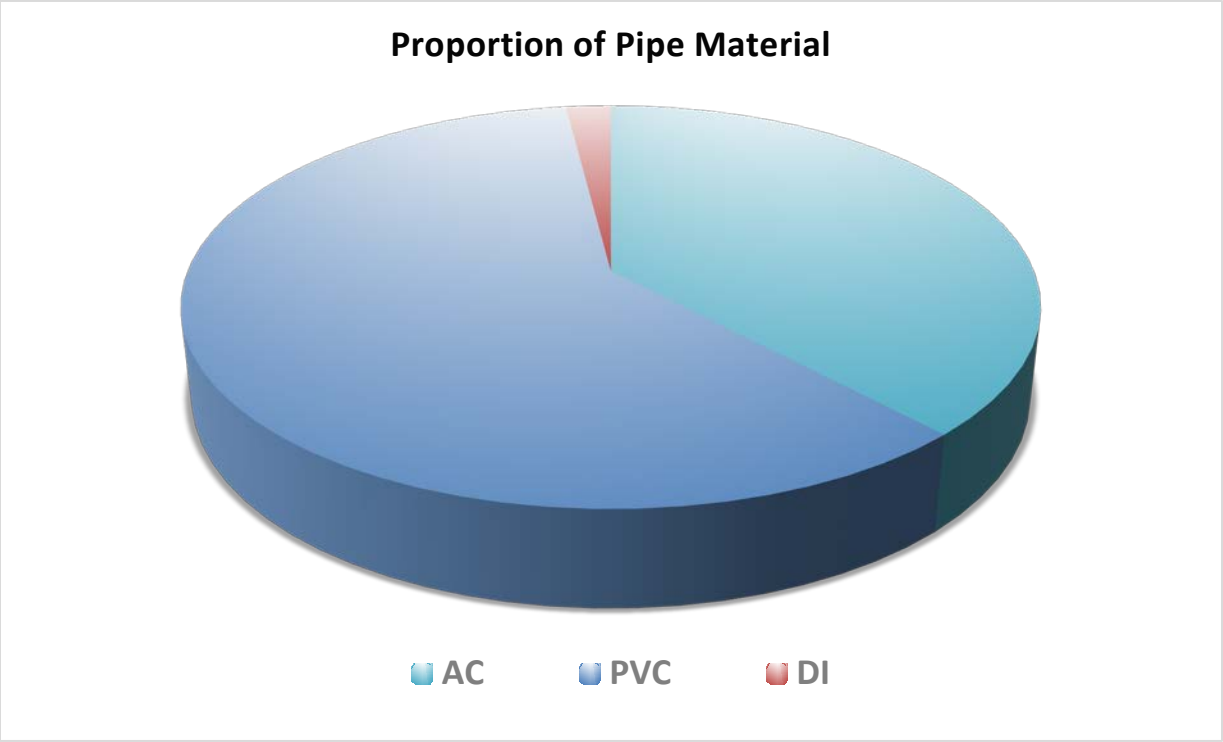

Well No. 1

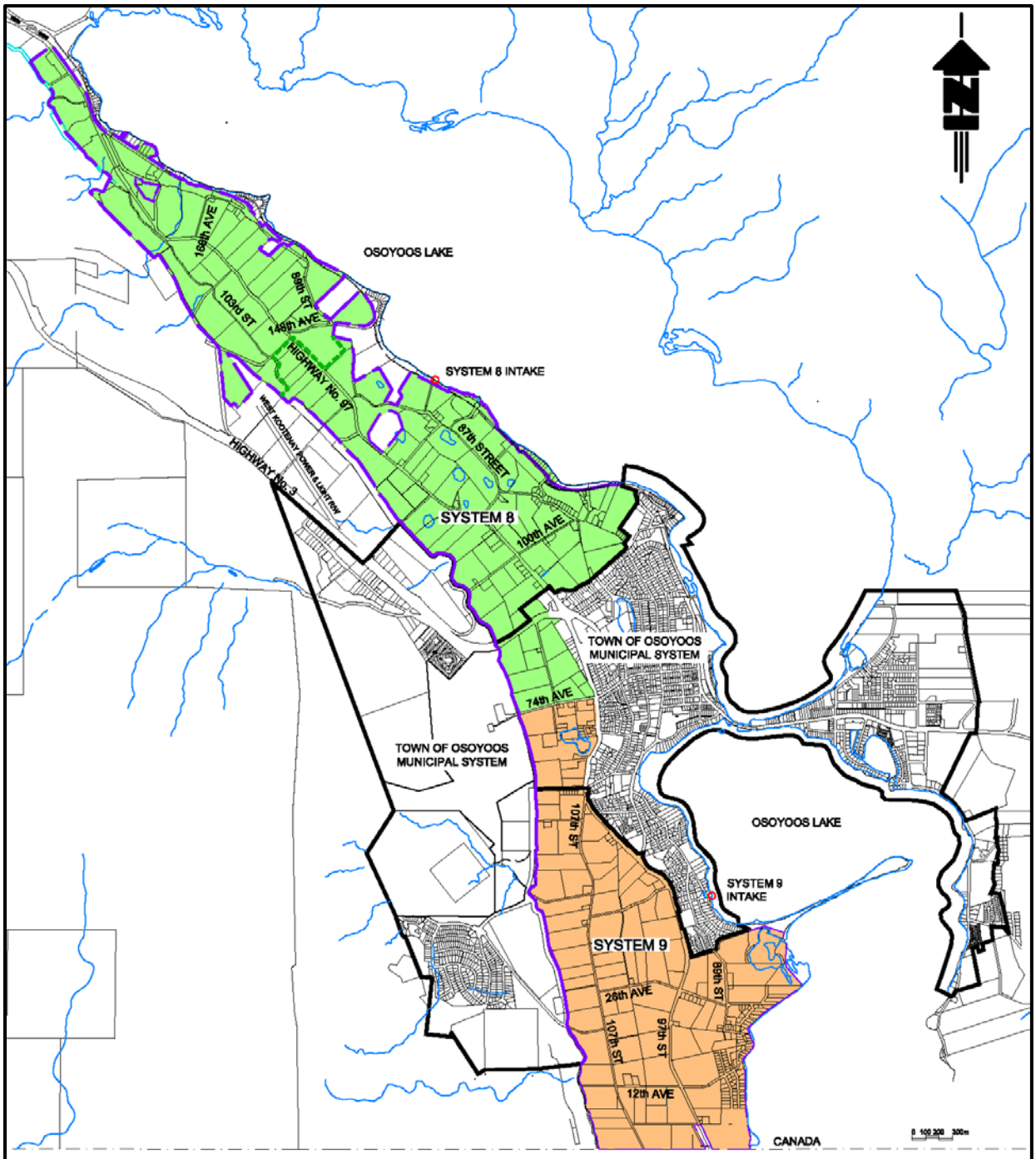
The Town of Osoyoos and True Consulting Ltd. are investigating strategies to address the concerns of the Interior Health Authority with the goal of transforming Well No. 7 into a full production well by 2020. The locations of the water supply wells are shown on the following map (Page 4) of the municipal water system.

2.2 Water Distribution System

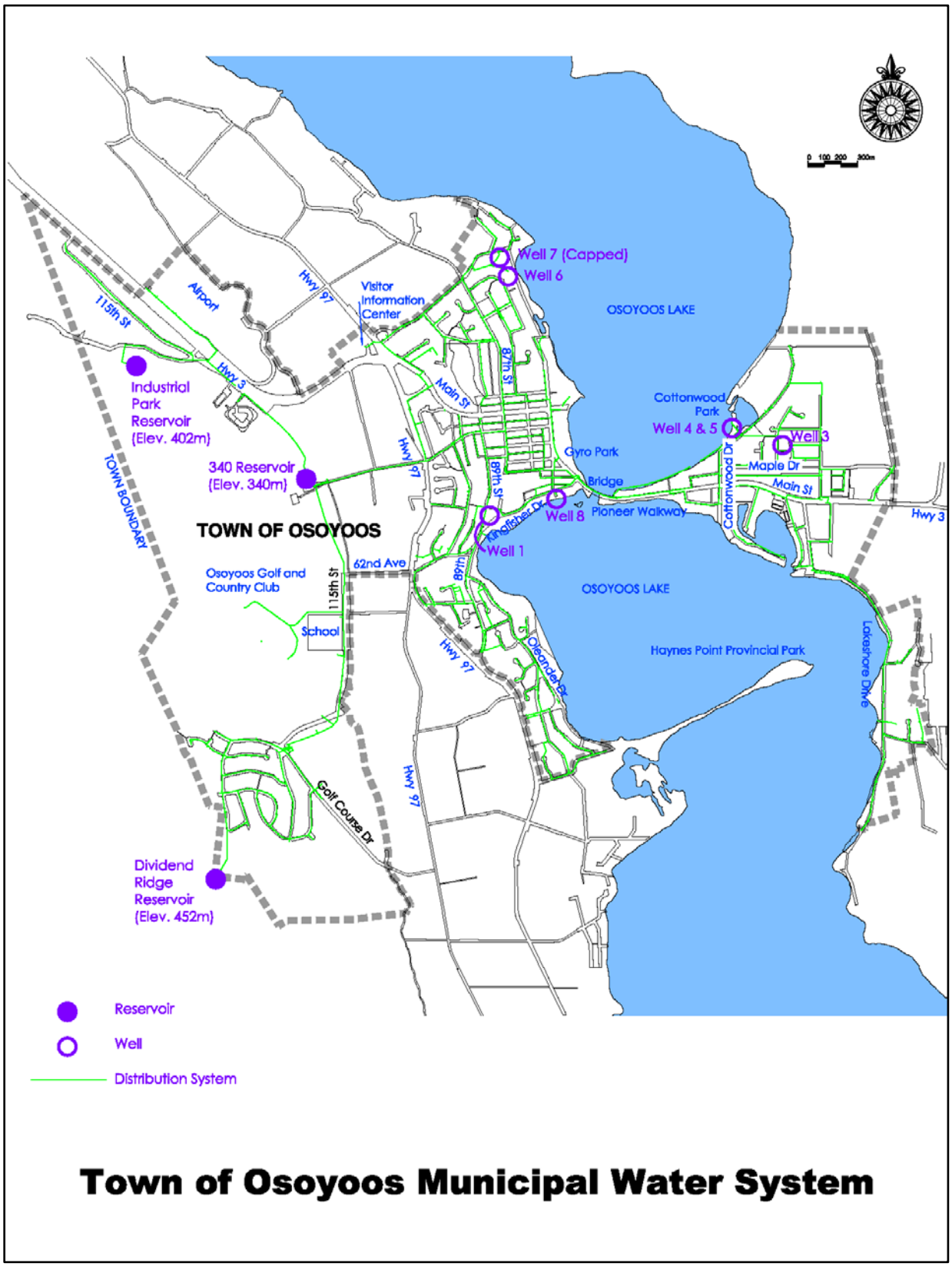
The municipal water distribution system comprises about 58.9 km of water main ranging in size from 50 mm (2”) to 400mm (16”). Pipe materials comprise:

- 22.2 km of asbestos cement pipe installed in the period up to 1980
- 0.9 km of ductile iron pipe installed in the 1980’s
- 35.8 km of PVC pipe installed since 1980





Town of Osoyoos Water System Service Areas



Town of Osoyoos Municipal Water System

2.3 Reservoirs and Pressure Zones

The municipal water system comprises a total of 3 pressure zones each at successively higher elevations servicing areas on the west side of Osoyoos Lake. The pressures zones and reservoirs in each pressure zone are listed following.

