

Wastewater Treatment and Reclaimed Water Irrigation Systems (ME-12214)

2021 Annual Report: Town of Osoyoos



June 2022

Project No. 302-1352-008

ENGINEERING ■ PLANNING ■ URBAN DESIGN ■ LAND SURVEYING

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Revision #	Revised by	Date	Issue / Revision Description

Report Submission

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Jun 23
2022

Permit to Practice
No. 1000129

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List of Acronyms

BOD ₅	5-day Biochemical Oxygen Demand
MOE	Ministry of Environment and Climate Change Strategy
OC	Operating Certificate ME-12214
TRUE	TRUE Consulting
TSS	Total Suspended Solids
WWA	Western Water Associates Ltd.

Units of Measure

ft	feet
lgpm	Imperial gallons per minute
km	kilometre
L/d	Litres per day
L/m	Litres per minute
L/s	Litres per second
lpcd	Litres per capita per day
m	metre
mg/L	milligrams per Litre
mm	millimetre
NTU	Nephelometric Turbidity Units
psi	pounds per square inch
USgpm	US gallons per minute

1.0 Wastewater Influent Flows (OC 1.0)

1.1 Wastewater Flow (OC 5.1, 7.2.4.1)

The Town of Osoyoos discharges wastewater from the Main Lift Station (Legion Beach Lift Station, E230277) and the Golf Course Lift Station (Desert Park Lift Station, E232882) to a treatment system, as authorized by Operating Certificate ME-12214 (OC), issued by the Ministry of Environment and Climate Change Strategy (MOE). Table 1-1 following summarizes the wastewater flow from these lift station sources in 2021.

TABLE 1-1: WASTEWATER INFLUENT FLOWS

2021 Monthly Flows							
Month	E230277 Main Lift Station (m ³)	E232882 Golf Course Lift Station (m ³)	2021 Monthly Totals (m ³)	2020 Monthly Totals (m ³)	2019 Monthly Totals (m ³)	2018 Monthly Totals (m ³)	2017 Monthly Totals (m ³)
January	62,505	3,877	61,634	61,289	61,144	57,646	59,886
February	57,658	4,079	56,335	56,636	55,302	52,666	56,320
March	66,765	4,200	64,972	62,283	64,145	63,429	62,640
April	64,303	4,505	63,770	59,325	63,601	66,024	61,997
May	64,679	4,512	70,902	67,563	70,726	104,922	75,009
June	78,391	4,622	76,994	76,744	76,568	77,060	79,411
July	97,971	4,802	99,216	102,448	98,750	96,107	96,265
August	93,856	4,994	98,176	106,325	98,153	94,926	99,749
September	76,466	4,605	78,112	88,123	77,100	70,913	75,508
October	69,846	4,577	65,810	76,788	65,184	62,288	66,681
November	60,768	4,035	58,075	66,256	57,318	56,216	58,421
December	58,804	3,874	58,957	65,240	58,292	56,488	56,583
TOTALS	852,013	52,682	904,695	889,020	846,282	858,684	848,470
	Summer Flow (May-Sept)		434,898	441,203	421,297	443,928	425,942
	Winter Flow (Oct-Apr)		469,797	447,817	424,985	414,756	422,528

The Golf Course Lift Station flow meter was connected to the Town's SCADA system in September 2019, enabling tabulation of flows on a daily basis. Daily flow measurements for both the Golf Course Lift Station and the Main Lift Station are included in Appendix A. The Golf Course Lift Station's monthly flows prior to installation of the SCADA system were obtained from the system's totalizer.

Table 1-2 summarizes influent sewage flow data for a 28-year period from 1994 – 2021. The per capita sewage flow rate from 1994 to 2021 has ranged between 0.388 to 0.466 m³/capita/day.

Average daily flows, maximum average monthly flows, and average winter influent flows from 1992-2021 can be seen graphically in Figure 1-1. Historical population estimates and permit annual average/maximum month average flows (as authorized in the OC) are also denoted.

The OC for the Town's wastewater treatment and water reuse systems is dated December 18, 1998 (see Appendix B). The OC projected the annual average daily sewage flow to increase from 1,760 m³/day in 1997 to 2,720 m³/day in 2008. As shown in Table 1-2, annual average daily sewage flows have not yet reached that projected for 2008. The 2021 annual average daily flow was 2,337 m³/day.

The OC also provides a projection of the maximum monthly average increasing from 3,250 m³/day in 2000 to 4,340 m³/day in 2008. The maximum monthly average in 2021 was 3,201 m³/day.

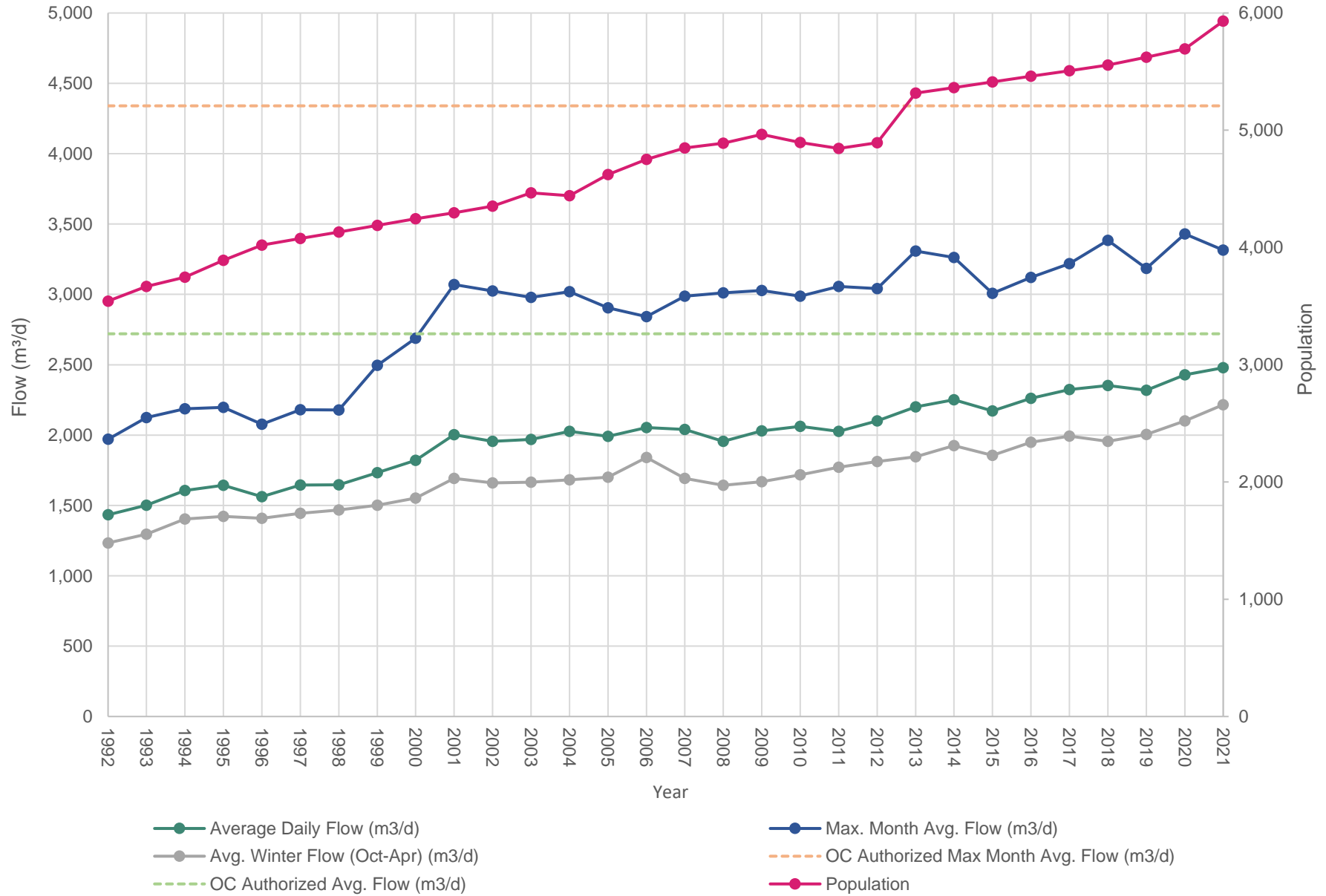
Overall, total annual, average daily and maximum month average daily sewage flows remain well within projections presented in Section 1.1.1 of the OC. The total volume of influent in 2021 decreased relative to the previous year.

TABLE 1-2: HISTORICAL INFLUENT SEWAGE FLOW DATA

	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Population Osoyoos (BC Stats)	3,746	3,890	4,021	4,076	4,131	4,188	4,245	4,295	4,353	4,466	4,441	4,623	4,752	4,848
Population Northwest Sector	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Population	3,746	3,890	4,021	4,076	4,131	4,188	4,245	4,295	4,353	4,466	4,441	4,623	4,752	4,848
Total Flow (Main Lift) (m ³)	572,678	583,903	551,576	579,686	577,999	607,413	638,527	703,823	686,031	689,695	709,562	696,018	718,297	712,704
Total Est. Flow (Golf Course Lift) (m ³)	13,797	16,097	18,396	20,696	22,995	25,295	26,280	27,375	28,105	29,018	29,930	30,660	31,390	32,120
Total Combined Flow (m ³)	586,475	600,000	569,972	600,382	600,994	632,708	664,807	731,198	714,136	718,713	739,492	726,678	749,687	744,824
Average Daily Flow (m ³ /d)	1,607	1,644	1,562	1,645	1,647	1,733	1,821	2,003	1,957	1,969	2,026	1,991	2,054	2,041
Average per capita Flow (m ³ /cap/d)	0.429	0.423	0.388	0.404	0.399	0.414	0.429	0.466	0.449	0.441	0.456	0.431	0.432	0.421
Max. Month Avg. Flow (m ³ /d)	2,187	2,197	2,077	2,181	2,179	2,496	2,688	3,071	3,025	2,979	3,019	2,904	2,842	2,988
Max. Month Avg. Flow per capita (m ³ /cap/d)	0.584	0.565	0.517	0.535	0.527	0.596	0.633	0.715	0.695	0.667	0.680	0.628	0.598	0.616
Avg. Winter Flow (Oct-Apr) (m ³ /d)	1,404	1,423	1,409	1,445	1,467	1,502	1,553	1,693	1,660	1,665	1,683	1,700	1,841	1,692
Avg. Winter Flow per capita (Oct-Apr) (m ³ /cap/d)	0.375	0.366	0.351	0.354	0.355	0.359	0.366	0.394	0.381	0.373	0.379	0.368	0.387	0.349

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Population Osoyoos (BC Stats)	4,889	4,965	4,896	4,845	4,893	4,941	4,989	5,037	5,085	5,133	5,181	5,248	5,319	5,556
Population Northwest Sector	-	-	-	-	-	375	375	375	375	375	375	375	375	375
Total Population	4,889	4,965	4,896	4,845	4,893	5,316	5,364	5,412	5,460	5,508	5,556	5,623	5,694	5,931
Total Flow (Main Lift) (m ³)	680,972	707,321	719,126	701,765	722,804	760,112	774,427	744,992	780,129	799,795	818,786	800,271	839,020	852,013
Total Est. Flow (Golf Course Lift) (m ³)	33,033	33,580	33,580	32,120	45,902	43,319	47,009	47,986	47,769	48,675	39,898	46,011	50,000	52,682
Total Combined Flow (m ³)	714,005	740,901	752,706	733,885	768,706	803,431	821,436	792,978	827,898	848,470	858,684	846,282	889,020	904,695
Average Daily Flow (m ³ /d)	1,956	2,030	2,062	2,027	2,100	2,201	2,251	2,173	2,262	2,325	2,353	2,319	2,429	2,479
Average per capita Flow (m ³ /cap/d)	0.400	0.409	0.421	0.418	0.429	0.414	0.420	0.401	0.414	0.422	0.423	0.412	0.427	0.418
Max. Month Avg. Flow (m ³ /d)	3,011	3,028	2,987	3,056	3,041	3,307	3,262	3,007	3,121	3,218	3,385	3,185	3,430	3,315
Max. Month Avg. Flow per capita (m ³ /cap/d)	0.616	0.610	0.610	0.631	0.621	0.622	0.608	0.556	0.572	0.584	0.609	0.566	0.602	0.559
Avg. Winter Flow (Oct-Apr) (m ³ /d)	1,644	1,669	1,717	1,772	1,812	1,845	1,925	1,855	1,948	1,993	1,956	2,004	2,101	2,216
Avg. Winter Flow per capita (Oct-Apr) (m ³ /cap/d)	0.336	0.336	0.351	0.366	0.370	0.347	0.359	0.343	0.357	0.362	0.352	0.356	0.369	0.374

FIGURE 1-1: TOWN OF OSOYOOS WWTP INFLUENT FLOW TRENDS



1.2 Influent Quality (OC 5.2, 7.2.4.2)

As per the requirements of the OC, grab sampling of influent to the wastewater treatment plant is to be completed semi-annually. The Town samples the influent for:

- a) total phosphorus and ortho phosphorus, expressed as P in mg/L.
- b) 5-day biochemical oxygen demand (BOD₅), mg/L.

The results for 2021 are presented in Table 1-3 as follows:

TABLE 1-3: INFLUENT MONITORING (E230037)

Date	BOD₅	Total Phosphorus (mg/L)	Ortho Phosphate (mg/L)
March 2, 2021	272	9.48	3.55
September 7, 2021	371	7.69	4.74

2.0 Wastewater Treatment and Winter Storage Facilities

This section discusses the Town’s wastewater treatment facilities, winter storage facilities, reclaimed water irrigation system and reclaimed water infiltration bed.