- 340 Zone – 2 Reservoirs having a combined capacity of 3,910,000 L (1,000,000 USgal). The service areas include all areas of the Town east of Highway 97 including East Osoyoos.
- Industrial Park Reservoir having a capacity of 1,000,000 L (260,000 USgal). The service area includes the Industrial Park, secondary school and Desert Park.
- Dividend Ridge Reservoir having a capacity of 1,140,000 L (300,000 USgal). The service area includes the Dividend Ridge neighbourhood and the golf course clubhouse.



340 North Reservoir under Construction 2011

3.0 Irrigation Water Districts

Up to 1990, irrigation systems 8 and 9 were owned and operated by the South Okanagan Lands Irrigation District (SOLID). In 1990, the Province dissolved SOLID and transferred ownership of irrigation systems 8 and 9 to the Town. The Osoyoos Water District provides irrigation water to about 670 hectares (1,660 acres) of agricultural land and about 500 domestic connections.



Irrigation System 8 Intake/Pumphouse

3.1 Osoyoos Lake Intakes

During the irrigation season, mid-April to mid-October annually, irrigation systems 8 and 9 are supplied from separate intakes in Osoyoos Lake. The System 8 intake is located south of the old BC Tree Fruits Packinghouse while the System 9 intake is on Acadia Court. At both intakes, water disinfection is provided by chlorination.



Irrigation System 9 Intake/Pumphouse

Outside of the irrigation system (mid-October to mid-April annually) the lake intakes are not operated except for emergency conditions. In this off-season period, water to domestic connections in the service area of Systems 8 and 9 are supplied groundwater from the Town's municipal system.

3.2 Water Distribution Systems

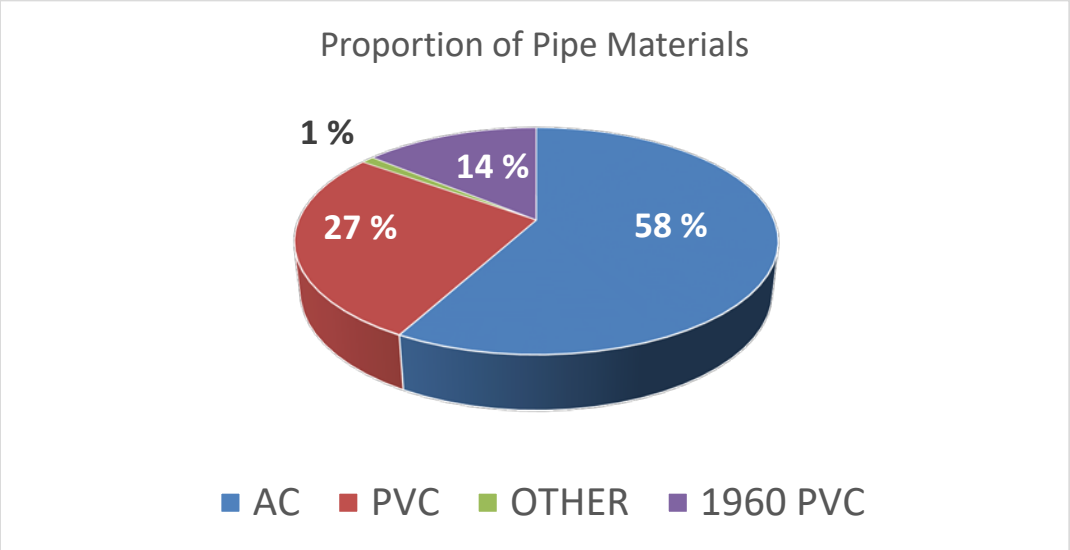
The System 8 and 9 water distribution systems were constructed in the 1960's when flood irrigation supplied from the irrigation canal was replaced with pressurized systems. Starting in September of 2016 the Town of Osoyoos began expanding its municpal water distribution system into Irrigation System No. 8 (north of Town). The pipe material and sizes installed in Contract No. 3 (2018) of this project are as follows:

- 1.2 km of 250mm diameter PVC pipe
- 0.4 km of 200mm diameter PVC pipe

Water distribution systems for Systems 8 and 9 comprise:

	System 8	System 9	Total
Small dia. PVC installed 1960's	3,875 m	1,953 m	5,828 m
Asbestos Cement	12,130 m	12,197 m	24,327 m
Ductile Iron and Concrete Cylinder	280 m	321 m	601 m
PVC installed since 1991	9,822 m	1,769 m	11,591 m
Totals	26,107 m	16,240 m	42,347 m

The total distribution main length is 42.3 km of which 24.3 km, 58%, is asbestos cement pipe.



3.3 Reservoir

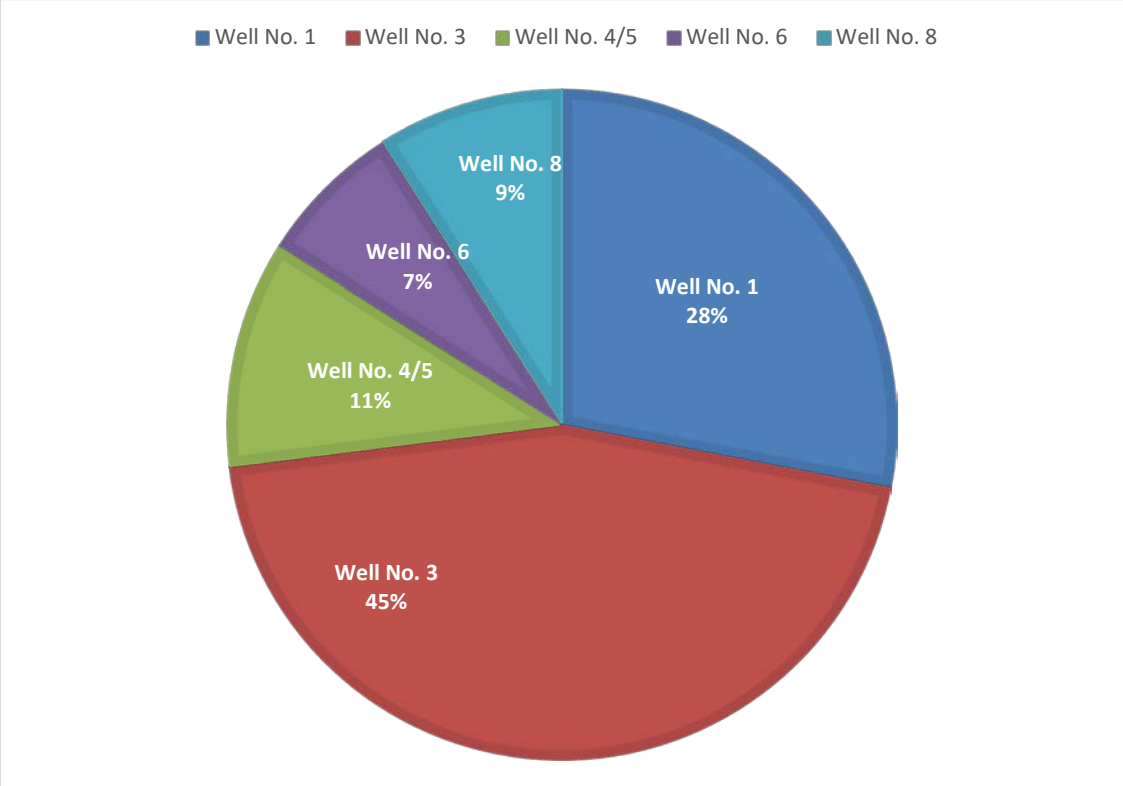
During the irrigation season, Systems 8 and 9 are operated / controlled by system pressure. Pressure monitors in each pumphouse start and stop supply pumps as required to maintain a set supply pressure. In the winter months, mid-October to mid-April annually, a reservoir located on the Osoyoos West Bench south and adjacent to the municipal 340 reservoir is put into service. This reservoir has an operating capacity of 482,000 L (130,000 USgal). In the winter months, water is supplied by Well No. 6 which is controlled by reservoir level.

4.0 Water Consumption

4.1 Municipal System

Consumption in the service area of the municipal water system in 2018 totaled 2,109 ML. Water supplied by each well is tabulated following.

Well No. 1	587 ML	(28%)
Well No. 3	954 ML	(45%)
Well No. 4/5	227 ML	(11%)
Well No. 6	149 ML	(7%)
Well No. 8	192 ML	(9%)
Total	2,109 ML	



The maximum day water consumption was recorded in the five day period from July 25th to 29st when the water consumption averaged 12.0 ML/day. 2018 annual and maximum day water consumption are compared to historical data on *Figure 1*. From *Figure 1*,

- total annual water consumption in 2018 was about 275 ML (11.5%) lower than 2017. This decrease could be attributed to reduced domestic irrigation demand as a result of cooler, wetter Spring weather and a Summer season affected by smoke from area forest fires.

- the maximum day demand in 2018 occurred on July 29 (12.4 ML) was 1.7 ML (12%) lower than the maximum day demand in 2017 (Maximum Day Demand = 14.1 ML on July 30, 2017).

- over the last 16 years, the total annual water consumption has remained relatively constant in the range of 2,100 to 2,500 ML/year. In this period the permanent population of the Town as measured by the census increased by 16% from 4,295 in 2001 to 5,050 in 2016.

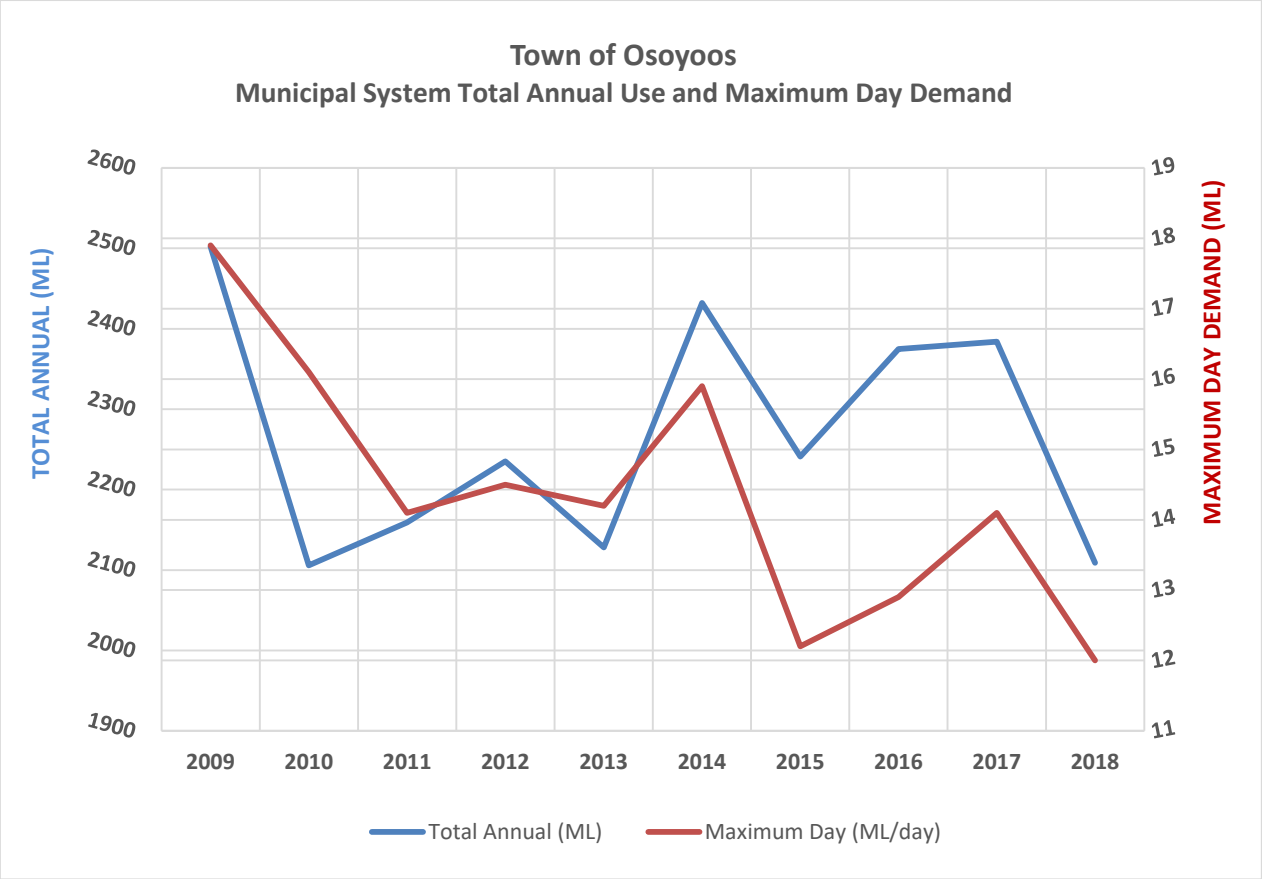


Figure 1

4.2 Irrigation Systems 8 and 9

Water consumption in 2018 in the service area of Irrigation Systems 8 and 9 is summarized as follows.

Irrigation Season		
System 8		3,404 ML
System 9		2,665 ML
	Total	6,069 ML
Winter		
Well No. 6		84 ML

The consumption of 6,153 ML in the irrigation season equates to an average application rate of 0.92 l / m2 based on 672 ha (1660 ac) of irrigation in the service area.

Figure 2 illustrates Irrigation Systems 8 and 9 consumption in the period 2008 to 2018. As compared to 2017, irrigation system consumption decreased by 657 ML (10.7%) in 2018. This decrease in consumption may be attributed to the conversion of agricultural land from fruit production to grape production. Orchards typically utilized a wide spray broadcast system for crop irrigation while vineyards typically use a drip irrigation system which consumes less water.

Irrigation Season Water Consumption
Irrigation Systems 8 and 9

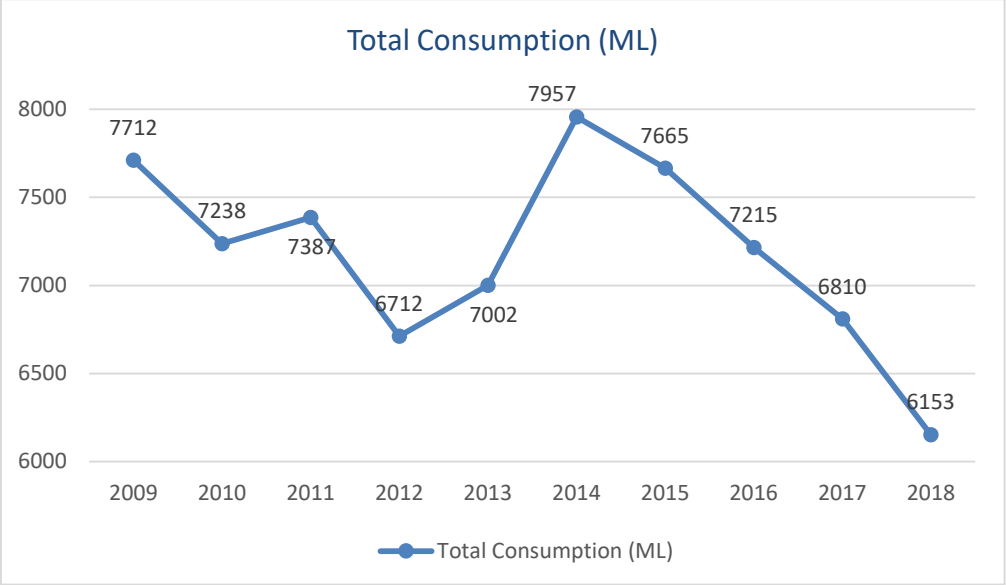


Figure 2

5.0 Water Sampling and Testing

5.1 Bacteriological Testing

The Town undertakes sampling for bacteriological analysis of both the irrigation and municipal systems. Sampling is undertaken weekly with the sampling locations listed following.

Municipal System Sampling Locations:

5202 Lombardy Lane	10124 Meadowlark Drive
8707 78th Avenue	8703 74th Avenue
8606 87th Avenue	6006 89th Street
4220 Lobelia Drive	5705 Lombardy Lane
6066 89th Street	8405 87th Street
4010 Lobelia Drive	11715 Locosta Lane

Irrigation System Sampling Locations:

System 9
5001 107th Street
10021 42nd Avenue

System 8
9103 – 100th Avenue
9707 – 87th Street

Bacteriological sampling results for 2018 are tabulated in Appendix A and summarized as follows.

Municipal System

- Total No. of Samples – 107
- Number of Positive Results for E.Coli – 0
- Number of Positive Results for Total Coliform – 3 (97.2% of samples had no detectable coliforms)

Irrigation Systems

- Total No. of Samples – 102
- Number of Positive Results for E.Coli – 0
- Number of Positive Results for Total Coliform – 7 (93.1% of samples had no detectable coliforms, 2 samples were detected with a count above 10)

Note: The Drinking Water Protection Act states in Schedule A Water Quality Standards for Potable Water that: “At least 90% of samples have no detectable total coliform”.

When positive results for EColi or Total Coliforms are discovered the Town's procedure is to thoroughly flush the area where the results where obtained and then re-sample. This has always resulted in the elimination of positive E.Coli and Total Coliform test results.

Beginnning in September of 2018, the Town implemented the practice of introducing chlorine into the municipal water system at Wells No. 1 & 3 on a continuous basis. No positive total coliform counts were recorded in the municipal water system since this practice was adopted.

5.2 Irrigation Districts Trihalomethane Testing

Trihalomethanes are a group of organic chemicals that are formed by the reaction of chlorine and organic materials which may be present in the water. Organic materials typically include algae, colour, and other natural organic matter. Trihalomethanes are described as disinfection by-products with the concentration being dependent on a number of factors including concentration of organic materials (usually measured as total organic carbon), chlorine dose and retention time in the distribution system.

Irrigation Systems 8 and 9 are sampled annually for trihalomethane. The sample results for 2018 are presented as follows.

Sample Date/Location	August 15 System 9 – 10021 42nd	August 15 System 8 – 25723 103rd	CDWQ Standard
Total Trihalomethanes	0.056 mg/L	0.065 mg/L	0.1 mg/L MAC
Bromodichloromethane	0.003	0.003	n/a
Bromoform	<0.001	<0.001	n/a
Chloroform	0.053	0.062	n/a
Dibromochloromethane	<0.001	<0.001	n/a

The sample results are well within the maximum acceptable standard as set in the Canadian Drinking Water Quality Standards.

5.3 Irrigation Districts Boil Water Advisory

Treatment provided for water supplied from the Systems 8 and 9 water intakes in Osoyoos Lake does not comply with IHA drinking water quality standards. The principal deficiencies are:

- inadequate chlorine contact time to services in proximity to the two pumphouses
- there is no treatment, typically filtration, for the removal or inactivation of parasites, most common being giardia and cryptosporidium

In accordance with instructions from IHA, the Town annually issues a boil water advisory for residents within the service area of Irrigation Systems 8 and 9. The boil water advisory was issued in April 2018 at the start of the irrigation season and rescinded in October 2018 at the end of the irrigation system.

Residents in the service area of irrigation systems 8 and 9 are advised of the Boil Water Advisory by notices published in the Osoyoos Times and posted on the Town's website. Notices are published in the Osoyoos Times:

- end of March or first week of April – Advanced Notice
- weekly in April
- monthly – May, June, July, August and September
- end of October or first week of November – Notice of Boil Water Advisory rescindment

5.4 Municipal System Full Spectrum Analysis

In addition to bacteriological testing as described in 5.1, the Town samples annually one of the six water supply wells for a full spectrum analysis. In 2018, Well No. 1 was sampled for a full spectrum analysis. Full spectrum water quality testing for the water supply Well No. 1 is contained in Appendix B.