2.1 Description

The Town’s wastewater treatment facility and reclaimed water irrigation areas are located on the Osoyoos West Bench as illustrated on Figure 2-1. The Fairway Hills / Dividend Ridge development area, which is serviced by the Golf Course lift station referenced in Section 1.0, is the neighbourhood to the south (right side) of the wastewater treatment facility, shown on Figure 2-1. Figure 2-2 illustrates the Town’s wastewater treatment, effluent storage, and reclaimed water supply works. From the inlet, the system components and upgrades are described in Table 2-1.

TABLE 2-1: WASTEWATER TREATMENT AND RECLAIMED WATER IRRIGATION SYSTEM COMPONENTS

Component	Size/Volume	Year Constructed/Status
Aerated Cell No. 1	3,300 m ³	Liner replaced in 1994 and aeration system upgraded in 1998. De-sludged in 2021.
Aerated Cell No. 2	27,00 m ³	De-sludged and liner/aeration system replaced in 2010. De-ragging in 2021.
Aerated Cell No. 3	58,000 m ³	Liner 1978 – aeration system upgrade in 2002. Lowering of Cell in Oct. 2017 and desludging in Nov./Dec. 2017. Liner replacement and aeration system upgrade completed in 2018.
Winter Storage 1	270,000 m ³	Expanded and liner replaced in 2008.
Winter Storage 2	295,000 m ³	Constructed 1990.
Aeration System Blowers		Replaced and upgraded in 2010. Solar power system installed in 2010 and expanded in 2018.
Effluent Pump Station		Upgraded – 2008.
Chlorine Contact Basin		Constructed – 2008.
Infiltration Bed		Constructed – 2013.
Reclaimed Booster Station		Constructed – 2014.
Reclaimed Booster Supply Main		Upgraded section from chlorine contact basin to golf course maintenance building – 2014.
Flushing Standpipe Installation		Flushing standpipe installation on reclaimed water system at the Secondary School for system flushing in 2017.
Main Lift Station		Replacement and upgrading begun in 2019 and completed in 2020.

In 2008, major capital improvements were completed at the treatment plant. Improvements comprised reconstruction and enlargement of reclaimed water storage basin No. 1, upgrading of the effluent supply pump station and appurtenant supply mains, and construction of a reinforced cast in place concrete chlorine contact basin, to replace an existing earthen basin built in 1990.

In 2010, aerated lagoon Cell No. 2 was removed from service, drained and accumulated sludge from 32 years of service was removed. After sludge removal, the liner was replaced with a 60 mil HDPE liner. The static tube aeration system, in service since 1978, was removed and replaced with a more energy efficient fine bubble system. Concurrently, a solar panel array was installed with the objective of supplying a portion of the blower electrical energy requirements.

An infiltration bed was constructed at Desert Park in January 2013. It has an area of approximately 740 m² and is used to dispose of reclaimed water in excess of irrigation requirements.

In 2014, construction of the reclaimed booster station and installation of a 400 mm diameter supply main from the chlorine contact basin to the golf course maintenance building was completed. The reclaimed booster station is currently used to supply reclaimed water to the secondary school for irrigation of playing fields.

In 2017, aerated lagoon Cell No.3 was drained and de-sludged in preparation for replacement of the liner and aeration system. Sludge removal was completed in November and December of 2017. Biosolids were pumped into geotubes and located on the former Tree Farm site south of the secondary school for dewatering. This location was also used for sludge dewatering of Cell No. 2 in 2010. A standpipe was also installed on the reclaimed water system at the former Tree Farm site in 2017, allowing the Town to flush the supply system at the start and end of each irrigation season.

The liner and aeration system in Cell No. 3 were replaced and upgraded in the winter and spring of 2018.

In 2019 construction of a replacement for the main lift station commenced. The replacement main lift station was completed and commissioned in 2020. The aeration system diffuser membranes on aerated lagoon Cell No. 1 and No. 2 were replaced in 2020.

In 2021 Cell 1 was drained, de-sludged and the aerators cleaned. The aerators in Cell 2 were raised three successive times to be cleaned. All waste was transported to the Town of Osoyoos Landfill.

The Main Lift station, commissioned in 2020, has a screening rack to manage the debris entering the treatment plant, limiting deleterious materials to flows from the Golf Course Lift Station. By cleaning Cells 1 and 2 the Town intended to stabilize the accumulation of debris in the plant.

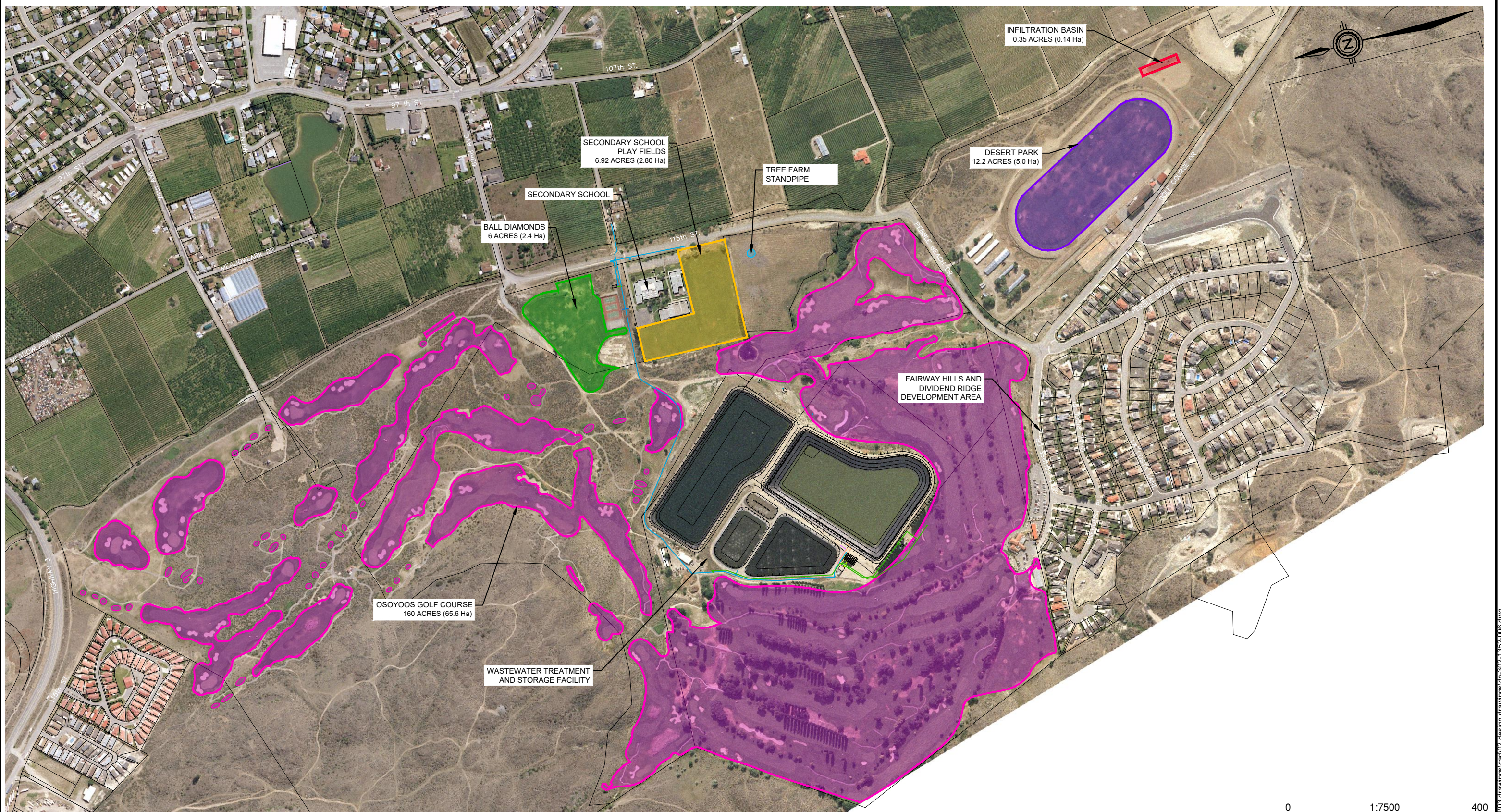
2.1.1 Lagoon Solar Power Generation

A solar power generation system was installed at the lagoons in 2010 with system upgrades and expansion in 2018. The total kilowatt hours (kWh) produced in 2021 was approximately 100,000 kWh. Totalizer readings were recorded on December 29, 2020 and then on June 20, 2021. Monthly data within this range was extrapolated based on proportional monthly energy generation during previous years. Monthly power generation from 2018 to 2021 is summarized in Table 2-2.

TABLE 2-2: LAGOON SOLAR POWER GENERATION SUMMARY FOR 2018 – 2021

Month	Power Generation (kWh)			
	2018	2019	2020	2021
January	655	1,250	1,590	1,641
February	2,544	2,703	6,254	6,457
March	5,058	5,640	10,448	10,787
April	5,335	6,096	11,623	12,000
May	6,710	6,541	12,134	12,527
June	7,476	7,716	11,486	15,306
July	8,183	6,928	14,245	13,094
August	5,319	13,774	13,645	10,327
September	5,521	8,249	9,279	8,812
October	3,913	7,814	6,911	6,852
November	2,266	3,773	3,583	2,752
December	744	1,602	2,280	1,940
Total	53,724	72,087	103,478	102,495

*Extrapolated values.



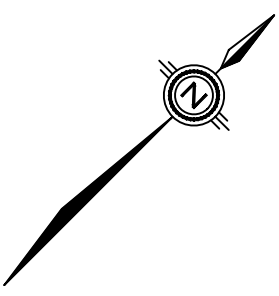
LEGEND

- THE OSOYOOS GOLF AND COUNTRY CLUB
- THE BALL DIAMONDS LOCATED WEST OF OSOYOOS SECONDARY SCHOOL
- THE INFIELD AREA OF DESERT PARK
- THE SECONDARY SCHOOL PLAYING FIELDS
- TREE FARM STANDPIPE
- INFILTRATION BASIN

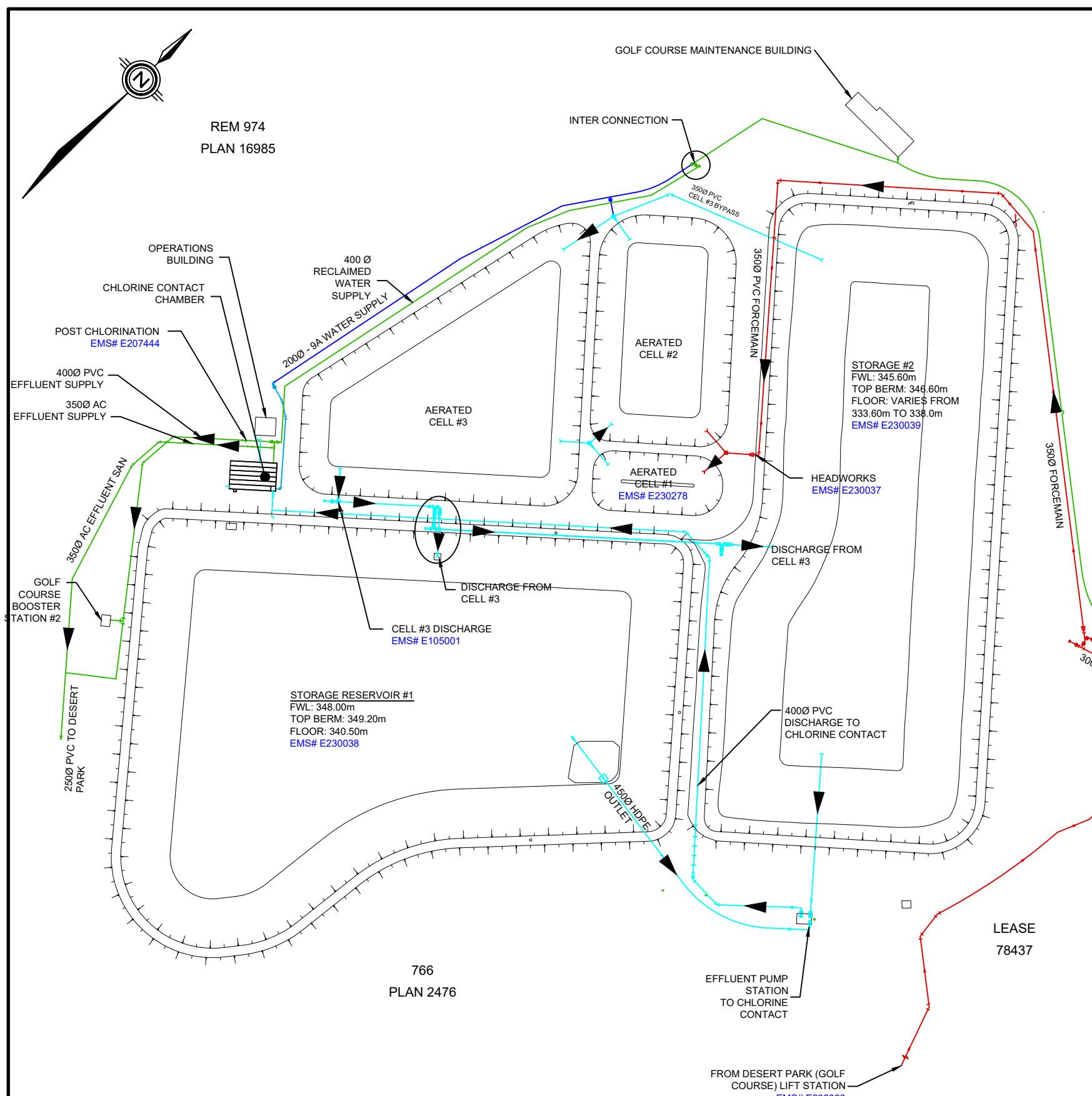
WWT & RW ANNUAL REPORT
RECLAIMED WATER IRRIGATION AREAS

DESIGN BY: NA
SCALE: 1:7500 (11x17)
DWG NO.:
FIGURE 2-1
REV:
DRAWN BY: DL
DATE: February 2020

FILE: \clients\300-399\302\302-1352-006\03 drawings\caat\02 design drawings\dm-302-1352-006.dwg