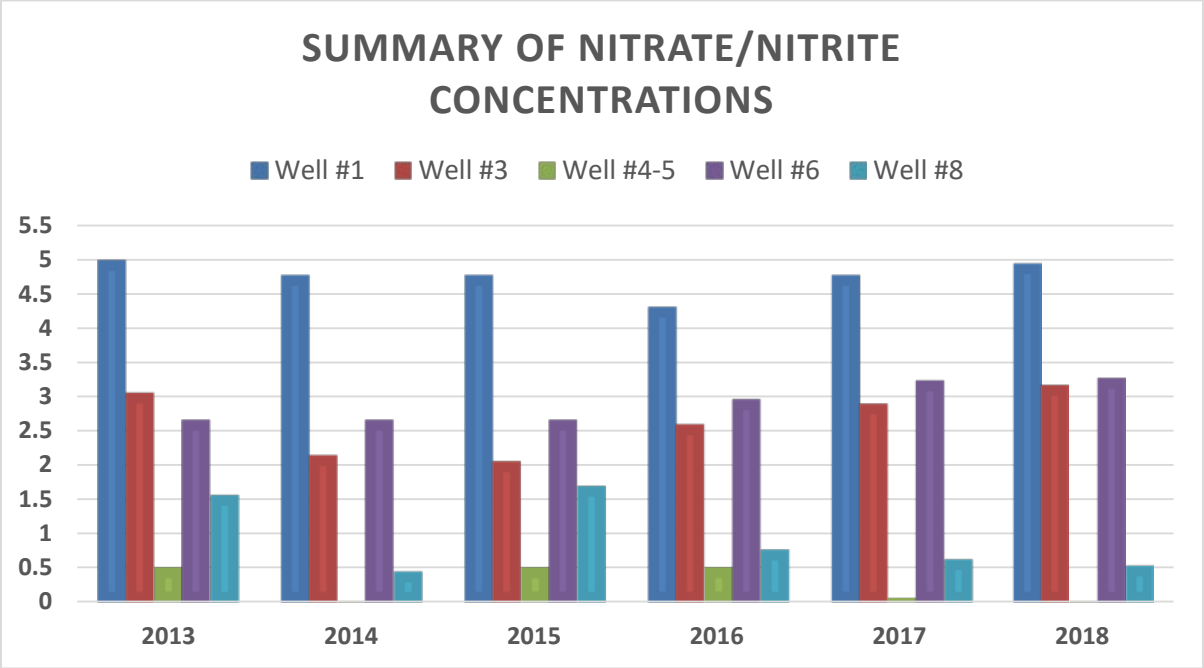
5.5 Groundwater Source Nitrate Monitoring

High nitrate concentrations in groundwater is experienced throughout the South Okanagan area. High nitrate concentrations are attributable to fertilizer use by the agricultural industry. The Town monitors nitrate concentration in all six of the water supply wells used as water sources. Nitrate data for each well for the period 2008 to 2017 is contained in Appendix C. The data is summarized following.

	Nitrate-Nitrite
Canadian Drinking Water Quality Maximum Acceptable Concentration	10 mg/L
Ten Year Averages (2008 to 2018)	
Well No. 1	4.74 mg/L
Well No. 3	2.88 mg/L
Wells No. 4 & 5	1.09 mg/L
Well No. 6	2.18 mg/L
Well No. 8	0.97 mg/L

Wells No. 1 and 3 have higher nitrate-nitrite concentrations than the Town's other four wells.

The following graph illustrates the nitrate-nitrite concentrations in all Wells.



Note: Data from Wells 4/5 may not show on chart due to the low results.

5.6 Water Quality Complaints and Operational Incidents

Dissolved Manganese concentration at or above the aesthetic objective as specified in the Canadian Drinking Water Quality Standards is present in water supplied by Wells 4, 5, 6 and 8. In 2010 there were suggestions from health authorities that Manganese would be elevated to a substance with a regulated maximum allowable concentration in drinking water. The Interior Health Authority (IHA) has suggested that this change in regulation could occur in 2019. At present, water supplied from Wells 4, 5, 6 and 8 would contain Manganese concentrations which would exceed the proposed maximum allowable concentration in drinking water. To the greatest extent practical the Town maximizes the use of Wells 1 and 3 to minimize the amount of dissolved Manganese in the water system. The Town's plan to insure that drinking water meets all required regulations (current and proposed) is outlined in section 7.1.4 of this report.

At the insistence of the Interior Health Authority, the Town of Osoyoos began adding a minimum amount of chlorine to the water obtained from Wells 1, 3 and 6 in September of 2018. This resulted in 11 complaints from residents expressing concern over a "chlorine taste" in the water or brown sediment appearing in the drinking water. (caused by manganense in the well water reacting with the chlorine)

6.0 Operation and Maintenance

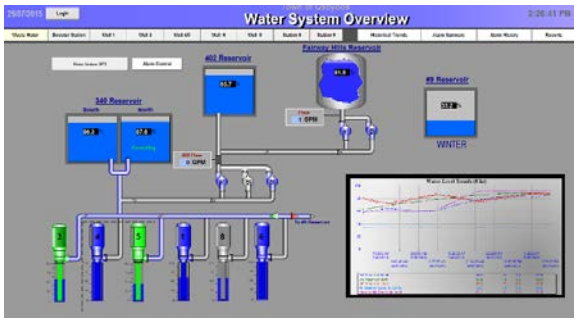
6.1 Routine Maintenance Program

- **Water Supply Wells**
  - daily check of all wells to confirm satisfactory operation. Operating parameters including discharge pressure, flow, running time, and service voltage are logged.
  - pumped lubrication and packing are checked and adjusted as required.
  - annual water sampling.
- **Irrigation Systems 8 and 9 Intake/Pumphouse**
  - daily check during the irrigation season. Operating parameters are logged.
  - pump lubrication and packing are checked and adjusted as required.
  - chlorine residual and turbidity analyser calibration is checked monthly.
  - chlorine cylinders are removed when empty and replaced with full cylinder.
  - pumphouse maintenance on an as required basis.
- **Booster Stations 402 and Fairway Hills**
  - daily inspections to check securing and record operating parameters.
  - pump lubrication and packing are checked and adjusted as required.
- **Reservoirs**
  - all reservoirs are inspected daily, excluding weekends, to confirm site and reservoir structure security.
- **Distribution System**
  - A more rigorous water main flushing program will be developed in 2019, with implementation scheduled for 2020.
  - A new fire hydrant annual maintenance program will be implemented in 2019.
  - pressure reducing stations are inspected monthly.
  - watermain valves are exercised annually.

6.2 SCADA (Supervisory Control and Data Acquisition) System

A SCADA computer control and monitoring system is used by the Town to control major components of the water systems.

System capabilities include:



- Water Supply Wells and Intakes
  - pump operational status
  - flow, elapsed running times
  - well levels where applicable
  - chlorine residuals at irrigation intake

- Booster Stations
    - pump operational status
    - flow and elapsed running time
- Reservoirs
    - reservoir level
    - pump start/stop and alarm set points
    - intruder alarms

The Town has an ongoing program to upgrade the capabilities of the SCADA system.

6.3 Major Maintenance – 2018

No major maintenance projects were undertaken in 2018.

6.4 Cross Connection Control Program

A cross connection is most commonly a plumbing system in a building that represents the risk of backflow into the Town's water distribution system thereby representing the potential of adversely affecting water quality. The Town has a program for identifying cross connections and requiring the installation and maintenance of backflow prevention devices to prevent reverse flow from a service connection to the Town's water distribution system.

The implementation and administration of the Town's cross connection program is contracted to Mr. Wayne Muzyka of Personnel Development & Consulting of Vernon. The Town's cross connection control program includes a total of 229 devices which include:

- 94 are classified as high hazard
- 75 are classified as medium hazard
- 48 are classified as low hazard

To the end of December 2018, a total of 190 of the backflow devices have been surveyed which comprises an inspection of the premises and backflow prevention devices. Of the high hazard group, 99% have been surveyed. At the end of December 2018, compliance with the Town's cross connection control program is summarized as follows.

Hazard Category			Compliant	
		Surveyed	**Number**	**%**
High	94	93	65	70%
Medium	75	58	41	71%
Low	48	38	16	42%

Non-compliance generally means a deficient (or lack of) backflow prevention device or failure by the property owner to provide certification of annual testing.

6.5 Emergency Response Plan

The Town has an emergency response plan for the water and sanitary sewer utilities which is available for public viewing at Operational Services. The plan describes strategies to respond to a wide range of water related events including source and distribution system contamination, high turbidity events in Osoyoos Lake, broken water main, chlorination failure, vandalism and extended interruption in electrical service. The emergency response plan was last updated in 2015.

7.0 Capital Program

7.1 Municipal System

7.1.1 Completed Capital Projects for 2018

- Twin the 250mm Town watermain into the South half of Irrigation District No. 8 along 87th Street from 100 Avenue to 134 Avenue.
- Retro-fitted Well No. 1 to be able to inject chlorine into the water distribution system.
- Purchased and installed a new master SCADA computer at the Operational Services Yards.

7.1.2 Budgeted Capital Projects for 2019

- Installation of Twin 300 mm water mains between Gyro Park and the Holiday Inn under Osoyoos Lake.
- Design a water treatment facility for the Town of Osoyoos water distribution system.
- Upgrade radios and PLC's for the SCADA system throughout the Town's water and sewer systems.
- Develop a water line flushing program for the Town's domestic water distribution system.
- Continue twinning the domestic water distribution system in Irrigation District No. 9 (Town boundary to the USA Border).
- Visually inspect and if necessary clean all four water reservoirs.
- Add chlorine injection capability to Wells 4 & 5.
- Develop a plan to chlorinate all four water reservoirs by 2020.

7.1.3 Other Water Related Budget Items

- As part of performing our due diligence, the Town of Osoyoos is exploring the possibility of changing our water source from groundwater (Wells) to surface water (Lake Osoyoos). Several source options have been presented to Town Council complete with initial infrastructure cost estimates as well as projected operating and maintenance costs for the next 40 years. The first step is to determine if the quality of water in Lake Osoyoos is suitable for use as a water source. The Town will perform a water sampling schedule during 2019 to obtain this information.

7.1.4 Master Plan

The Town of Osoyoos is currently exploring three options for the development of a water treatment program for the community. They consist of:

- Option No. 1 – Treat Well 6 (& maybe 7) on Spartan Drive and Wells 1, 3, 4, 5 & 8 at a central treatment facility located in Jack Shaw Gardens. Note, this option requires the construction of a water line under Osoyoos Lake which the Town has not been able to obtain approval for since 2016. Estimated cost $12.2 million.
- Option No. 2 – Treat Well 6 (& maybe 7) on Spartan Drive, Wells 1 & 8 in Jack Shaw Garens and Well 3, 4 & 5 at a facility in Kinsmen Park. Estimated cost $15 million.
- Option No. 3 – Convert the water supply to surface water obtained directly for Osoyoos Lake. Estimated cost $24 million.

7.2 Irrigation Districts

7.2.1 Completed Projects in 2018

- Contract No. 3 of the Rural Water Twinning Project (System 8 87th Street – 104th Avenue to Highway No. 97).
- Installion of a new pump (No. 5) in Irrigation Pumphouse No. 9.