REM 974
PLAN 16985



PERMIT ME-12214 SAMPLING REQUIREMENT FOR PERMITTED WORKS (EXCLUDING GROUND AND SURFACE WATER MONITORING PROGRAMME)

SITE	EMS #	PERMIT REQUIREMENT	MONITORING TYPE	FREQUENCY	SAMPLING PARAMETERS
Legion Beach Lift Station (Main Lift Station)	E230277	Avg. annual flow = 2,720 m ³ /d Max. monthly avg. flow = 4,430 m ³ /d	Flow	Daily	Flow (m ³ /d)
Deserr Park Lift Station (Golf Course Lift Station)	E232882		Flow	Daily	Flow (m ³ /d)
Headworks	E230037		Grab sample (analytical)	Semi-annual	
Cell #1	E230278	BOD ₅ ≤ 45 mg/L TSS ≤ 60 mg/L	Sludge sample (analytical)	Annual	Total Solids (g/L), Moisture Content (%), Volatile Suspended Solids (g/L), Total Kjeldahl N (g/L and g/kg dry solids)
Cell #3 Discharge	E105001		Grab sample (analytical)	Monthly/semi-annual	Monthly: BOD ₅ (mg/L), TSS (mg/L) Semi-Annually: Total P, Ortho P, Total Dissolved P (mg./L) Total N, Ammonia N, Nitrate N, Nitrite N, Organic N (mg/L)
Storage Reservoir #1	E230038		Level	Weekly	Storage volume (calculated)
Storage Reservoir #2	E230039		Level	Weekly	Storage volume (calculated)
Post Chlorination	E207444	Chlorine residual ≥ 1 mg/L Fecal coliforms ≤ 200 MPN/100mL (agricultural, silvicultural, low use public land) Fecal coliforms ≤ 2.2 MPN/100mL (high use public land)	Grab Sample	Weekly/monthly	Weekly: Fecal Coliforms & Total Coliforms (MPN/100mL), Total P & Total N (mg/L) Monthly: Chlorine Residual (mg/L)
Infiltration Basin	E218460		Flow	As required	Flow
Irrigation Areas		Flow records	Flow	Weekly	Flow

LEGEND

- RAW INFLUENT
- INTER-CELL PIPING
- RECLAIMED WATER SUPPLY
- SYSTEM 9A WATER SUPPLY

TREATMENT AND STORAGE SITE PLAN

DESIGN BY: NA

SCALE: 1:2500 (11x17)

DWG NO.: **FIGURE 2-2**

REV:

DRAWN BY: DL

DATE: March 2018

FILE: \clients\300-399\302\302-1352-008\03 drawings\cad\02 design drawings\dm-302-1352-008.dwg

2.2 Effluent Quality (OC 1.2.1, 5.3, 7.2.4.3)

The OC for the Town's wastewater treatment system requires that the effluent quality after Cell No. 3 and prior to storage, shall be equivalent to or better than:

5 Day Biochemical Oxygen Demand (BOD₅)– 45 mg/L

Total Suspended Solids (TSS) – 60 mg/L

The OC specifies that the effluent after Cell No. 3 (EMS site number E105001) be sampled as follows:

- a) **Monthly:** 5-day biochemical oxygen demand, mg/L;
- b) **Monthly:** total suspended solids (non-filterable residue), mg/L;
- c) **Semi-annually:** total phosphorus, ortho phosphorus, and total dissolved phosphorus, all expressed as mg/L P;
- d) **Semi-annually:** total nitrogen, ammonia nitrogen, nitrate nitrogen, nitrite nitrogen, and organic nitrogen, all expressed as mg/L N.

2021 sampling results for the effluent quality at the outlet of Cell No. 3 (E105001) are summarized in Table 2-3.

TABLE 2-3: AERATED LAGOON CELL NO. 3 – EFFLUENT QUALITY DATA (E105001)

Date	BOD-5 (mg/L)	Total Suspended Solids (mg/L)	Total Phosphorus (mg/L)	Total Dissolved Phosphorus (mg/L)	Ortho Phosphorus (mg/L)	Total Kjeldahl Nitrogen (mg/L)	Total Ammonia (mg/L)	Nitrate (as N) (mg/L)	Nitrite (as N) (mg/L)	Organic Nitrogen (mg/L)
(2021) Jan. 05	33.1	25.7	-	-	-	-	-	-	-	-
(2021) Feb. 09	42.6	39.3	-	-	-	-	-	-	-	-
(2021) Feb. 23	29.6	31.0	-	-	-	-	-	-	-	-
(2021) Mar. 16	-	-	5.07	4.8	3.7	44.8	38.6	0.149	0.081	-
(2021) Apr. 06	95	21.8	-	-	-	-	-	-	-	-
(2021) May. 04	42.9	41.5	-	-	-	-	-	-	-	-
(2021) Jun. 01	13.0	57.0	-	-	-	-	-	-	-	-
(2021) Jul. 06	7.0	18.0	-	-	-	-	-	-	-	-
(2020) Aug. 11	17.8	19.7	-	-	-	-	-	-	-	-
(2021) Sep. 21	< 7.4	6.8	5.83	5.73	4.95	12.9	7.79	5.76	3.64	-
(2021) Oct. 05	29.6	6.4	-	-	-	-	-	-	-	-
(2021) Nov. 05	7.4	4.8	-	-	-	-	-	-	-	-
(2021) Dec. 09	16.0	13.6	-	-	-	-	-	-	-	-

A BOD₅ exceedance was observed in April 2021. Additionally, organic nitrogen was not included in the analytical sampling suite. The Town will ensure that organic nitrogen is included on future lab analysis. Additionally, BOD₅ data will be monitored as it appears to be an anomaly. All other samples were in compliance with the OC.

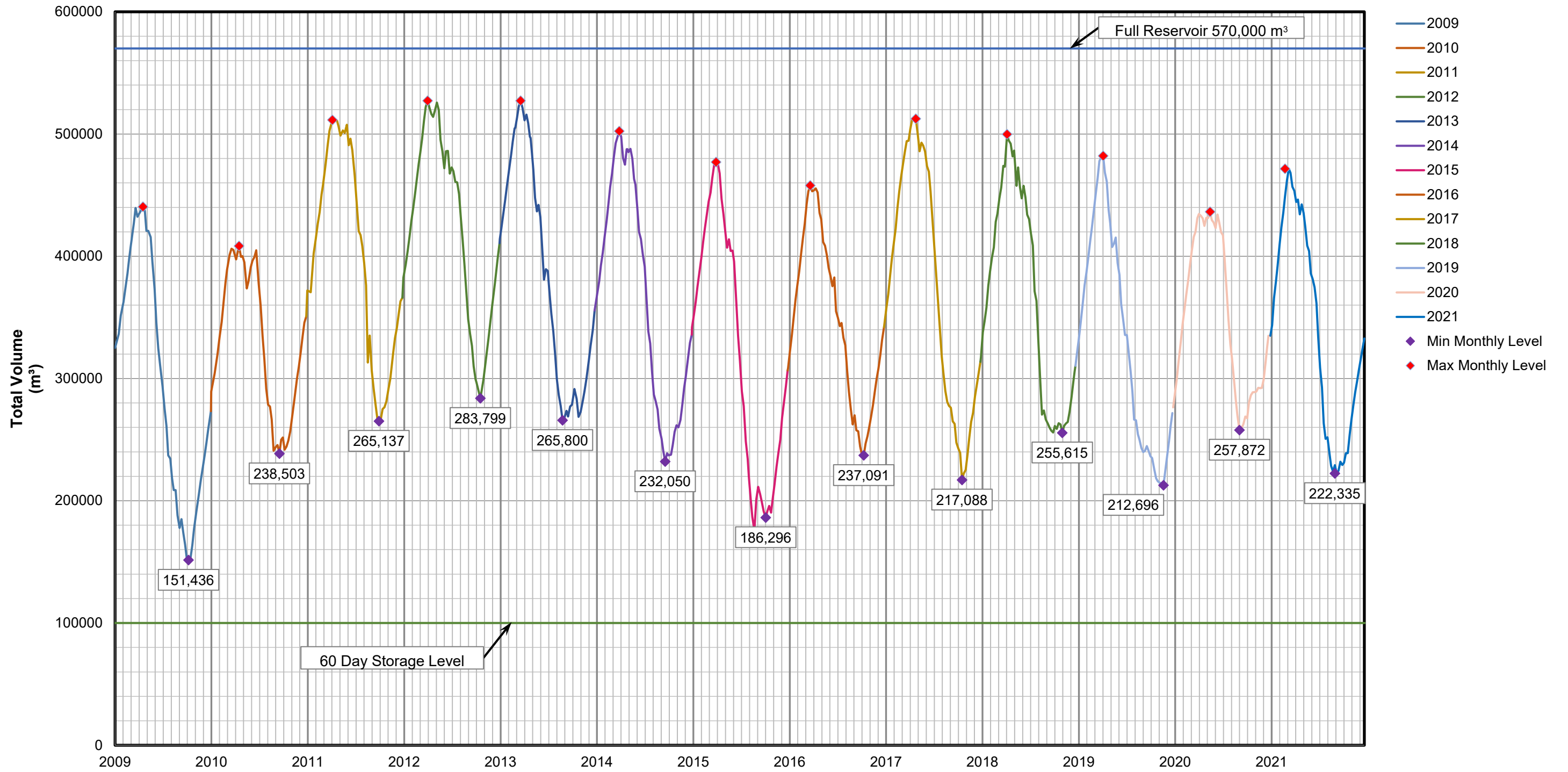
2.3 Winter Storage Facilities (OC 5.4, 7.2.4.4)

As illustrated in Figure 2-2, the Town’s wastewater treatment and appurtenant facilities include two winter effluent storage reservoirs. Historical storage volumes from 2009-2021 are shown graphically in Figure 2-3. This includes the maximum and minimum monthly water level, full reservoir volume notation, and 60-day storage level notation. As per OC Section 5.4, weekly operational data and the percent full storage volume for 2021 is presented in Table 2-4. The percent full for each storage reservoir can be used to reference the corresponding storage volumes using the calibration curves provided in Appendix C.

TABLE 2-4: STORAGE POND LEVELS

Date	Storage 1 %	Storage 2 %	Total Volume m ³	Date	Storage 1 %	Storage 2 %	Total Volume m ³
29-Dec-20	66.3	72.7	335,014	6-Jul-21	75.3	57.8	308,776
5-Jan-21	66.4	74.8	343,564	13-Jul-21	75.5	52.5	292,628
12-Jan-21	66.8	80.0	365,969	20-Jul-21	59.4	58.3	263,369
19-Jan-21	66.8	83.1	379,154	27-Jul-21	49.0	63.0	250,621
26-Jan-21	66.9	86.1	392,586	3-Aug-21	52.4	60.7	251,905
2-Feb-21	67.3	89.5	409,107	10-Aug-21	58.6	51.4	239,364
9-Feb-21	68.0	92.2	423,702	17-Aug-21	59.6	46.7	228,514
16-Feb-21	72.3	92.0	435,672	24-Aug-21	51.6	52.7	223,908
23-Feb-21	76.8	91.9	449,015	31-Aug-21	47.3	58.0	229,170
2-Mar-21	80.9	91.9	461,869	7-Sep-21	45.7	57.2	222,335
9-Mar-21	85.1	91.1	471,571	14-Sep-21	51.5	53.0	224,557
16-Mar-21	89.1	87.5	468,152	21-Sep-21	56.6	50.8	231,947
23-Mar-21	85.5	87.6	456,851	28-Sep-21	61.8	44.7	229,254
30-Mar-21	79.9	90.8	453,586	5-Oct-21	59.1	48.1	231,076
6-Apr-21	72.4	93.8	444,475	12-Oct-21	56.9	52.8	238,835
13-Apr-21	77.9	90.6	446,388	19-Oct-21	51.8	57.3	238,974
20-Apr-21	81.8	85.2	434,291	26-Oct-21	51.3	62.2	254,045
27-Apr-21	86.1	83.9	442,417	2-Nov-21	50.6	66.1	265,935
4-May-21	89.8	79.4	435,374	9-Nov-21	50.0	69.7	277,599
11-May-21	83.9	81.2	423,718	16-Nov-21	48.8	73.4	288,586
18-May-21	75.3	84.0	408,689	23-Nov-21	48.9	75.6	297,571
25-May-21	69.9	86.7	404,184	30-Nov-21	53.5	74.7	306,456
1-Jun-21	59.0	89.7	385,997	7-Dec-21	58.0	73.8	315,416
8-Jun-21	53.5	92.0	381,322	14-Dec-21	62.4	72.9	324,431
15-Jun-21	58.5	87.5	374,586	21-Dec-21	66.6	71.9	332,801
22-Jun-21	63.8	81.0	361,395	28-Dec-21	70.7	72.0	345,400
29-Jun-21	69.4	70.0	333,864				

FIGURE 2-3: TOWN OF OSOYOOS RECLAIMED WATER STORAGE POND VOLUMES 2009-2021



3.0 Reclaimed Water Irrigation System

3.1 System Overview

Reclaimed water from the Town's wastewater treatment facility supplies irrigation water to areas within the West Bench. These locations are depicted on Figure 2-1 and described as follows:

- i. Osoyoos Golf and Country Club:
 - Metered from Golf Course Booster Station;
 - Total area = 160 ac (65.6 ha);
 - Irrigation type = reclaimed water;
 - Crop = turf grass.

- ii. Osoyoos Ball Diamonds:
 - Located west of 115th street adjacent to the Osoyoos Secondary School;
 - Metered from Desert Park Irrigation Booster;
 - Total area = 6 ac (2.4 ha);
 - Irrigation type = reclaimed water;
 - Crop = turf grass.

- iii. Desert Park Infield Area:
 - Located southeast of wastewater treatment facility;
 - Metered from Desert Park Irrigation Booster (Desert Park Reclaimed Water Meter Account #5560099005);
 - Total area = 12.2 ac (5.0 ha);
 - Irrigation type = reclaimed water;
 - Crop = turf grass.

- iv. Secondary School Playing Fields:
 - Located west of wastewater treatment facility;
 - Metered from High School Booster Station (Secondary School Irrigation Meter Account #70235020);
 - Constructed in 2013-2014;
 - First started irrigating with reclaimed water in 2015;
 - Total area = 6.92 ac (2.8 ha);
 - Irrigation type = reclaimed water;
 - Crop = turf grass.

- v. Former Tree Farm Standpipe and Infiltration:
 - Located south of secondary school playing field;
 - Metered from High School Booster Station;
 - Irrigation type = reclaimed water;
 - Crop type = tree farm and infiltration.

The combined area of the above users excluding the former Tree Farm site is approximately 185 ac (76 ha).

Figure 3-1 provides a schematic overview of the reclaimed water distribution system and metering. Chlorinated reclaimed water is supplied by gravity from the Chlorine Contact Basin to the Golf Course Booster Station and Desert Park Booster Station.

The Golf Course Booster Station supplies reclaimed water to:

- Osoyoos Golf and Country Club
- Osoyoos Ball Diamonds

The Desert Park Booster Station provides reclaimed water to the Desert Park infield. This reclaimed water supply was constructed in 2012. The High School Booster Station provides reclaimed water to the secondary school playing fields and the former Tree Farm standpipe.

If needed, the Town can supplement the reclaimed water system using the 9A Pumphouse on Osoyoos Lake, as shown in Figure 2-2. The 9A Pumphouse was formerly owned and operated by the South Okanagan Lands Irrigation District and is currently used only as a supplemental water source to the Town's reclaimed water system.

In 2013 and 2014, supply works were constructed to supply reclaimed water to the secondary school playing fields. These works are planned to be extended in the future to provide reclaimed water to the airport area.

3.2 Reclaimed Water Usage Data (OC 5.5, 7.2.4.5)

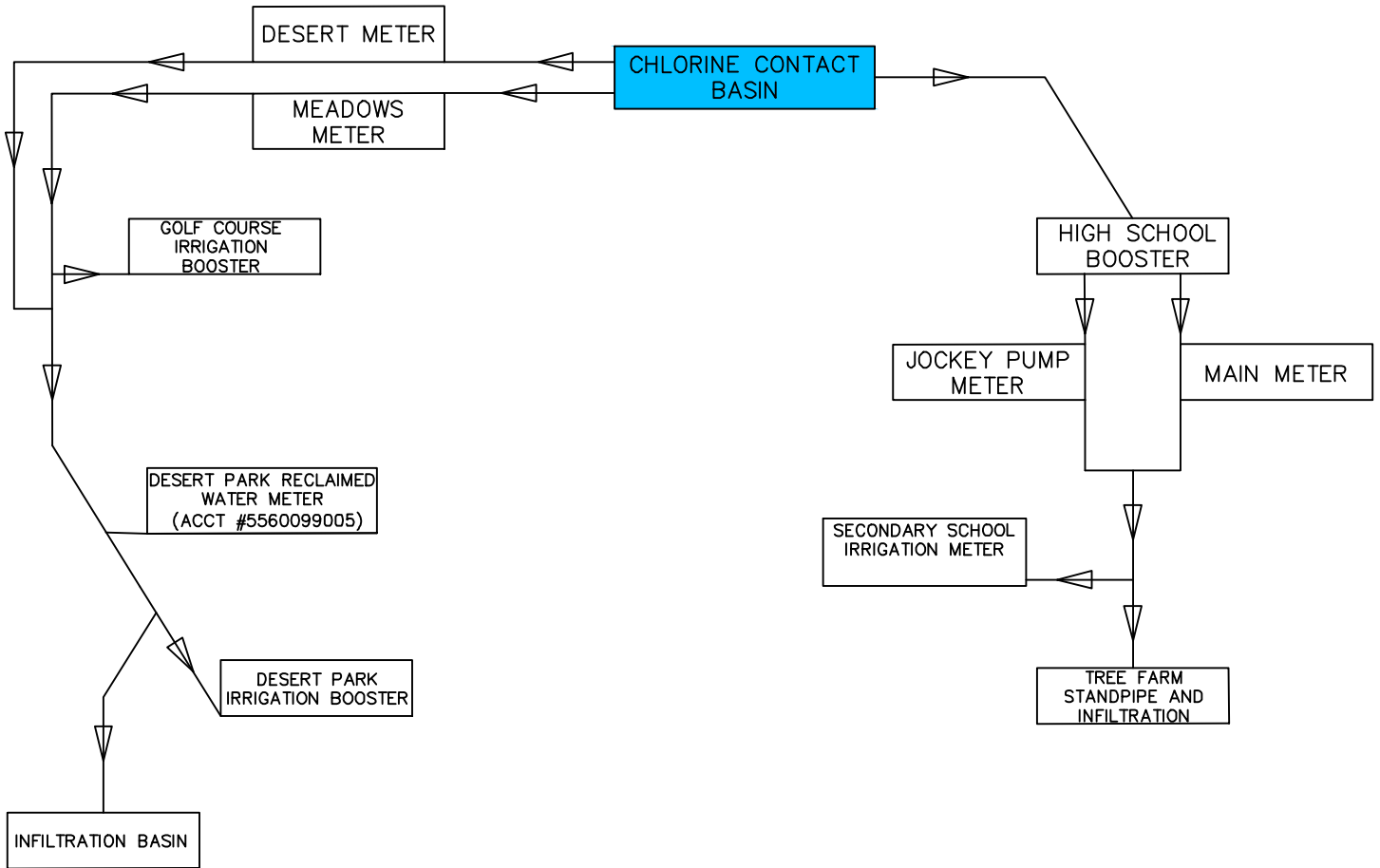
As described in Section 3.1, reclaimed water usage is measured by three flow meter stations. Two of the meters are on supply mains to the golf course and are designated as the “Desert” and “Meadows” meters. The third meter station is in the High School Booster Station and comprises both low flow (Jockey) and high flow (Main) meters.

The Desert and Meadows meters measure reclaimed water volumes to the Golf Course, Desert Park, and Infiltration Basin.

The meters in the “High School Booster” measure reclaimed water to the secondary school and former Tree Farm standpipe. A schematic illustration of the system downstream of the chlorine contact basin is presented in Figure 3-1.

The records of total reclaimed water use by month, as measured by the Desert, Meadows, and High School Booster meters from 2015 to 2021 are presented in Table 3-1. Operating records indicate that the irrigation was discontinued in October for the Meadows and Desert Nine meters and in December for the High School Booster Station meter. It is presumed that irrigation for the dog park was continued (Account #60666992). While this usage extends past the authorized discharge period within the permit and is recorded as a non-compliance, it is considered modest. Daily flow readings for the Desert, Meadows, and High School Booster meters for 2021 can be found in Appendix D.

Reclaimed water usage generally increases during periods of warm dry weather and decreases in months that are more cool and wet. Historical data for seasonal precipitation for Osoyoos is presented in Appendix E.



METERING SCHEMATIC OF RECLAIMED WATER SYSTEM



DSGN. BY: TU
 SCALE: N.T.S.
 DWG. NO.:
 REV.:
 DWN. BY: NA
 DATE: APRIL 2018

DSGN. BY: TU
 SCALE: N.T.S.
 DWG. NO.:
 REV.:
FIG
 3-1

TABLE 3-1: RECLAIMED WATER USAGE

Month	2021 Desert Nine Volumes m ³	2021 Meadows Volumes m ³	2021 High School Volumes m ³	2021 Total Volumes m ³	2020 Total Volumes m ³	2019 Total Volumes m ³	2018 Total Volumes m ³	2017 Total Volumes m ³	2016 Total Volumes m ³
January	0	0	0	0	0	0	0	0	0
February	0	0	0	0	0	0	0	0	0
March	14,064	15,399	28,152	57,615	11,635	3,105	697	24,301	21,725
April	27,430	26,491	29	53,950	75,595	78,915	65,395	50,144	66,903
May	48,221	42,752	197	91,170	56,043	80,262	127,319	100,097	99,302
June	59,092	53,295	0	112,387	76,240	106,908	108,886	123,251	93,647
July	70,549	73,401	3,737	147,687	157,551	137,778	177,376	163,787	119,211
August	43,276	44,581	6,411	94,268	152,967	132,576	163,461	131,477	140,511
September	27,787	22,697	2,233	52,717	69,978	67,976	104,178	83,834	79,574
October	15,627	12,918	3,639*	28,545	37,192	101,958	67,823	105,854	57,219
November	0	0	373*	0	43,039	83,591	56,674	7,330	16,111
December	0	0	71*	0	9,592	0	0	0	3,870
Totals	306,046	291,534	44,842	642,422	689,830	793,069	871,809	790,075	778,302

*Assumed from Town of Osoyoos Customer Account reading history. Daily flow data not recorded in field by Public Works staff.

Referencing Figure 3-1, derivation of reclaimed water supply to irrigated areas is described as follows.

For the supply to Desert Park:

- Total metered reclaimed water use in 2021 was $133,263 \text{ m}^3$
(minus) calculated volume to infiltration *Data not provided (assumed zero)*
(equals) calculation volume to Desert Park $133,263 \text{ m}^3$

For the supply to the High School Area:

- Total metered reclaimed water at the High School $44,842 \text{ m}^3$
(minus) metered irrigation use to school* $45,848 \text{ m}^3$
(equals) calculated volume to Tree Farm Site 0 m^3

*Town switched high school to domestic water on Sept. 30, 2021 and pumps turned off. Assumed use at dog park.

For the Golf Course and Playing Fields:

- Total measured flow (Desert and Meadows) was $597,580 \text{ m}^3$
(minus) total flow to Desert Park $133,263 \text{ m}^3$
(equals) calculated use by Golf Course $464,317 \text{ m}^3$

The Town did not provide the 2021 flow data for the infiltration basin volumes. It is assumed that the infiltration basin was not used in 2021.

Golf Course and Ball Diamonds:

- i. Total usage: $464,317 \text{ m}^3$
- ii. Application over an area of 68 ha
- iii. Calculated application rate: 0.683 m

Desert Park:

- i. Total usage: $133,263 \text{ m}^3$
- ii. Application over an area of 5 ha
- iii. Calculated application rate: 2.67 m

Secondary School:

- i. Total usage of $45,858 \text{ m}^3$
- ii. Application over an area of 2.8 ha
- iii. Calculated application rate of 1.64 m

3.3 Reclaimed Water Quality Data (OC 5.5.3, 7.2.4.6)

The operational certificate specifies the following sampling and analysis program for reclaimed water (EMS site reference number E207444).

- a) **Monthly:** fecal and total coliforms, MPN/100 mL;
- b) **Monthly:** total phosphorus, mg/L;
- c) **Monthly:** total nitrogen, mg/L;
- d) **Weekly:** chlorine residual, mg/L.

Disinfection is to be maintained in the reclaimed water discharged from the storage reservoirs to the irrigation system. Compliance requires a chlorine residual of ≥ 1 mg/L to be maintained at all times, immediately prior to irrigating. In addition, fecal coliforms shall not exceed 200 MPN per 100 mL for agricultural, silvicultural and low public use lands, or exceed 2.2 MPN per 100 mL for high public use lands. The authorized discharge period for irrigation is during the period of March 15 to November 15 each year. The Town began irrigation via the Desert and Meadows systems on March 16th and the High School Booster Station on March 9th (or 6 days prior to that authorized in Permit section 4.2.1).

Sampling data for reclaimed water (EMS Site E207444) is summarized in Table 3-2 and Table 3-3. Daily readings were recorded and are presented in Appendix F.

TABLE 3-2: RECLAIMED WATER QUALITY DATA (E207444)

Date	Fecal Coliforms (MPN/100mL)	Total Nitrogen (mg/L)	Total Phosphorus (mg/L)
(2021) Mar. 23	<1		
(2021) Mar. 30	<1		
(2021) Apr. 06	4*		
(2021) Apr. 13	<1	30.1	4.98
(2021) Apr. 20	<1		
(2021) Apr. 27	<1		5.1
(2021) May. 04	<1		
(2021) May. 11	>2420**		
(2021) May. 18	<1	24.0	2.54
(2021) May. 25	<1		
(2021) Jun. 01	<1		
(2021) Jun. 08	<1		
(2021) Jun. 15	<1	25.8	4.96
(2021) Jun. 29	<1		
(2021) Jul. 06	<1		
(2021) Jul. 13	248*	18.1	0.826
(2021) Jul. 20	<1		
(2021) Jul. 27	<1		
(2021) Aug. 03	<1		
(2021) Aug. 10	<1		
(2021) Aug. 17	<1	18.8	3.00
(2021) Aug. 24	<1		
(2021) Aug. 31	<1		
(2021) Sep. 07	<1		
(2021) Sep. 14	<1		
(2021) Sep. 21	<1	23.3	6.96
(2021) Sep. 28	<1		
(2021) Oct. 05	<1		
(2021) Oct. 12	<1	15.4	6.50

*Exceedances reported to MoE non-compliance report system in May 2022.