7.2.2 Budgeted Capital Projects for 2019

- Phases 2 & 3 of the Rural Water Twinning Project for System No. 9. The Phases consist of the following:
    - Phase 2 – construction of the water main along Highway No. 97 between Nighthawk Drive and 32 Avenue as well as twinning the domestic water lines to the area East of Highway No. 97; Town border to the USA border.
    - Phase 3 – twinning the domestic water lines to the area West of Highway No. 97; Town border to the USA border.
- Installation of 136 water meters in the areas which have received domestic water connections as a result of the System No. 8 Rural Water Twinning projects.
- Inspection and if necessary cleaning the Wet Well at Irrigation Pumphouse No. 8.

7.2.3 Master Plan

In 2008, the Town of Osoyoos adopted a plan to construct twin domestic water distribution systems in the Systems 8 and 9 service areas to comply with IHA 43210 drinking water treatment standards. The twin domestic water systems will be supplied by municipal system groundwater sources thereby discontinuing the use of intakes in Osoyoos Lake as potable water sources.

To date, Contracts No. 1, 2 & 3 of the Irrigation System No. 8 Rural Water Twinning Project have been completed.

The Twinning project will be undertaken in four phases as described below:

Phase 1	South half of System No. 8 service area from 74th Ave to 148th Ave.
Phase 2	East half of System No. 9 service area generally comprising the area East of Hwy 97 from 32nd Ave to the USA border, including the supply main from Nighthawk Drive.
Phase 3	West half of System No. 9 service area comprising the area West of Hwy 97 from 74th Ave to the USA border.
Phase 4	North half of System No. 8 service area from 148th Ave to Willow Beach.

Note: Maps illustrating the areas which now have access to Town of Osoyoos domestic well water are enclosed on Appendix E of this report.

APPENDIX A

Bacteriological Test Results

TOWN SYSTEM

LOCATION	DATE COLLECTED	COLIFORM TOTAL	E.COLI
8707 78th Ave	Jan 2/18	<1	<1
7203 85th	Jan 2/18	<1	<1
20 Poplar Crt	Jan 9/18	<1	<1
Well #3	Jan 9/18	<1	<1
7802 89th	Jan 16/18	3	<1
7203 85th	Jan 16/18	<1	<1
Well #3	Jan 23/18	<1	<1
7203 85th	Jan 23/18	<1	<1
5708 Lombardy	Jan 30/18	<1	<1
7203 85th	Jan 30/18	<1	<1
5302 Lombardy	Feb 6/18	<1	<1
Well #3	Feb 6/18	<1	<1
8707 78th	Feb 13/18	2	<1
6812 89th	Feb 13/18	<1	<1
8707 78th	Feb 21/18	<1	<1
6601 89th	Feb 21/18	<1	<1
4220 Lobelia	Feb 27/18	<1	<1
5302 Lombardy	Feb 27/18	<1	<1
6601 89th	Mar 6/18	<1	<1
7203 85th	Mar 6/18	<1	<1
6418 Chickadee	Mar 13/18	<1	<1
Well #3	Mar 13/18	<1	<1
5302 Lombardy	Mar 20/18	<1	<1
6812 89th	Mar 20/18	<1	<1
8707 78th	Mar 27/18	<1	<1
Well #1	Mar 27/18	<1	<1
6601 89th	Apr 3/18	<1	<1
Well #3	Apr 3/18	<1	<1
5302 Lombardy	Apr 10/18	<1	<1
Well #1	Apr 10/18	<1	<1
Well #4	Apr 17/18	<1	<1
6418 Chickadee	Apr 17/18	<1	<1
5302 Lombardy	Apr 24/18	<1	<1
Well #5	Apr 24/18	<1	<1
Well #8	May 1/18	<1	<1
6601 89th	May 1/18	<1	<1
Well #3	May 8/18	<1	<1
5302 Lombardy	May 8/18	<1	<1
6418 Chickadee	May 15/18	<1	<1
Well #4	May 15/18	<1	<1
Well #1	May 24/18	16	<1
5302 Lombardy	May 24/18	<1	<1
Well #1	May 29/18	<1	<1
6601 89th	May 29/18	<1	<1
5302 Lombardy	May 29/18	<1	<1
4220 Lobelia	Jun 6/18	<1	<1
5302 Lombardy	Jun 6/18	<1	<1
6601 89th	Jun 12/18	<1	<1
5704 Lombardy	Jun 12/18	<1	<1
6812 89th	Jun19/18	<1	<1
8707 78th	Jun19/18	<1	<1
4220 Lobelia	Jun 26/18	<1	<1
11605 97th	Jun 26/18	<1	<1

TOWN SYSTEM

LOCATION	DATE COLLECTED	COLIFORM TOTAL	E.COLI
6812 89th	Jul 3/18	NA	NA
4220 Lobelia	Jul 3/18	NA	NA
6812 89th	Jul 10/18	<1	<1
4220 Lobelia	Jul 10/18	<1	<1
6418 Chickadee	Jul 17/18	<1	<1
5302 Lombardy	Jul 17/18	<1	<1
Well #1	Jul 25/18	<1	<1
Well #3	Jul 25/18	<1	<1
5302 Lombardy	Jul 31/19	<1	<1
6601 89th	Jul 31/19	<1	<1
4220 Lobelia	Aug 7/18	<1	<1
6812 89th	Aug 7/18	<1	<1
Well #3	Aug 14/18	<1	<1
5302 Lombardy	Aug 14/18	<1	<1
6418 Chickadee	Aug 21/18	<1	<1
Well #1	Aug 21/18	<1	<1
Well #1	Aug 28/18	<1	<1
Well #4	Aug 28/18	<1	<1
5302 Lombardy	Aug 28/18	<1	<1
Well #1	Sept 4/18	<1	<1
6418 Chickadee	Sept 4/18	<1	<1
5302 Lombardy	Sept 11/18	<1	<1
4220 Lobelia	Sept 11/18	<1	<1
Well #1	Sept 11/18	<1	<1
Well #3	Sept 18/18	<1	<1
6418 Chickadee	Sept 18/18	<1	<1
5302 Lombardy	Sept 25/18	<1	<1
6812 89th	Sept 25/18	<1	<1
Well #3	Oct 2/18	<1	<1
6601 89th	Oct 2/18	<1	<1
5302 Lombardy	Oct 9/18	<1	<1
4220 Lobelia	Oct 9/18	<1	<1
Well #3	Oct 17/18	<1	<1
6418 Chickadee	Oct 17/18	<1	<1
6812 89th	Oct 23/18	<1	<1
8707 78th	Oct 23/18	<1	<1
Well #3	Oct 30/18	<1	<1
5302 Lombardy	Oct 30/18	<1	<1
Well #1	Nov 6/18	<1	<1
6418 Chickadee	Nov 6/18	<1	<1
4420 Lobelia	Nov 13/18	<1	<1
5302 Lombardy	Nov 13/18	<1	<1
Well #3	Nov 20/18	<1	<1
6812 89th	Nov 20/18	<1	<1
5302 Lombardy	Nov 27/18	<1	<1
8707 78th	Nov 27/18	<1	<1
8707 78th	Dec 4/18	<1	<1
Well #3	Dec 4/18	<1	<1
6418 Chickadee	Dec 11/18	<1	<1
5302 Lombardy	Dec 11/18	<1	<1
20 Willow Cres	Dec 18/18	<1	<1
4220 Lobelia	Dec 18/18	<1	<1
5302 Lombardy	Dec 27/18	<1	<1
6812 89th	Dec 27/18	<1	<1

SYSTEM 8

LOCATION	DATE COLLECTED	COLIFORM TOTAL	E.COLI
20970 103rd	Jan 2/18	<1	<1
25723 103rd	Jan 9/18	<1	<1
20970 103rd	Jan 16/18	<1	<1
25723 103rd	Jan 23/18	<1	<1
20970 103rd	Jan 30/18	<1	<1
25723 103rd	Feb 6/18	<1	<1
20970 103rd	Feb 13/18	<1	<1
25723 103rd	Feb 21/18	<1	<1
20970 103rd	Feb 27/18	<1	<1
25723 103rd	Mar 6/18	<1	<1
20970 103rd	Mar 13/18	<1	<1
25723 103rd	Mar 20/18	<1	<1
20970 103rd	Mar 27/18	<1	<1
25723 103rd	Apr 3/18	<1	<1
20835 103rd	Apr 10/18	<1	<1
25723 103rd	Apr 17/18	<1	<1
25723 103rd	Apr 24/18	<1	<1
25723 103rd	May 1/18	<1	<1
20835 103rd	May 8/18	<1	<1
25723 103rd	May 15/18	<1	<1
20835 103rd	May 24/18	<1	<1
20835 103rd	May 29/18	<1	<1
25723 103rd	Jun 6/18	<1	<1
20835 103rd	Jun 12/18	<1	<1
25723 103rd	Jun19/18	<1	<1
20835 103rd	Jun 26/18	<1	<1
25723 103rd	Jul 3/18	NA	NA
25723 103rd	Jul 10/18	<1	<1
20835 103rd	Jul 17/18	<1	<1
25723 103rd	Jul 25/18	4	<1
25723 103rd	Jul 31/19	2	<1
25723 103rd	Aug 7/18	<1	<1
20835 103rd	Aug 14/18	<1	<1
25723 103rd	Aug 21/18	<1	<1
20835 103rd	Aug 28/18	<1	<1
20970 103rd	Sept 4/18	<1	<1
25723 103rd	Sept 11/18	<1	<1
20835 103rd	Sept 18/18	<1	<1
25723 103rd	Sept 25/18	<1	<1
20835 103rd	Oct 2/18	<1	<1
25723 103rd	Oct 9/18	<1	<1
20835 103rd	Oct 17/18	<1	<1
25723 103rd	Oct 23/18	<1	<1
20835 103rd	Oct 30/18	<1	<1
25723 103rd	Nov 6/18	<1	<1
20835 103rd	Nov 13/18	<1	<1
25723 103rd	Nov 20/18	<1	<1
20835 103rd	Nov 27/18	<1	<1
25723 103rd	Dec 4/18	<1	<1
20835 103rd	Dec 11/18	<1	<1
25723 103rd	Dec 18/18	<1	<1
20835 103rd	Dec 27/18	<1	<1