**Expected lab error, total coliforms measured as 13 MPN/100mL.

TABLE 3-3 RECLAIMED WATER USE – CHLORINE RESIDUAL

Date	Chlorine Residual (mg/L)	Date	Chlorine Residual (mg/L)
(2021) Mar. 16	0.94	(2021) Jul. 08	2.2
(2021) Mar. 23	0.29	(2021) Jul. 15	1.55
(2021) Mar. 30	0.21	(2021) Jul. 22	0.89
(2021) Apr. 08	2.1	(2021) Jul. 29	1.05
(2021) Apr. 15	2.2	(2021) Aug. 05	0.14
(2021) Apr. 22	2.2	(2021) Aug. 12	2.2
(2021) Apr. 29	2.2	(2021) Aug. 19	2.2
(2021) May. 06	0.98	(2021) Aug. 26	2.2
(2021) May. 14	0.09	(2021) Sep. 01	2.2
(2021) May. 21	0	(2021) Sep. 08	0.79
(2021) May. 28	0.32	(2021) Sep. 15	1.9
(2021) Jun. 04	0.71	(2021) Sep. 21	2.1
(2021) Jun. 11	1.53	(2021) Sep. 26	2.2
(2021) Jun. 18	1.4	(2021) Oct. 03	0.55
(2021) Jun. 25	2.2	(2021) Oct. 10	0.45
(2021) Jul. 01	2.2	(2021) Oct. 16	1.5

As seen in Table 3-2, a fecal coliform concentration exceedance was observed on four separate occasions in 2021.

Per the requirements for reclaimed wastewater irrigation in the Town’s OC Section 4.1.2, a chlorine residual of at least 1 mg/L must be maintained at all times, immediately prior to irrigating. As seen in Table 3-3 this residual is not being achieved consistently during sampling. The Town’s operators have described that there is an apparent time difference (approx. 2-6 hours) from the stop of irrigation and chlorination to chlorine residual sampling, during which time free chlorine consumption takes place.

To address these treatment deficiencies, it is TRUE’s recommendation to:

- Install an in-line chlorine analyzer which will allow for representative chlorine residual sampling results.
- Re-circulate stagnant treated reclaimed water back into the chlorination system.
- Adjust chlorination as required to achieve the 1 mg/L chlorine residual objective.

These upgrades will assist with observed fecal coliform exceedances and chlorine residual objectives.

3.4 Reclaimed Water Infiltration Bed

In 2013, an infiltration bed was constructed for surplus reclaimed water quantities from the Town's wastewater treatment facility. The infiltration bed was designed for a flow rate of 500 m³/d, which is measured by a flow meter located at the Desert Park Booster Station. In 2021, the reclaimed water infiltration bed was used from October 14th to December 31st, The calculated volume of water over this 78 day period is 39,000 m³.

4.0 Sludge – Monitoring Program (OC 3.20, 5.6)

In accordance with the Town of Osoyoos' OC Section 3.20, a Sludge Management Plan was prepared for the wastewater treatment facility in April 2019 and included in Appendix H of the 2018 Annual report submission. No changes, nor amendments, have been made to the sludge management report. This document outlines the monitoring, management, and beneficial use of the Town's municipal biosolids. A brief summary of historic operations and 2021 analytical sampling is provided herein.

4.1 Historic Operations Summary (7.2.4.8)

The following summarizes the frequency of withdrawal and volumes of desludging activities to date and an operations overview for sludge removal within each cell:

- Cell No. 1 generally requires sludge removal every 5 years, based on public works operating experience. This is completed by vacuum truck removal and disposal at the Town's municipal landfill hauled liquid waste ponds. This was done most recently in 2021.
- Cell No. 2 was de-sludged once (in 2010) since its initial construction in 1978. During de-sludging, approximately 10,500 m³ of sludge was removed. This equates to an annual production rate of 330 m³/year. In 2021 the Cell was partially drained, and rags were removed from the diffusers.
- Cell No. 3 was de-sludged for the first time in 2018. A total of approximately 7,000 m³ of sludge was removed. This equates to an annual production rate of 175 m³/year.

4.2 Analytical Sampling (OC 5.6, 7.2.4.7)

Cell #1 is sampled annually as a part of the sludge monitoring program outlined in Section 5.6 of the OC. The sampling results for 2021 are presented below in Table 4-1.

TABLE 4-1: AERATED LAGOON CELL No. 1 – SLUDGE SAMPLING RESULTS (E230278)

Sludge Monitoring Program	
Analysis Parameter	Cell #1 Sewer Site (E230278)
Date Sampled	October 5, 2021
Date Reported	October 14, 2021
Work Order	21J1716
General Parameters	
Total Solids*	16.8%
Moisture	96.3%
Total Volatile Solids*	53.0%
Total Kjeldahl Nitrogen*	77.2 g/L dry
Strong Acid Leachable Metals	
Aluminum	2810 mg/kg dry
Arsenic	8.3 mg/kg dry
Cadmium	0.644 mg/kg dry
Calcium	23800 mg/kg dry
Chromium	32.7 mg/kg dry
Cobalt	2.21 mg/kg dry
Copper	866 mg/kg dry
Iron	10900 mg/kg dry
Lead	23.6 mg/kg dry
Manganese	141 mg/kg dry
Mercury	1.38 mg/kg dry
Molybdenum	25.8 mg/kg dry
Nickel	20 mg/kg dry
Silver	2.62 mg/kg dry
Sodium	4150 mg/kg dry
Zinc	1040 mg/kg dry

5.0 System Hydraulic Balance (OC 3.16)

As defined in the OC Section 3.16, the Town is required to operate and maintain the aerated lagoons and the reclaimed wastewater storage reservoir to minimize leakage. A system hydraulic balance represents a methodology to confirm that the system is being operated in accordance with Section 3.16 of the operational certificate. A hydraulic balance for the Town of Osoyoos system in 2021 is presented in Table 5-1.

TABLE 5-1: 2021 SYSTEM HYDRAULIC BALANCE

	<u>As per data</u>	
Volume in Storage – December 29, 2020	335,014	m ³
(plus) Total Sewage Inflow	904,695	m ³
(plus) Freshwater Inflow	0	m ³
(minus) Total Reclaimed Water Use	642,422	m ³
(minus) Rapid Infiltration Basin	39,000	m ³
(minus) Unaccounted Gains/Losses	212,887	m ³
Volume in Storage – December 28, 2021	345,400	m ³

In 2021, there was no requirement for additional water from Pumphouse 9A, except following the end of use of reclaimed water and switch over of the High School booster station to the 9A water supply on Sept. 30, 2021. As seen in the hydraulic balance, there is an unaccounted loss of 212,887 m³, higher than the unaccounted losses in 2020 of 135,882 m³. With a surface area of 11.6 ha and an evaporation rate of 0.8 m/year, there is a potential evaporation loss of 93,000 m³/year, which can account for part of the system losses observed. It is suspected that reclaimed water was used at the Tree Farm site, however data was not provided at the time of writing this report.

6.0 Groundwater Monitoring (OC 5.7, 7.2.4.9)

As per sections 5.7 and 7.2.4.9 of the OC, records of groundwater well elevations and ground/surface water quality are to be reported annually with results reviewed by a qualified professional engineer (hydrogeologist). Presented herein are the 2021 sampling results for the groundwater monitoring programme. A hydrogeological review of the Town of Osoyoos' reclaimed wastewater irrigation and disposal system environmental monitoring programme was reviewed by Wester Water Associates Ltd (WWA) in 2019. Following this review, the Town of Osoyoos installed two of the three recommended additional groundwater monitoring wells in 2021, with the third scheduled to be constructed in 2022. A detailed review of the 2021 groundwater monitoring results will be completed by WWA and submitted to the Ministry as an addendum to this report.

6.1 Groundwater Monitoring

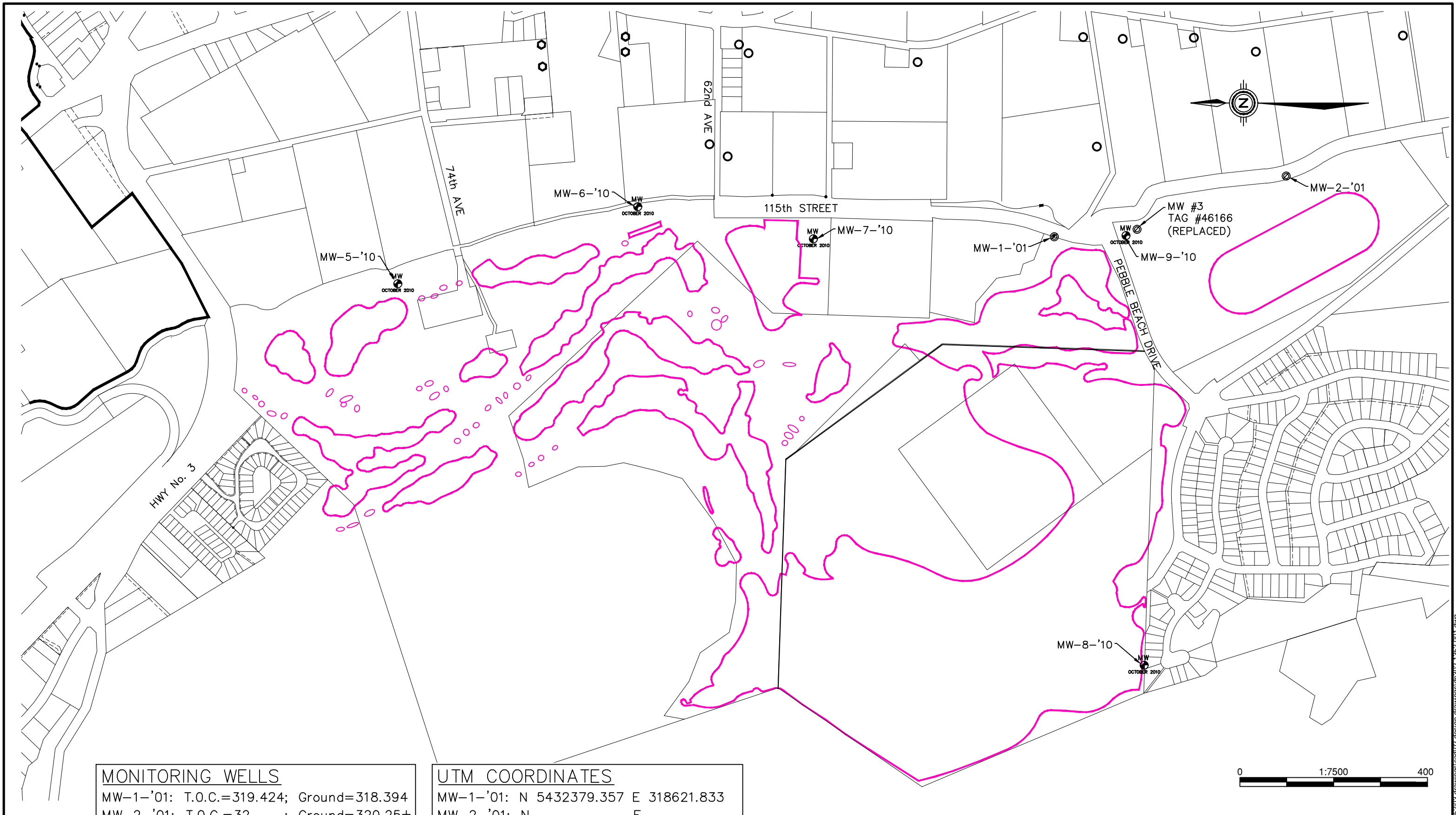
6.1.1 Monitoring Programme

The groundwater monitoring programme consists of bi-annual (May and September) monitoring of groundwater quality and monthly monitoring of water levels in the seven monitoring wells surrounding the treatment facility.

Figure 6-1 illustrates groundwater monitoring wells on the Osoyoos West Bench. Monitoring wells MW 1-'01 and MW 2-'01 represent the original wells drilled in 2001, used to monitor down gradient groundwater quality. MW-5-'10, MW-6-'10, MW-7-'10, MW-8-'10, and MW-9-'10 were drilled in 2010. Wells constructed in 2021 will be sampled in 2022 and included in subsequent annual reporting.

The location of the 7 monitoring wells is illustrated on Figure 6-1. The groundwater monitoring programme consists of the following:


- Monthly measurement of the depth to the groundwater table;
- Semi-annual (May and September) analytical sampling of:
 - Total Dissolved Phosphorus
 - Ammonia (as N)
 - Nitrate-Nitrite (as N)
 - Chloride
 - Sodium
 - Hardness



MONITORING WELLS	
MW-1-'01:	T.O.C.=319.424; Ground=318.394
MW-2-'01:	T.O.C.=32.____; Ground=320.25±
MW-5-'10:	T.O.C.=328.867; Ground=328.217
MW-6-'10:	T.O.C.=320.506; Ground=319.906
MW-7-'10:	T.O.C.=328.810; Ground=328.280
MW-8-'10:	T.O.C.=372.078; Ground=371.498
MW-9-'10:	T.O.C.=320.190; Ground=319.420

UTM COORDINATES	
MW-1-'01:	N 5432379.357 E 318621.833
MW-2-'01:	N _____ E _____
MW-5-'10:	N 5433779.638 E 318521.980
MW-6-'10:	N 5433267.733 E 318686.135
MW-7-'10:	N 5432893.203 E 318617.742
MW-8-'10:	N 5432187.920 E 317707.195
MW-9-'10:	N 5432226.168 E 318624.341


 Canada's warmest welcome™
GOLF COURSE AREA
GROUNDWATER MONITORING WELLS

	DESIGN BY: NA
	SCALE: 1:7500 (11x17)
DRAWN BY: DL	DWG NO.: FIGURE
DATE: March 2018	6-1
	REV:

FILE: C:\GIS\PROJECTS\2018\201803\20180301\20180301.dwg

6.1.2 Groundwater Monitoring Data

Two of the seven wells (MW-02-'01 and MW-06-'10) were dry as of the year of 2011. In June 2013, groundwater in MW-02-'01 was once again observed and thus measured. Monthly depth to groundwater levels are measured in each monitoring well.