SYSTEM 9

LOCATION	DATE COLLECTED	COLIFORM TOTAL	E.COLI
10021 42nd	Jan 2/18	<1	<1
5001 107th	Jan 9/18	<1	<1
10021 42nd	Jan 16/18	<1	<1
5001 107th	Jan 23/18	<1	<1
10021 42nd	Jan 30/18	<1	<1
5001 107th	Feb 6/18	<1	<1
10021 42nd	Feb 13/18	<1	<1
5001 107th	Feb 21/18	<1	<1
10021 42nd	Feb 27/18	<1	<1
5001 107th	Mar 6/18	<1	<1
10021 42nd	Mar 13/18	<1	<1
5001 107th	Mar 20/18	<1	<1
10021 42nd	Mar 27/18	<1	<1
5001 107th	Apr 3/18	<1	<1
10021 42nd	Apr 10/18	<1	<1
5001 107th	Apr 17/18	<1	<1
10021 42nd	Apr 24/18	<1	<1
5001 107th	May 1/18	<1	<1
10021 42nd	May 8/18	<1	<1
5001 107th	May 15/18	1	<1
5001 107th	May 24/18	<1	<1
10021 42nd	May 29/18	<1	<1
5001 107th	Jun 6/18	<1	<1
10024 42nd	Jun 12/18	<1	<1
5001 107th	Jun19/18	<1	<1
10021 42nd	Jun 26/18	<1	<1
5001 107th	Jul 3/18	NA	NA
5001 107th	Jul 10/18	<1	<1
10021 42nd	Jul 17/18	<1	<1
10021 42nd	Jul 25/18	12	<1
10021 42nd	Jul 31/19	2	<1
10021 42nd	Aug 7/18	<1	<1
5001 107th	Aug 14/18	<1	<1
10021 42nd	Aug 21/18	<1	<1
5001 107th	Aug 28/18	1	<1
5001 107th	Sept 4/18	600	<1
5001 107th	Sept 11/18	<1	<1
5001 107th	Sept 18/18	<1	<1
3201 107th	Sept 25/18	<1	<1
10021 42nd	Oct 2/18	<1	<1
5001 107th	Oct 9/18	<1	<1
10021 42nd	Oct 17/18	<1	<1
5001 107th	Oct 23/18	<1	<1
10021 42nd	Oct 30/18	<1	<1
5001 107th	Nov 6/18	<1	<1
10021 42nd	Nov 13/18	<1	<1
10021 42nd	Nov 20/18	<1	<1
5001 107th	Nov 27/18	<1	<1
10021 42nd	Dec 4/18	<1	<1
5001 107th	Dec 11/18	<1	<1
10021 42nd	Dec 18/18	<1	<1
5001 107th	Dec 27/18	<1	<1

Chlorine Readings

DATE	# 8	# 9	Staff
Jan 2/18	0.3	0.5	FZ
Jan 9/18	0.5	0.5	DS
Jan 16/18	0.5	0.5	DS
Jan 23/18	0.5	0.5	KF
Jan 30/18	0.6	0.5	DS
Monthly Average	**0.48**	**0.50**	
Feb 6/18	0.5	0.4	LL
Feb 13/18	0.5	0.5	FZ
Feb 20/18	0.5	0.5	DS
Feb 27/18	0.4	0.5	KF
Monthly Average	**0.48**	**0.48**	
Mar 6/18	0.4	0.3	DS
Mar 13/18	0.3	0.3	LL
Mar 20/18	0.3	0.3	FZ
Mar 28/18	0.2	0.2	LL
Monthly Average	**0.30**	**0.28**	
Apr 3/18	0.3	0.4	FZ
Apr 10/18	0.3	0.3	DS
Apr 17/18	0.3	0.5	LL
Apr 24/18	0.9	0.7	DS
Monthly Average	**0.45**	**0.48**	
May 2/18	0.7	0.7	DS
May 8/18	0.5	0.7	LL
May 15/18	0.6	0.6	KF
May 22/18	0.6	0.6	LL
May 31/18	0.6	0.2	DS
Monthly Average	**0.60**	**0.56**	
Jun 6/18	0.6	0.6	FZ
Jun 12/18	0.4	0.6	DS
Jun 19/18	0.4	0.9	FZ
Jun 26/18	0.5	0.6	KF
Monthly Average	**0.48**	**0.68**	

DATE	# 8	# 9	Staff
Jul 3/18	0.5	0.6	DS
Jul 10/18	0.6	0.9	FZ
Jul 17/18	0.6	0.8	KF
Jul 24/18	0.7	1.0	DS
Jul 31/18	0.6	0.8	LL
Monthly Average	**0.60**	**0.82**	
Aug 7/18	0.8	1.1	FZ
Aug 14/18	0.6	0.8	LL
Aug 21/18	0.5	0.8	LL
Aug 28/18	0.7	0.7	LL
Monthly Average	**0.65**	**0.85**	
Sept 4/18	0.7	0.8	LL
Sept 11/18	0.5	0.7	FZ
Sept 18/18	0.8	0.8	LL
Sept 25/18	0.6	0.9	FZ
Monthly Average	**0.65**	**0.80**	
Oct 2/18	0.5	0.5	DS
Oct 9/18	0.8	0.6	LL
Oct 17/18	0.4	0.3	KF
Oct 23/18	0.5	0.5	FZ
Oct 30/18	0.4	0.4	KF
Monthly Average	**0.52**	**0.46**	
Nov 6/18	0.4	0.5	LL
Nov 13/18	0.4	0.5	FZ
Nov 20/18	0.5	0.4	DS
Nov 27/18	0.5	0.5	FZ
Monthly Average	**0.45**	**0.48**	
Dec 4/18	0.5	0.6	DS
Dec 11/18	0.4	0.4	LL
Dec 18/18	0.5	0.4	DS
Dec 27/18	0.4	0.4	KF
Monthly Average	**0.45**	**0.45**	

DATE	ADDRESS	TOWN SYSTEM
FEB 20/18	6601 89th	0.5
FEB 20/18	8707 78th	0.3
Mar20/18	5302 Lombardy	0.1
Mar20/18	6812 89th	0.1
Apr 24/18	5302 Lombardy	0.2
Apr 24/18	6606 89th	0.2
May 31/18	6601 89th	0.5
May 31/18	5302 Lombardy	0.1
May 31/18	6406 Nighthawk	0.3
May 31/18	9301 Hummingbird	0.1
May 31/18	38 Willow	0.01
Jun 19/18	15204 89th	0.4
Jun 19/18	5 Bartlet	0.4
Jun 19/18	10435 87th	0.2
Jun 19/18	8707 78th	0.1
Jun 19/18	6812 89th	0.5
Jul 17/18	6418 Chickadee	0.4
July 18/18	5302 Lombardy	0.3
Jul 19/18	6606 89th	0.3
Oct 23/18	6812 89th	0.4
Oct 23/18	8707 78th	0.2
Oct 30/18	5302 Lombardy	0.01
Oct 30/18	20 Poplar	0.1
Nov 6/18	6418 Chickadee	0.5
Nov 13/18	4220 Lobelia	0.3
Nov 13/18	5302 Lombardy	0.5
Nov 20/18	6812 89th	0.4
Nov 27/18	5302 Lombardy	0.5
Nov 27/18	8707 78th	0.3
Dec 4/18	7813 87th	0.2
Dec 11/18	5302 Lombardy	0.5
Dec 11/18	6418 Chickadee	0.6
Dec 18/18	4220 Lobelia	0.3
Dec 18/18	20 Willow Cres	0.4
Dec 27/18	6812 89th	0.8
Dec 27/18	5302 Lombardy	0.5
	Annual Average	**0.32**

APPENDIX B

Water Supply Well
Full Spectrum Water Quality Analysis

CARO ANALYTICAL SERVICES

TEST RESULTS

REPORTED TO	Osoyoos, Town of	**WORK ORDER**	8091607
PROJECT	General Potability	**REPORTED**	2018-09-26 19:12

Analyte	Result	Guideline	RL	Units	Analyzed	Qualifier
Town System Well #4/5 (8091607-01) | Matrix: Water | Sampled: 2018-09-18 11:45						
Anions						
Chloride	**5.20**	AO ≤ 250	0.10	mg/L	2018-09-20	
Fluoride	**0.44**	MAC = 1.5	0.10	mg/L	2018-09-20	
Nitrate (as N)	< 0.010	MAC = 10	0.010	mg/L	2018-09-20	
Nitrite (as N)	< 0.010	MAC = 1	0.010	mg/L	2018-09-20	
Sulfate	**28.0**	AO ≤ 500	1.0	mg/L	2018-09-20	
Calculated Parameters						
Hardness, Total (as CaCO3)	**189**	None Required	0.500	mg/L	N/A	
Langelier Index	**0.2**	N/A	-5.0	-	2018-09-26	
Solids, Total Dissolved	**262**	AO ≤ 500	1.00	mg/L	N/A	
General Parameters						
Alkalinity, Total (as CaCO3)	**233**	N/A	1.0	mg/L	2018-09-21	
Alkalinity, Phenolphthalein (as CaCO3)	< 1.0	N/A	1.0	mg/L	2018-09-21	
Alkalinity, Bicarbonate (as CaCO3)	**233**	N/A	1.0	mg/L	2018-09-21	
Alkalinity, Carbonate (as CaCO3)	< 1.0	N/A	1.0	mg/L	2018-09-21	
Alkalinity, Hydroxide (as CaCO3)	< 1.0	N/A	1.0	mg/L	2018-09-21	
Colour, True	**6.1**	AO ≤ 15	5.0	CU	2018-09-19	
Conductivity (EC)	**477**	N/A	2.0	µS/cm	2018-09-21	
Cyanide, Total	**0.0053**	MAC = 0.2	0.0020	mg/L	2018-09-21	
pH	**7.66**	7.0-10.5	0.10	pH units	2018-09-21	HT2
Temperature, at pH	**22.1**	N/A		°C	2018-09-21	HT2
Turbidity	**0.75**	OG < 1	0.10	NTU	2018-09-19	
Microbiological Parameters						
Coliforms, Total	< 1	MAC = 0	1	CFU/100 mL	2018-09-19	
E. coli	< 1	MAC = 0	1	CFU/100 mL	2018-09-19	
Total Metals						
Aluminum, total	**0.0096**	OG < 0.1	0.0050	mg/L	2018-09-23	
Antimony, total	< 0.00020	MAC = 0.006	0.00020	mg/L	2018-09-23	
Arsenic, total	**0.00489**	MAC = 0.01	0.00050	mg/L	2018-09-23	
Barium, total	**0.134**	MAC = 1	0.0050	mg/L	2018-09-23	
Boron, total	**0.0291**	MAC = 5	0.0050	mg/L	2018-09-23	
Cadmium, total	< 0.000010	MAC = 0.005	0.000010	mg/L	2018-09-23	
Calcium, total	**37.5**	None Required	0.20	mg/L	2018-09-23	
Chromium, total	< 0.00050	MAC = 0.05	0.00050	mg/L	2018-09-23	
Cobalt, total	< 0.00010	N/A	0.00010	mg/L	2018-09-23	
Copper, total	**0.00175**	AO ≤ 1	0.00040	mg/L	2018-09-23	
Iron, total	**0.203**	AO ≤ 0.3	0.010	mg/L	2018-09-23	
Lead, total	< 0.00020	MAC = 0.01	0.00020	mg/L	2018-09-23	
Magnesium, total	**23.1**	None Required	0.010	mg/L	2018-09-23	
Manganese, total	**0.111**	AO ≤ 0.05	0.00020	mg/L	2018-09-23	
Mercury, total	< 0.000010	MAC = 0.001	0.000010	mg/L	2018-09-24	

CARO ANALYTICAL SERVICES

TEST RESULTS

REPORTED TO	Osoyoos, Town of	**WORK ORDER**	8091607
PROJECT	General Potability	**REPORTED**	2018-09-26 19:12

Analyte	Result	Guideline	RL	Units	Analyzed	Qualifier
Town System Well #4/5 (8091607-01) | Matrix: Water | Sampled: 2018-09-18 11:45, Continued						
Total Metals, Continued						
Molybdenum, total	**0.00630**	N/A	0.00010	mg/L	2018-09-23	
Nickel, total	< 0.00040	N/A	0.00040	mg/L	2018-09-23	
Potassium, total	**4.52**	N/A	0.10	mg/L	2018-09-23	
Selenium, total	< 0.00050	MAC = 0.05	0.00050	mg/L	2018-09-23	
Sodium, total	**21.2**	AO ≤ 200	0.10	mg/L	2018-09-23	
Strontium, total	**0.566**	N/A	0.0010	mg/L	2018-09-23	
Uranium, total	**0.00231**	MAC = 0.02	0.000020	mg/L	2018-09-23	
Zinc, total	**0.0052**	AO ≤ 5	0.0040	mg/L	2018-09-23	

Sample Qualifiers:

HT2 The 15 minute recommended holding time (from sampling to analysis) has been exceeded - field analysis is recommended.

APPENDIX C

Cross Connection Control Program

Cross-Connection Control Program

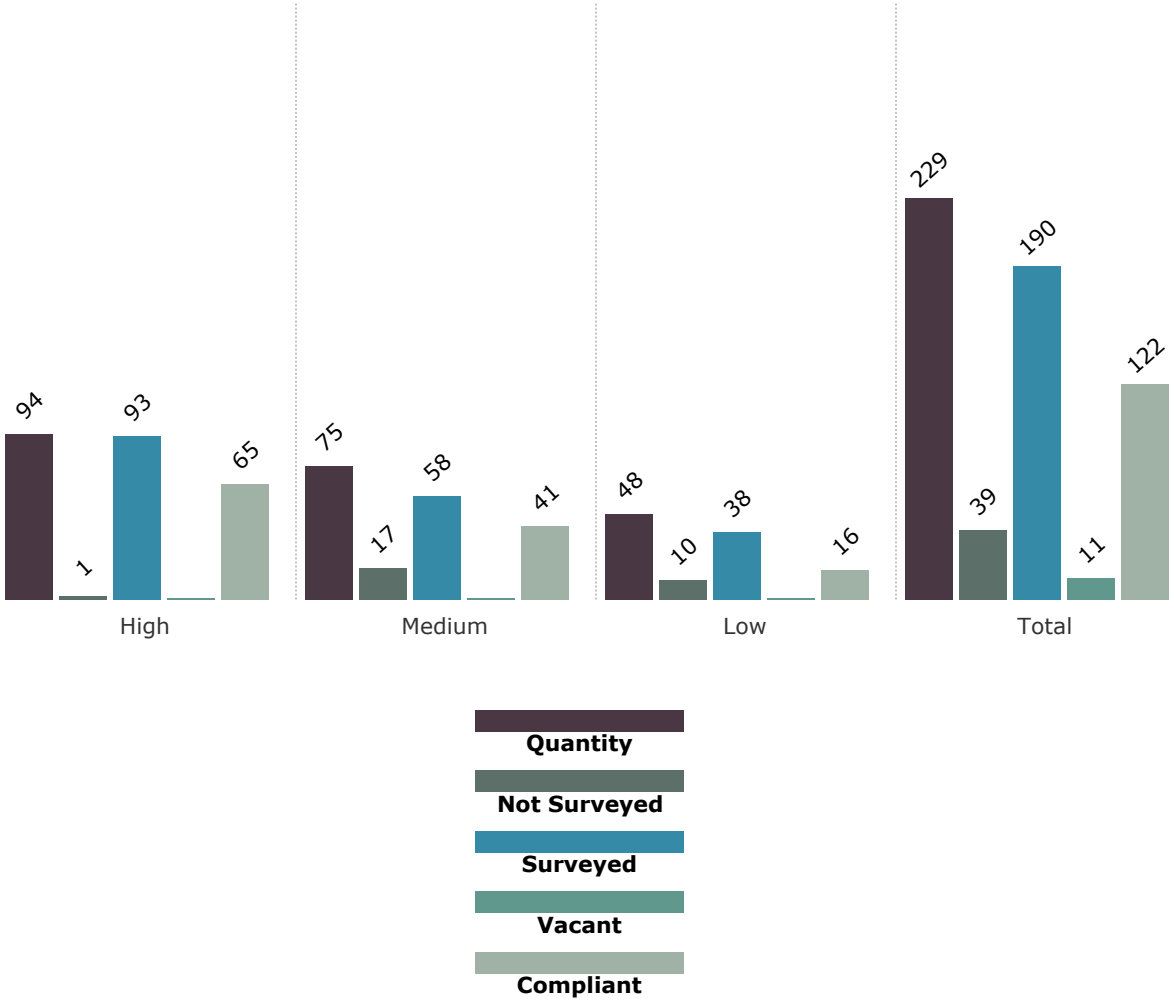
Town of Osoyoos

Summary Report - Feb 26, 2019

Customers	229
BFP's Tracked	331

Facilities

Hazards	Quantity	Not Surveyed	Surveyed	Vacant	Compliant
High	94	1	93	0	65
Medium	75	17	58	0	41
Low	48	10	38	0	16
None	12	11	1	11	0
Totals	229	39	190	11	122



APPENDIX D

Notice of Water Restrictions

Osoyoos
Canada's warmest welcome

BOIL WATER NOTICE

Osoyoos Water District Systems 8 & 9

The Town of Osoyoos has issued a **BOIL WATER NOTICE** for Domestic Water Customers served by **Rural Water Systems 8 & 9 effective April 1, 2019 until November 16, 2019.** Please refer to the first three digits (008 or 009) of the account number on your Annual Utilities Invoice.

During this time period the water source is switched from groundwater (well source) to Osoyoos Lake surface water supply. While the Osoyoos Lake water is chlorinated, the current disinfection process is not adequate to protect from bacterial, viral and protozoan pathogens that may be present in the surface water source.

The Town of Osoyoos and Interior Health recommend individuals drink boiled water or a safe alternative until further notice.

Rural Water Systems 8 & 9 customers, water intended for drinking, washing ready to eat fruits and vegetables, making beverages, ice, or brushing teeth should be **boiled for one minute**. Please notify tenants, visitors, or other building occupants of the boil water notice.

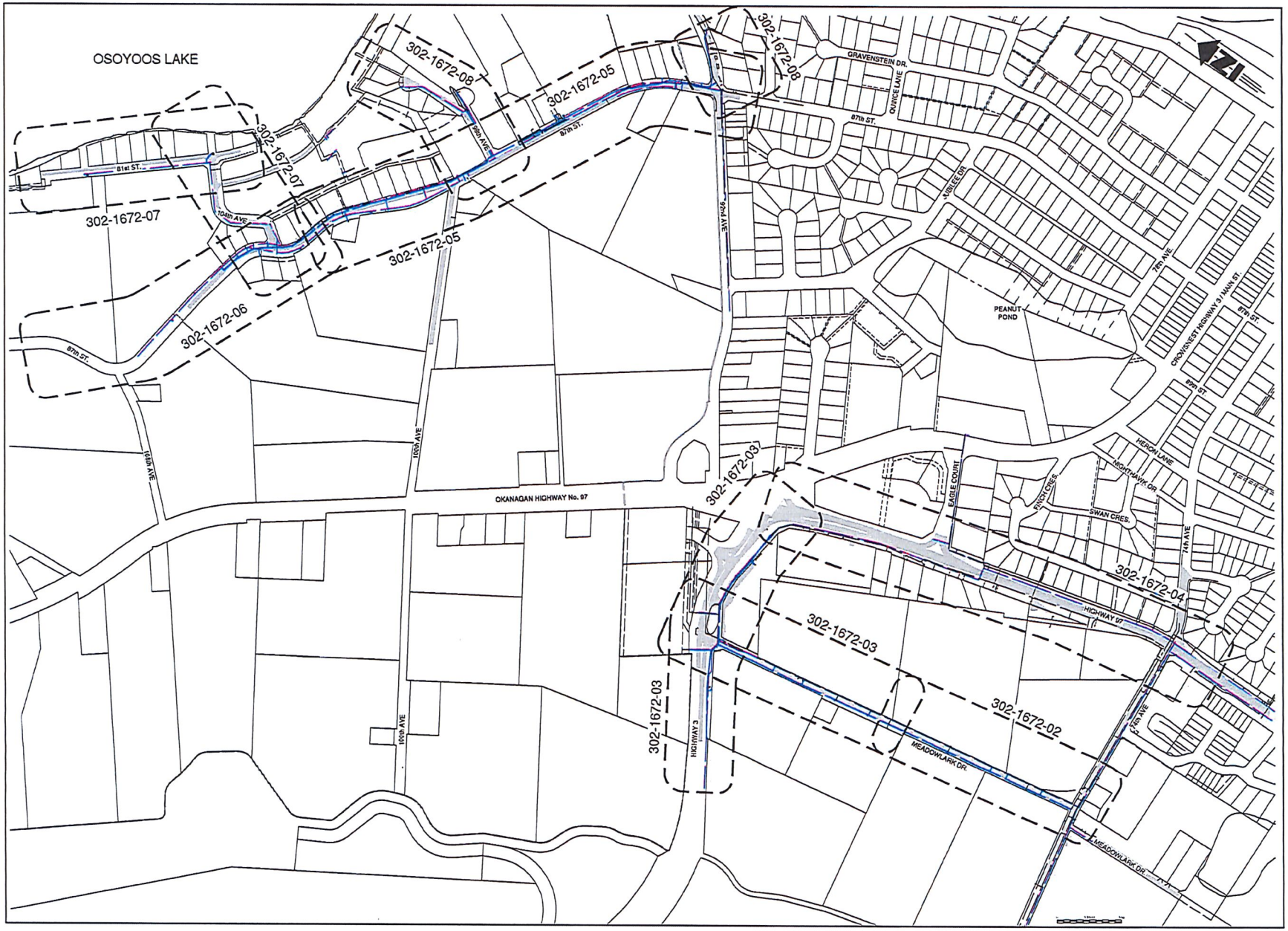
Interior Health has been consulted, and the public will be notified when conditions change or water quality has improved. The Town of Osoyoos is in the process of separating irrigation lines from domestic lines to improve water quality. The public will be notified when these projects are completed.