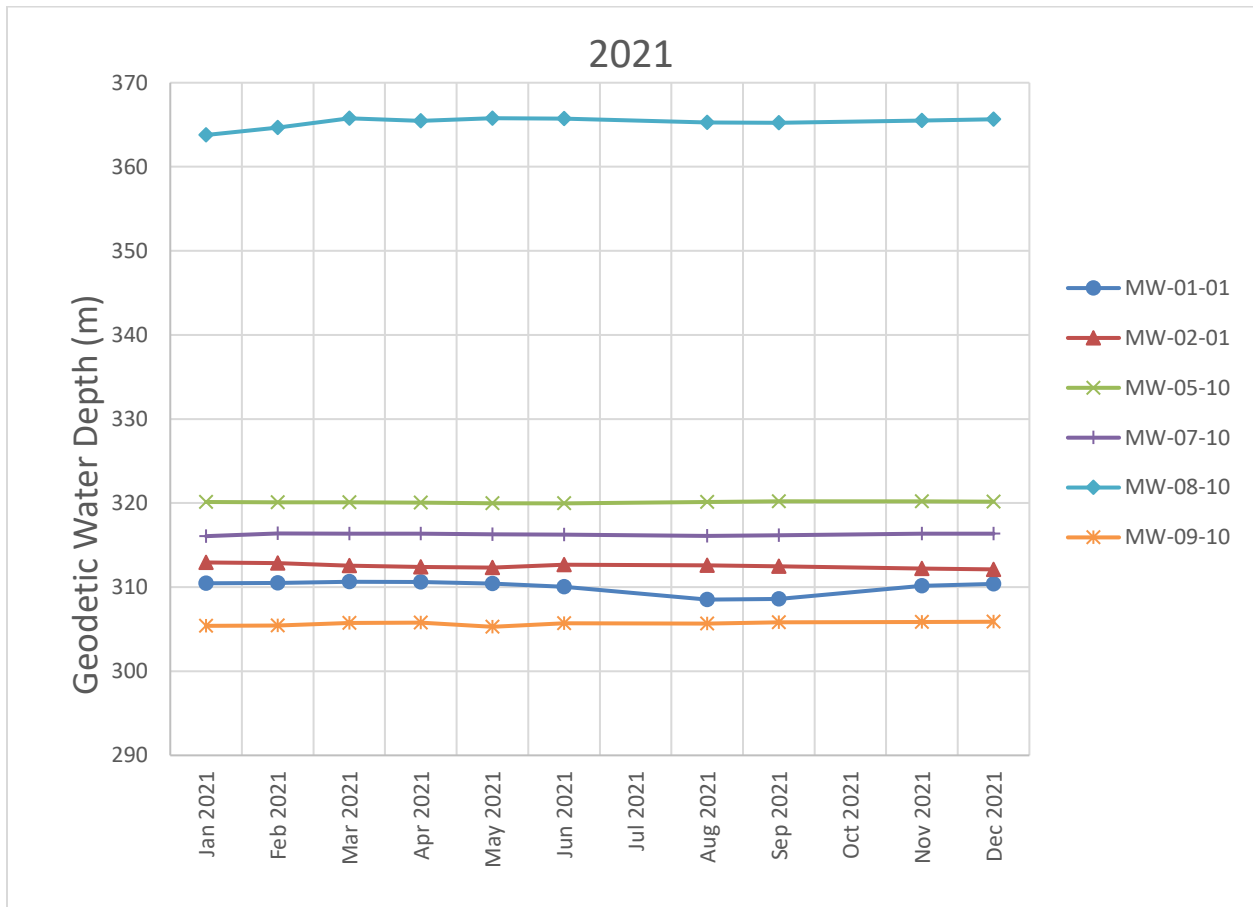


FIGURE 6-2: DEPTH TO GROUNDWATER IN MONITORING WELLS – GOLF COURSE AREA – 2021

As depicted in the above plot of the geodetic levels recorded over 2021, the depth to groundwater is relatively constant.

The analytical results for the five wells with sufficient groundwater to sample are summarized in the following table. The complete analytical reports for each well can be found in Appendix G.

TABLE 6-1: 2021 GROUNDWATER MONITORING WELL DATA

Analysis Parameter	MW-1-01		MW-5-10	
Date	(2021) Apr. 20*†	-	(2021) Apr. 20*†	-
Total Dissolved Phosphorus	0.0117	-	0.0163	-
Ammonia as N	<0.050	-	<0.050	-
Nitrate+nitrite as N	<0.0200	-	7.4	-
Chloride	13.9	-	195	-
Sodium	40.8	-	101.0	-
Total Hardness (as CaCO₃)	607	-	525	-

Analysis Parameter	MW-7-10		MW-8-10 (Up Gradient)		MW-9-10	
Date	(2021) Apr. 20*†	-	(2021) Apr. 20*†	-	(2021) Apr. 20*†	-
Total Dissolved Phosphorus	0.0167	-	0.0087	-	0.0695	-
Ammonia as N	<0.050	-	<0.050	-	0.115	-
Nitrate+nitrite as N	0.112	-	2.76	-	0.121	-
Chloride	4.77	-	31.7	-	1.78	-
Sodium	14.8	-	51.3	-	16.6	-
Total Hardness (as CaCO₃)	573	-	1640	-	144	-

*The sample has been filtered for TDP in the laboratory. Results may not reflect conditions at the time of sampling.

†Sample has been preserved for TDP in the laboratory and the holding time has been extended.

6.2 Groundwater Monitoring Program Review

In May 2019 a hydrogeological review of the Town's reclaimed wastewater irrigation and disposal system environmental monitoring program was completed by Western Water Associates Ltd. (WWAL). This report consisted of all available data up to and including 2017. An update to this report with data collected in 2018 and 2019 was completed in 2020. The updated 2020 report included the following conclusions and recommendations:

- Continued monitoring of water levels and bi-annual sampling at the wells currently being sampled;
- Consider sampling the low flow monitoring wells (MW-2-'01 and MW-6-'10) using low flow sampling techniques (peristaltic or bladder pump);
- Installation and monitoring of two new high priority wells and one new low priority well;
- Detailed review of historical land use in the vicinity of MW-5-'10 in order to identify potential reasons for anomalous quality results;
- Addition of chloride and sodium analysis of reclaimed water at EMS sampling site E207444.

The 2021 data is consistent with previous historic trends and these conclusions remain relevant. The full WWA report is included in Appendix H of this report.

7.0 Operator Certification

The Town of Osoyoos is a Municipal Wastewater Treatment Class I (MWWT-I) facility under the Environmental Operators Certification Program (Facility #243). This classification was renewed in 2018. In compliance with OC Section 3.8, operator certification is summarized as follows:

Frank Zandvliet (#5657)	Wastewater Collection Level II Water Distribution Level I Municipal Wastewater Treatment Level I
David Stene (#6851)	Wastewater Collection Level I Multi Utility Operator Level II Municipal Wastewater Treatment Level I
Karl Fichter (#6840)	Wastewater Collection Level I Multi Utility Operator Level II Municipal Wastewater Treatment Level I

8.0 Facility Inspection Update

The Ministry of Environment completed an inspection of the wastewater treatment facility and review of the associated Operation Certificate ME-12214 on July 19, 2018. A warning letter was received on July 26, 2018. Table 8-1 provides a summary of non-compliance items and remedial actions completed by the Town to date.

TABLE 8-1 2018 NON-COMPLIANCE ITEMS

OC Section	Non-Compliance	Remedial Action
1.2	BOD ₅ and TSS exceedances of effluent discharged from Cell #3	New aeration system installed and desludging of Cell #3 in 2018.
3.2	Cell #3 was bypassed during de-sludging, liner replacement and new aeration system installation w/o MoE approval.	A notice was issued by TRUE to the Ministry on January 18, 2017 regarding liner replacement in aerated lagoon Cell #3.
3.6.2	Copy of Operation and Maintenance Manual	The Town has completed the updated O&M Manual for the sewage treatment, reclaimed wastewater utilization and infiltration works. This will be submitted the environmental compliance reporting inbox as a separated document due to size.
3.7	Facility classification expiry August 1, 2018.	The Town renewed the facility classification with EOCP.
3.8	2016 Annual Report did not list current certified operators.	Current certified operators were included in the 2018, 2019, and 2020 Annual Reports and provided in Section 7.0 of the 2021 Annual Report.
3.15.1	No signage containing emergency phone numbers observed at entrance of treatment plant site.	Signage has been installed.
3.15.2	No signage describing contents of reservoir.	Signage has been installed.
3.17	Outline Spill Procedures in Contingency Plan and submit to Ministry.	The Town will undertake preparation of a Contingency Plan with Spill Procedures.
3.20	No Sludge Management Plan.	A Sludge Management Plan was prepared in 2019 and is included in Appendix H of the 2018 Annual Report.
4.1.2, 5.5.3	No weekly chlorine residual sampling.	Daily chlorine residual measurements are included in Appendix F of this report. It is the recommendation of TRUE that the Town proceed with installation of an in-line analyzer.
4.2.1	Irrigation occurred in December 2016.	Reclaimed water irrigation ended in October 2021 in accordance with the period specified by their Permit (Mar. 15 th to Nov. 15 th). The High School booster station was switched over to the 9A water supply.
5.1.2	Daily flows for Desert Park Lift Station required.	Connection to SCADA for purpose of daily data collection was completed in 2019.

OC Section	Non-Compliance	Remedial Action
5.7.3	Ground and Surface Water Monitoring Program to be reviewed by a suitably qualified Professional Engineer (or Hydrogeologist).	The Town retained Western Water Associated Ltd. to complete a hydrological review of the reclaimed wastewater irrigation and disposal system monitoring programme and review of annual reports. Two new monitoring well installations were completed in 2021 and the final is scheduled in 2022. The Town has retained the 2021 ground and surface water monitoring programme data. This will be submitted as an addendum to this report.
7.1.3	Electronic reporting of daily flow at Legion Beach and Desert Park Lift stations not being uploaded to EMS.	The Town is to confirm that this is being done correctly.
7.2.3	Annual Report submission late in 2017 and 2018.	Town to submit 2022 Annual Report on time prior to 90 day deadline on March 30 th .
7.2.4.8	Frequency and volumes of sludge removal to be included in annual report.	This has been included in Section 4.1 of the Annual Report.

9.0 Capital Project Budget 2022

The town has the following capital projects anticipated for 2022:

- Complete decommissioning of the old Main Lift Station.
- Replacement of the Gala Lift Station.
- Preparation of a Capital and Asset Management Plan.
- Continue working on odor problems with Biomax application in sewer forcemains.

APPENDIX A

Influent Flow Summaries (OC 7.2.4.10)

Osoyoos Lift Stations

Date	Golf		Flow m3
	Pump 1 HOURS	Pump 2 HOURS	
1-Jan-21	1.279999	1.549999	150.5372
2-Jan-21	1.069999	1.259999	122.6685
3-Jan-21	0.989999	1.349999	120.8605
4-Jan-21	1.269999	1.539999	141.6394
5-Jan-21	1.069999	1.109999	110.6028
6-Jan-21	0.989999	1.259999	123.9308
7-Jan-21	0.969999	1.159999	116.2057
8-Jan-21	0.919999	1.249999	116.3256
9-Jan-21	1.029999	1.229999	124.536
10-Jan-21	1.009999	1.309999	120.5288
11-Jan-21	1.069999	1.449999	128.1757
12-Jan-21	1.099999	1.369999	129.2702
13-Jan-21	0.949999	1.349999	113.602
14-Jan-21	0.959999	1.169999	115.9916
15-Jan-21	1.009999	1.379999	119.6225
16-Jan-21	1.029999	1.579999	123.424
17-Jan-21	1.089999	1.569999	132.2584
18-Jan-21	1.049999	1.499999	126.0264
19-Jan-21	1.009999	1.319999	119.093
20-Jan-21	1.029999	1.469999	121.9239
21-Jan-21	1.069999	1.309999	124.1674
22-Jan-21	1.009999	1.419999	121.8595
23-Jan-21	1.009999	1.409999	124.3167
24-Jan-21	1.109999	1.499999	133.7474
25-Jan-21	1.049999	1.269999	124.2117
26-Jan-21	0.949999	1.439999	119.3981
27-Jan-21	1.089999	1.409999	127.5948
28-Jan-21	1.069999	1.279999	123.9559
29-Jan-21	1.029999	1.459999	124.4015
30-Jan-21	1.009999	1.629999	126.3005
31-Jan-21	1.229999	1.809999	149.8611
Total	32.52998	43.11997	3877.038
Average	1.049354	1.390967	125.0657
Min	0.919999	1.109999	110.6028
Max	1.279999	1.809999	150.5372