Thank you in advance for your patience. If you have any further questions please contact:

Town of Osoyoos
Operational Services
11500 115 Street, Box 3010
Osoyoos BC V0H 1V0
(T) 250.495.6213
(E) pubworks@osoyoos.ca

APPENDIX E

Illustrated Maps of Irrigation System 8 Rural Water Twinning (Contracts No.1, 2 & 3)



No.	DATE	DESCRIPTION	BY	APP.
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3	[illegible]	[illegible]	[illegible]	[illegible]
2	[illegible]	[illegible]	[illegible]	[illegible]
1	[illegible]	[illegible]	[illegible]	[illegible]

ISSUES / REVISIONS

CONSULTANT SEAL

TRUE CONSULTING

201 - 2973 Falcon Road • Kamloops BC • V2C 4J2
tel 250.828.0881 • fax 250.828.0717
www.TRUE.ca

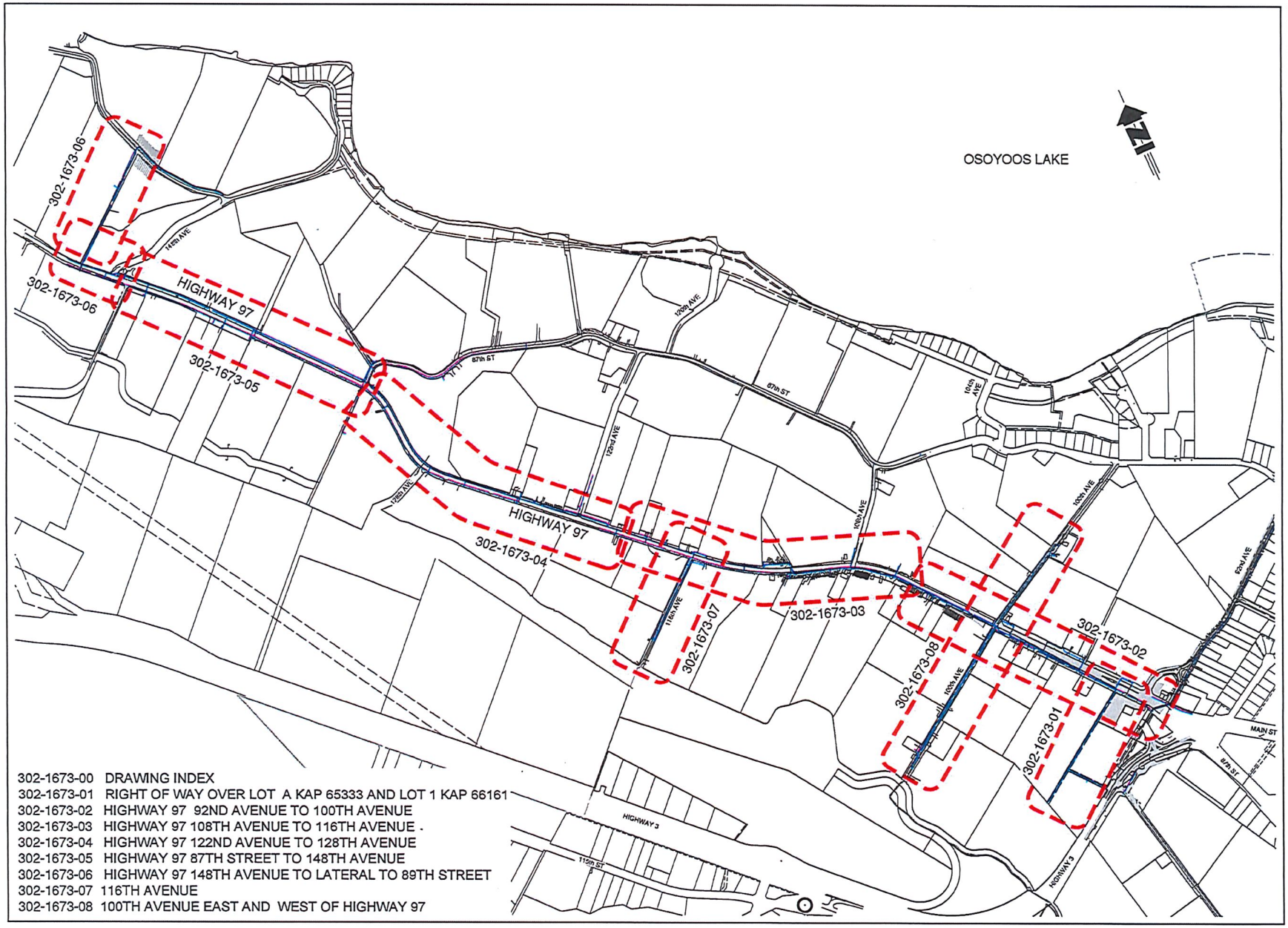
Osoyoos
Canada's warmest welcome

RURAL AREA WATER SYSTEM TWINNING - SYSTEM 8

PHASE 1 - CONTRACT 1

LOCATION AND KEY PLANS

SCALE	1:2500
DESIGN BY	TRU
DRAWN BY	DL
DATE	MAY, 2014
PROJECT REFERENCE No.	302-1672
DRAWING No.	302-1672-01
SHEET	
REVISION	5



302-1673-00 DRAWING INDEX
302-1673-01 RIGHT OF WAY OVER LOT A KAP 65333 AND LOT 1 KAP 66161
302-1673-02 HIGHWAY 97 92ND AVENUE TO 100TH AVENUE
302-1673-03 HIGHWAY 97 108TH AVENUE TO 116TH AVENUE
302-1673-04 HIGHWAY 97 122ND AVENUE TO 128TH AVENUE
302-1673-05 HIGHWAY 97 87TH STREET TO 148TH AVENUE
302-1673-06 HIGHWAY 97 148TH AVENUE TO LATERAL TO 89TH STREET
302-1673-07 116TH AVENUE
302-1673-08 100TH AVENUE EAST AND WEST OF HIGHWAY 97

LEGEND

ISSUES / REVISIONS

TRUE CONSULTING

Osoyoos
Canada's warmest welcome

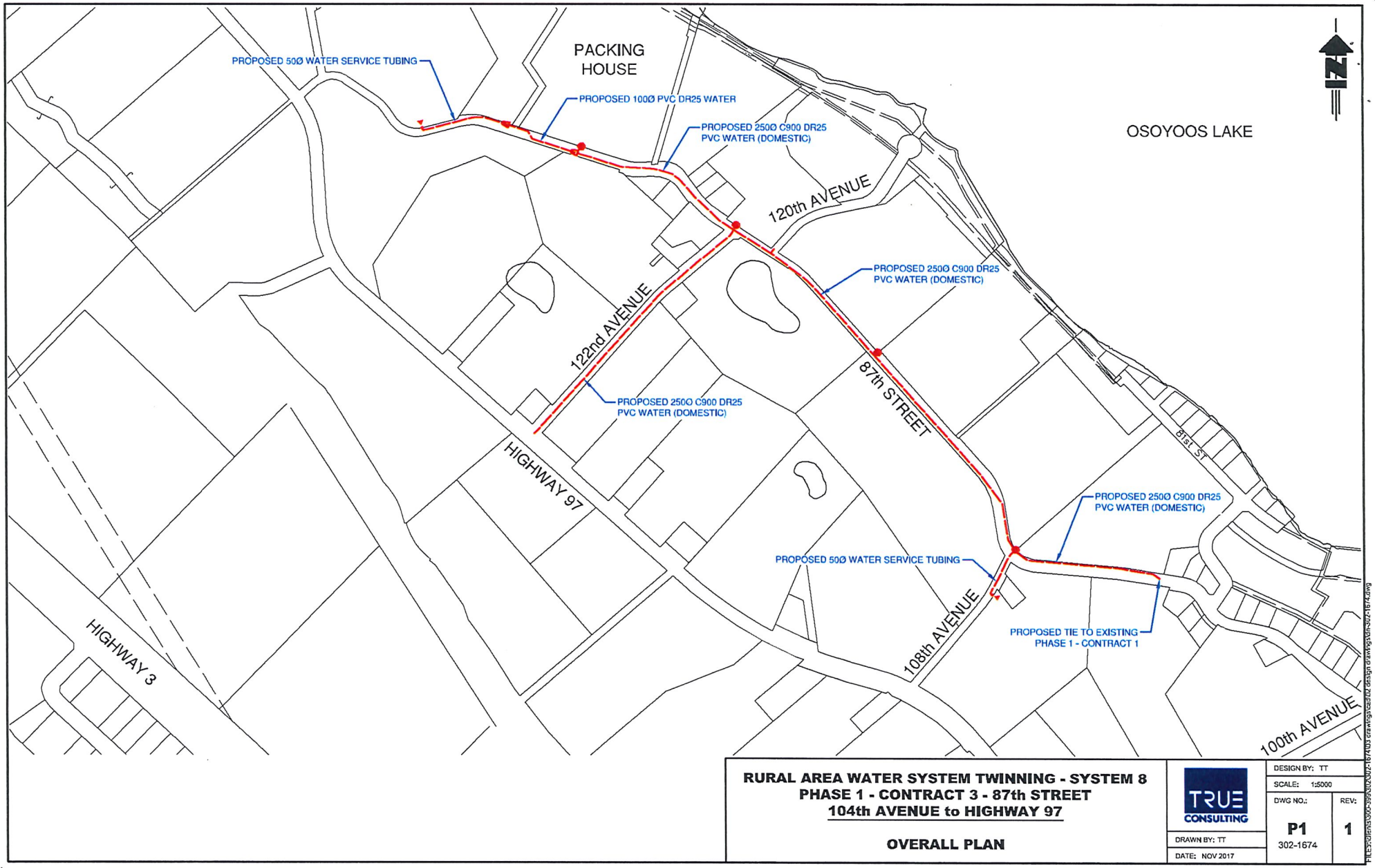
RURAL AREA
WATER SYSTEM
TWINNING - SYSTEM 8

PHASE 1 - CONTRACT 2
HIGHWAY 97
RIGHT OF WAY
HIGHWAY 3 TO
148TH AVENUE

DRAWING
INDEX

1:4000
TRU
DL
JAN 2017

302-1673-00
4



RURAL AREA WATER SYSTEM TWINNING - SYSTEM 8
PHASE 1 - CONTRACT 3 - 87th STREET
104th AVENUE to HIGHWAY 97

OVERALL PLAN

TRUE CONSULTING

DESIGN BY: TT
SCALE: 1:5000
DWG NO.: P1 302-1674
REV: 1
DRAWN BY: TT
DATE: NOV 2017

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