Osoyoos Lift Stations

Date	Golf		Flow m3
	Pump 1 HOURS	Pump 2 HOURS	
1-Feb-21	1.229999	1.749999	146.9963
2-Feb-21	1.119999	1.319999	128.0649
3-Feb-21	1.029999	1.249999	121.3927
4-Feb-21	0.989999	1.329999	120.7433
5-Feb-21	1.069999	1.349999	126.0717
6-Feb-21	1.029999	1.379999	126.8069
7-Feb-21	1.169999	1.529999	140.15
8-Feb-21	1.069999	1.269999	128.533
9-Feb-21	1.049999	1.299999	126.3543
10-Feb-21	1.049999	1.469999	132.2891
11-Feb-21	1.089999	1.329999	133.0767
12-Feb-21	1.049999	1.329999	129.044
13-Feb-21	1.189999	1.389999	137.2644
14-Feb-21	1.109999	1.539999	135.1024
15-Feb-21	1.129999	1.499999	133.6197
16-Feb-21	1.129999	1.599999	135.1367
17-Feb-21	1.059999	1.469999	127.9547
18-Feb-21	1.149999	1.369999	131.5768
19-Feb-21	1.069999	1.369999	129.5712
20-Feb-21	1.199999	1.659999	144.1181
21-Feb-21	1.269999	1.659999	150.1845
22-Feb-21	1.189999	1.719999	144.1055
23-Feb-21	0.989999	1.369999	118.7341
24-Feb-21	1.089999	1.369999	125.8613
25-Feb-21	1.049999	1.299999	126.5078
26-Feb-21	1.049999	1.419999	124.6939
27-Feb-21	1.089999	1.559999	131.8415
28-Feb-21	1.149999	1.589999	141.5145
1-Mar-21	1.169999	1.349999	130.5123
	0.989999	1.349999	124.4082
	1.029999	1.459999	127.156
Total	34.05998	44.65997	4079.386
Average	1.098709	1.440644	131.5931
Min	0.989999	1.249999	118.7341
Max	1.269999	1.749999	150.1845

Osoyoos Lift Stations

Date	Golf		Flow m3
	Pump 1 HOURS	Pump 2 HOURS	
2-Mar-21	0.989999	1.349999	124.4082
3-Mar-21	1.029999	1.459999	127.156
4-Mar-21	1.089999	1.319999	124.7604
5-Mar-21	1.099999	1.379999	126.933
6-Mar-21	1.059999	1.559999	130.497
7-Mar-21	1.139999	1.559999	137.1809
8-Mar-21	1.069999	1.449999	131.186
9-Mar-21	1.029999	1.359999	123.5799
10-Mar-21	1.069999	1.509999	128.8833
11-Mar-21	1.029999	1.329999	123.8746
12-Mar-21	1.089999	1.279999	123.7995
13-Mar-21	1.109999	1.589999	132.4985
14-Mar-21	1.149999	1.629999	138.8305
15-Mar-21	1.149999	1.629999	138.8305
16-Mar-21	1.139999	1.529999	136.8516
17-Mar-21	1.129999	1.399999	131.8065
18-Mar-21	1.189999	1.419999	137.3516
19-Mar-21	1.189999	1.529999	137.3516
20-Mar-21	1.189999	1.609842	140.8831
21-Mar-21	1.189999	1.769999	142.8288
22-Mar-21	1.189999	1.769999	143.6821
23-Mar-21	1.189999	1.659999	143.6821
24-Mar-21	1.149999	1.569999	138.723
25-Mar-21	1.169999	1.569999	132.1108
26-Mar-21	1.169999	1.429999	134.339
27-Mar-21	1.169999	1.449999	139.6448
28-Mar-21	1.319999	1.619999	151.8085
29-Mar-21	1.319999	1.619999	151.8085
30-Mar-21	1.239999	1.529999	141.603
31-Mar-21	1.209999	1.529999	141.2641
1-Apr-21	1.209999	1.529999	141.9143
Total	35.47998	46.94981	4200.072
Average	1.144515	1.51451	135.4862
Min	0.989999	1.279999	123.5799
Max	1.319999	1.769999	151.8085

Osoyoos Lift Stations

Date	Golf		
	Pump 1 HOURS	Pump 2 HOURS	Flow m3
2-Apr-21	1.238035	1.689999	144.7545
3-Apr-21	1.378292	1.689999	157.3068
4-Apr-21	1.379999	1.779999	161.7353
5-Apr-21	1.349999	1.779999	161.7353
6-Apr-21	1.229999	1.609999	147.4826
7-Apr-21	1.139999	1.409999	136.0107
8-Apr-21	1.129999	1.409999	136.0412
9-Apr-21	1.129999	1.409999	136.0412
10-Apr-21	1.248517	1.549999	143.9697
11-Apr-21	1.319999	1.549999	147.689
12-Apr-21	1.319999	1.589999	148.4156
13-Apr-21	1.269999	1.589999	148.4156
14-Apr-21	1.209999	1.569999	144.4564
15-Apr-21	1.209999	1.588033	146.7348
16-Apr-21	1.279999	1.669999	147.8931
17-Apr-21	1.279999	1.669999	147.8931
18-Apr-21	1.209999	1.589999	141.3882
19-Apr-21	1.179999	1.629999	141.3882
20-Apr-21	1.219999	1.629999	140.1799
21-Apr-21	1.219999	1.569999	140.1799
22-Apr-21	1.119999	1.539999	133.0317
23-Apr-21	1.119999	1.609999	133.5124
24-Apr-21	1.189999	1.669999	145.0179
25-Apr-21	1.309999	1.769999	155.845
26-Apr-21	1.309999	1.769999	155.845
27-Apr-21	1.089999	1.629999	134.2658
28-Apr-21	1.269999	1.629999	143.4223
29-Apr-21	1.269999	1.559999	143.4223
30-Apr-21	1.189999	1.535459	142.3864
1-May-21	1.239999	1.669999	149.0413
2-May-21	1.239999	1.669999	149.0413
Total	38.29482	50.03346	4504.543
Average	1.235317	1.613982	145.3078
Min	1.089999	1.409999	133.0317
Max	1.379999	1.779999	161.7353

Osoyoos Lift Stations

Date	Golf		
	Pump 1 HOURS	Pump 2 HOURS	Flow m3
2-May-21			
3-May-21	1.239999	1.669999	149.0413
4-May-21	1.239999	1.649999	150.8764
5-May-21	1.209999	1.539999	145.4172
6-May-21	1.129999	1.529999	137.126
7-May-21	1.129999	1.559999	137.126
8-May-21	1.109999	1.559999	135.8783
9-May-21	1.179999	1.669999	142.9507
10-May-21	1.179999	1.669999	142.9507
11-May-21	1.149999	1.649999	139.5112
12-May-21	1.109999	1.539999	138.2823
13-May-21	1.179999	1.56803	143.0322
14-May-21	1.179999	1.639999	145.2721
15-May-21	1.189999	1.639999	144.1136
16-May-21	1.259999	1.749999	154.7019
17-May-21	1.259999	1.749999	154.7019
18-May-21	1.219999	1.669999	152.0402
19-May-21	1.169999	1.519999	140.0416
20-May-21	1.169999	1.489999	140.0416
21-May-21	1.159999	1.489999	140.5268
22-May-21	1.289999	1.679999	145.1869
23-May-21	1.289999	1.713749	147.5262
24-May-21	1.269999	1.729999	148.6234
25-May-21	1.289999	1.979998	160.9815
26-May-21	1.289999	1.979998	160.9815
27-May-21	1.749999	2.409998	147.5501
28-May-21	1.749999	2.409998	134.4098
29-May-21	1.129999	1.559999	139.535
30-May-21	1.129999	1.768474	139.9654
31-May-21	1.249999	1.848764	154.8985
1-Jun-21	1.249999	1.869999	156.986
2-Jun-21	1.159999	1.699999	141.2463
Total	38.31997	53.20898	4511.523
Average	1.236128	1.716419	145.533
Min	1.109999	1.489999	134.4098
Max	1.749999	2.409998	160.9815

Osoyoos Lift Stations

Date	Golf		Flow m3
	Pump 1 HOURS	Pump 2 HOURS	
2-Jun-21			
3-Jun-21	1.159999	1.799999	138.8691
4-Jun-21	1.149999	1.799999	140.9499
5-Jun-21	1.199999	1.629999	139.8563
6-Jun-21	1.199999	1.799999	148.4307
7-Jun-21	1.239273	1.799999	149.3804
8-Jun-21	1.339999	1.979998	166.9367
9-Jun-21	1.339999	1.979998	166.9367
10-Jun-21	1.185698	1.699999	141.2408
11-Jun-21	1.189999	1.559999	142.4097
12-Jun-21	1.139999	1.799999	137.6508
13-Jun-21	1.269999	1.799999	147.9192
14-Jun-21	1.269999	1.729999	153.5019
15-Jun-21	1.269999	1.729999	153.5019
16-Jun-21	1.259999	1.929999	158.9825
17-Jun-21	1.259999	1.929999	159.0122
18-Jun-21	1.249999	1.479999	143.6703
19-Jun-21	1.259999	1.469999	139.6479
20-Jun-21	1.279999	1.669999	154.161
21-Jun-21	1.319999	1.669999	154.161
22-Jun-21	1.319999	1.499999	151.6792
23-Jun-21	1.169999	1.439999	141.4161
24-Jun-21	1.259999	1.379999	135.1261
25-Jun-21	1.259999	1.389999	138.9932
26-Jun-21	1.229999	1.389999	138.9932
27-Jun-21	1.264285	1.339999	141.7454
28-Jun-21	1.319999	1.469999	149.5307
29-Jun-21	1.323502	1.499999	151.6912
30-Jun-21	1.329999	1.569999	152.8135
1-Jul-21	1.389999	1.569999	156.4147
2-Jul-21	1.429999	1.549999	158.3004
3-Jul-21	1.489999	1.629999	168.3688
Total	39.37273	50.98996	4622.292
Average	1.270088	1.644837	149.1062
Min	1.139999	1.339999	135.1261
Max	1.489999	1.979998	168.3688

Osoyoos Lift Stations

Date	Golf		
	Pump 1 HOURS	Pump 2 HOURS	Flow m3
2-Jul-21	1.489999	1.629999	168.3688
3-Jul-21	1.489999	1.629999	168.3688
4-Jul-21	1.469999	1.609999	165.0637
5-Jul-21	1.409999	1.609999	159.8836
6-Jul-21	1.279999	1.599999	155.7905
7-Jul-21	1.237735	1.599999	146.182
8-Jul-21	1.259999	1.739999	148.9471
9-Jul-21	1.259999	1.739999	148.9471
10-Jul-21	1.329999	1.649999	156.0807
11-Jul-21	1.329999	1.649999	156.0807
12-Jul-21	1.329999	1.739999	153.8681
13-Jul-21	1.389999	1.739999	151.4566
14-Jul-21	1.389999	1.679999	157.3439
15-Jul-21	1.399999	1.707271	159.3751
16-Jul-21	1.399999	1.729999	161.561
17-Jul-21	1.249999	1.709999	149.1101
18-Jul-21	1.269999	1.709999	151.4561
19-Jul-21	2.509998	2.736359	149.1777
20-Jul-21	2.509998	2.759998	146.8414
21-Jul-21	1.219999	1.739999	151.2934
22-Jul-21	1.289999	1.795593	157.4529
23-Jul-21	1.329999	1.859999	163.171
24-Jul-21	1.369999	1.859999	163.171
25-Jul-21	1.369999	1.669999	154.6865
26-Jul-21	1.239999	1.649999	146.9336
27-Jul-21	1.269999	1.649999	148.2573
28-Jul-21	1.389999	1.819278	154.6115
29-Jul-21	1.389999	1.989518	155.8363
30-Jul-21	1.309999	2.009999	152.1317
31-Jul-21	1.309999	1.757564	147.9569
1-Aug-21	1.369999	1.759999	152.3514
Total	43.86771	55.53555	4801.757
Average	1.415087	1.791469	154.8954
Min	1.219999	1.599999	146.182
Max	2.509998	2.759998	168.3688

Osoyoos Lift Stations

Date	Golf		Flow m3
	Pump 1 HOURS	Pump 2 HOURS	
2-Aug-21	1.369999	1.669999	153.6529
3-Aug-21	1.529999	1.609251	150.7267
4-Aug-21	1.529999	1.609999	152.2285
5-Aug-21	1.349999	1.557355	152.2285
6-Aug-21	1.369999	1.644397	154.2489
7-Aug-21	1.369999	1.649999	155.5812
8-Aug-21	1.329999	1.596348	150.664
9-Aug-21	1.388049	1.699999	154.3705
10-Aug-21	1.389999	1.699999	155.7227
11-Aug-21	1.379999	1.669999	155.4372
12-Aug-21	2.154824	3.329997	264.7081
13-Aug-21	2.176481	3.329997	268.3475
14-Aug-21	2.179998	3.259997	269.5392
15-Aug-21	1.292431	1.599999	145.4533
16-Aug-21	1.299999	1.599999	146.8022
17-Aug-21	1.269999	1.479999	140.6643
18-Aug-21	1.335622	1.529999	145.5852
19-Aug-21	1.339999	1.529999	147.0103
20-Aug-21	1.329999	1.555175	146.4581
21-Aug-21	1.309999	1.584033	145.5493
22-Aug-21	1.402543	1.709999	153.6211
23-Aug-21	1.449999	1.769999	158.8084
24-Aug-21	1.449999	1.769999	158.8084
25-Aug-21	1.279999	1.649999	140.0459
26-Aug-21	1.288116	1.629999	141.5701
27-Aug-21	1.289999	1.629999	142.9568
28-Aug-21	1.338918	1.589999	144.9515
29-Aug-21	1.339999	1.589999	147.1231
30-Aug-21	1.339999	1.599999	150.9364
31-Aug-21	1.348326	1.709999	152.3241
1-Sep-21	1.349999	1.709999	148.0789
Total	44.57529	55.56652	4994.203
Average	1.437913	1.792468	161.1033
Min	1.269999	1.479999	140.0459
Max	2.179998	3.329997	269.5392

Osoyoos Lift Stations

Date	Golf		
	Pump 1 HOURS	Pump 2 HOURS	Flow m3
2-Sep-21	1.409999	1.549999	148.4254
3-Sep-21	1.409999	1.544399	149.7805
4-Sep-21	1.369999	1.719999	153.6548
5-Sep-21	1.599999	1.986497	180.9476
6-Sep-21	1.599999	1.989998	182.175
7-Sep-21	1.369999	1.709999	153.8799
8-Sep-21	1.209999	1.559999	139.0776
9-Sep-21	1.269999	1.349999	135.7046
10-Sep-21	1.343713	1.469999	147.2039
11-Sep-21	1.369999	1.499999	148.53
12-Sep-21	1.289999	1.499999	145.0109
13-Sep-21	1.289999	1.459999	146.2951
14-Sep-21	1.199999	1.419999	137.6853
15-Sep-21	1.209999	1.379999	134.6223
16-Sep-21	1.249999	1.389999	140.8198
17-Sep-21	1.249999	1.389999	140.8256
18-Sep-21	1.239999	1.359999	141.2569
19-Sep-21	1.319999	1.539999	154.0549
20-Sep-21	1.319999	1.539999	154.0549
21-Sep-21	1.229999	1.418359	143.9676
22-Sep-21	1.229999	1.439999	145.6184
23-Sep-21	1.189999	1.429999	138.1363
24-Sep-21	1.169999	1.409999	137.671
25-Sep-21	1.239999	1.439999	139.3649
26-Sep-21	1.239999	1.509999	142.4955
27-Sep-21	1.508066	2.109998	179.3689
28-Sep-21	1.529999	2.109998	180.9935
29-Sep-21	1.239999	1.439912	141.7516
30-Sep-21	1.239999	1.499999	143.3825
1-Oct-21	1.189999	1.599999	138.6236
2-Oct-21	1.199999	1.599999	139.8203
Total	40.53175	48.36914	4605.199
Average	1.307476	1.560295	148.5548
Min	1.169999	1.349999	134.6223
Max	1.599999	2.109998	182.175

Osoyoos Lift Stations

Date	Golf		
	Pump 1 HOURS	Pump 2 HOURS	Flow m3
2-Oct-21	1.199999	1.599999	139.8203
3-Oct-21	1.209999	1.456014	139.8203
4-Oct-21	1.209999	1.459999	138.9586
5-Oct-21	1.199999	1.389999	136.5541
6-Oct-21	1.189999	1.369999	136.8873
7-Oct-21	1.189999	1.369999	137.3202
8-Oct-21	1.229999	1.355739	136.7708
9-Oct-21	1.259999	1.394171	140.7515
10-Oct-21	1.316635	1.539999	149.7792
11-Oct-21	1.409999	1.789999	165.0246
12-Oct-21	1.409999	1.789999	165.0246
13-Oct-21	1.339999	1.689999	154.609
14-Oct-21	1.339999	1.689999	154.609
15-Oct-21	1.244876	1.469999	144.1568
16-Oct-21	1.249999	1.979998	154.424
17-Oct-21	1.259999	1.979998	156.0553
18-Oct-21	1.559999	1.409999	139.2489
19-Oct-21	1.559999	1.409999	139.2489
20-Oct-21	1.509999	1.489999	138.9094
21-Oct-21	1.598364	1.489999	142.9355
22-Oct-21	1.979998	1.726451	174.6248
23-Oct-21	1.979998	1.729999	176.2203
24-Oct-21	2.029999	1.926223	174.2988
25-Oct-21	2.029999	1.949998	175.9583
26-Oct-21	1.619999	1.349999	135.4825
27-Oct-21	1.689999	1.389999	138.5251
28-Oct-21	1.689999	1.389999	138.5251
29-Oct-21	1.589999	1.389999	138.1455
30-Oct-21	1.539999	1.449999	137.8192
31-Oct-21	1.529999	1.449999	138.361
1-Nov-21	1.529999	1.429999	138.361
Total	45.69985	48.30857	4577.23
Average	1.474189	1.558341	147.6526
Min	1.189999	1.349999	135.4825
Max	2.029999	1.979998	176.2203

Osoyoos Lift Stations

Date	Golf		Flow m3
	Pump 1 HOURS	Pump 2 HOURS	
2-Nov-21	1.529999	1.329262	135.1223
3-Nov-21	1.529999	1.329999	136.8327
4-Nov-21	1.529999	1.249999	133.5486
5-Nov-21	1.479999	1.269999	130.1195
6-Nov-21	1.519999	1.38722	139.6063
7-Nov-21	1.519999	1.699999	141.9649
8-Nov-21	1.519999	1.869999	140.252
9-Nov-21	1.489999	2.029999	137.6998
10-Nov-21	1.509999	1.959998	133.7305
11-Nov-21	1.609999	1.889999	138.4693
12-Nov-21	1.499999	1.539999	132.9137
13-Nov-21	1.529999	1.689999	139.3278
14-Nov-21	1.389999	1.489999	121.1765
15-Nov-21	1.309999	1.349999	115.4591
16-Nov-21	1.269999	1.329999	113.0713
17-Nov-21	1.389999	1.369999	119.4346
18-Nov-21	1.469999	1.789999	131.69
19-Nov-21	1.489999	1.769999	129.4873
20-Nov-21	1.609999	1.669999	135.9446
21-Nov-21	1.469999	1.589999	127.5351
22-Nov-21	1.509999	2.229998	137.1468
23-Nov-21	1.429999	1.879999	130.1725
24-Nov-21	1.469999	1.549999	127.1539
25-Nov-21	1.409999	1.389999	118.8744
26-Nov-21	1.329999	1.429999	119.3232
27-Nov-21	1.389999	1.549999	127.8116
28-Nov-21	1.409999	1.549999	130.6589
29-Nov-21	1.449999	1.529999	131.905
30-Nov-21	1.449999	1.529999	131.8798
1-Dec-21	1.409999	1.389999	123.7678
2-Dec-21	1.269999	1.349999	123.1602
Total	45.19997	48.98645	4035.24
Average	1.458063	1.580208	130.169
Min	1.269999	1.249999	113.0713
Max	1.609999	2.229998	141.9649

Osoyoos Lift Stations

Date	Golf		Flow m3
	Pump 1 HOURS	Pump 2 HOURS	
2-Dec-21	1.269999	1.349999	123.1602
3-Dec-21	1.149999	1.369999	119.9914
4-Dec-21	1.369999	1.569999	131.6306
5-Dec-21	1.369999	1.529999	131.1076
6-Dec-21	1.299999	1.489999	128.3024
7-Dec-21	1.329999	1.489999	129.0326
8-Dec-21	1.469999	1.429999	130.859
9-Dec-21	1.189999	1.509999	117.0633
10-Dec-21	1.169999	1.349999	111.1568
11-Dec-21	1.459999	1.549999	136.0547
12-Dec-21	1.349999	1.329999	119.4796
13-Dec-21	1.379999	1.589999	125.7065
14-Dec-21	1.429999	1.729999	133.3346
15-Dec-21	1.439999	1.529999	130.2564
16-Dec-21	1.489999	1.459999	128.5026
17-Dec-21	1.459999	1.559999	128.4373
18-Dec-21	1.489999	1.579999	131.6053
19-Dec-21	1.689999	1.439999	134.6197
20-Dec-21	1.389999	1.559999	129.1098
21-Dec-21	1.229999	1.479999	116.6877
22-Dec-21	1.309999	1.369999	118.0459
23-Dec-21	1.429999	1.529999	127.5102
24-Dec-21	1.449999	1.669999	131.9341
25-Dec-21	1.569999	1.769999	141.1559
26-Dec-21	1.489999	1.989998	133.0992
27-Dec-21	1.509999	2.069999	143.9227
28-Dec-21	1.549999	1.869999	136.1793
29-Dec-21	1.489999	2.089998	135.8049
30-Dec-21	1.409999	1.729999	127.6469
31-Dec-21	1.749999	1.889999	143.0364

Start And E Start And E Start And End Time Must Be Supplied For This Query

Total	42.38997	47.87997	3874.433
Average	1.412999	1.595999	129.1478
Min	1.149999	1.329999	111.1568
Max	1.749999	2.089998	143.9227

Osoyoos Lift Stations														Month	Jan-19
Date	Main Lift			Smith Loveless			Northwest Sector			Robert's Point			Inkaneep Point		
	Pump 1	Pump 2	Flow	Pump 1	Pump 2	Flow	Pump 1	Pump 2	Flow	Pump 1	Pump 2	Flow	Pump 1	Pump 2	Flow
	Min	Min	m3	Min	Min	m3	Min	Min	m3	Min	Min	m3	Min	Min	m3
1-Jan-19	192.0	190.0	1746.0	78.0	84.0	409.0	18.0	15.0	24.4	29.0	34.0	43.6	31.0	28.0	113.9
2-Jan-19	203.0	198.0	1834.0	76.0	82.0	403.0	18.0	15.0	24.4	32.0	33.0	45.3	32.0	29.0	117.2
3-Jan-19	198.0	202.0	1813.0	78.0	83.0	407.0	18.0	15.0	24.4	27.0	32.0	41.1	29.0	25.0	101.5
4-Jan-19	197.0	193.0	1765.0	74.0	83.0	395.0	18.0	15.0	24.4	23.0	24.0	33.1	25.0	22.0	93.0
5-Jan-19	203.0	203.0	1853.0	78.0	81.0	407.0	18.0	15.0	24.4	24.0	29.0	36.6	25.0	24.0	100.5
6-Jan-19	206.0	195.0	1820.0	77.0	84.0	409.0	18.0	15.0	24.4	27.0	28.0	38.2	28.0	25.0	104.9
7-Jan-19	210.0	213.0	1929.0	74.0	79.0	389.0	18.0	15.0	24.4	25.0	29.0	37.9	28.0	25.0	103.5
8-Jan-19	193.0	203.0	1798.0	76.0	80.0	396.0	18.0	15.0	24.4	30.0	33.0	44.1	30.0	28.0	120.5
9-Jan-19	190.0	191.0	1743.0	76.0	83.0	404.0	18.0	15.0	24.4	31.0	33.0	44.9	33.0	30.0	126.5
10-Jan-19	193.0	203.0	1802.0	73.0	80.0	391.0	18.0	15.0	24.4	31.0	35.0	46.0	30.0	27.0	110.3
11-Jan-19	218.0	210.0	1938.0	87.0	91.0	454.0	18.0	15.0	24.4	29.0	32.0	42.4	32.0	28.0	117.4
12-Jan-19	206.0	198.0	1836.0	78.0	82.0	406.0	18.0	15.0	24.4	31.0	36.0	46.2	32.0	30.0	122.6
13-Jan-19	193.0	190.0	1726.0	75.0	82.0	400.0	18.0	15.0	24.4	30.0	35.0	45.3	32.0	28.0	112.0
14-Jan-19	213.0	208.0	1902.0	88.0	102.0	481.0	18.0	15.0	24.4	44.0	50.0	67.1	50.0	42.0	162.6
15-Jan-19	195.0	190.0	1744.0	74.0	80.0	391.0	18.0	15.0	24.4	30.0	35.0	45.2	33.0	30.0	116.9
16-Jan-19	184.0	190.0	1708.0	76.0	79.0	395.0	18.0	15.0	24.4	29.0	31.0	41.4	30.0	28.0	118.6
17-Jan-19	185.0	188.0	1708.0	69.0	77.0	374.0	18.0	15.0	24.4	28.0	31.0	40.8	30.0	27.0	119.0
18-Jan-19	194.0	200.0	1810.0	72.0	75.0	376.0	18.0	15.0	24.4	23.0	28.0	34.7	25.0	22.0	93.1
19-Jan-19	196.0	206.0	1854.0	72.0	77.0	383.0	18.0	15.0	24.4	26.0	27.0	36.3	27.0	24.0	101.3
20-Jan-19	193.0	195.0	1783.0	74.0	79.0	390.0	18.0	15.0	24.4	28.0	31.0	41.3	31.0	27.0	116.4
21-Jan-19	185.0	191.0	1721.0	81.0	85.0	426.0	18.0	15.0	24.4	27.0	30.0	38.7	28.0	27.0	106.7
22-Jan-19	199.0	207.0	1868.0	76.0	86.0	408.0	18.0	15.0	24.4	27.0	30.0	40.5	30.0	26.0	107.7
23-Jan-19	216.0	237.0	2082.0	74.0	80.0	391.0	18.0	15.0	24.4	29.0	30.0	41.2	28.0	26.0	106.5
24-Jan-19	213.0	221.0	1989.0	74.0	79.0	386.0	18.0	15.0	24.4	28.0	32.0	42.2	31.0	27.0	115.1
25-Jan-19	218.0	235.0	2078.0	71.0	76.0	376.0	18.0	15.0	24.4	28.0	31.0	40.5	28.0	27.0	107.9
26-Jan-19	228.0	246.0	2172.0	74.0	82.0	396.0	18.0	15.0	24.4	27.0	30.0	39.6	31.0	27.0	111.5
27-Jan-19	234.0	256.0	2250.0	77.0	83.0	405.0	18.0	15.0	24.4	30.0	33.0	43.4	30.0	27.0	114.8
28-Jan-19	221.0	242.0	2125.0	75.0	77.0	387.0	18.0	15.0	24.4	26.0	28.0	37.2	28.0	25.0	105.1
29-Jan-19	204.0	210.0	1919.0	83.0	89.0	436.0	18.0	15.0	24.4	29.0	32.0	42.4	32.0	29.0	123.9
30-Jan-19	180.0	192.0	1700.0	73.0	80.0	387.0	18.0	15.0	24.4	30.0	32.0	42.2	32.0	28.0	112.4
31-Jan-19	185.0	196.0	1741.0	79.0	85.0	415.0	18.0	15.0	24.4	28.0	31.0	40.6	30.0	28.0	108.4
Total	6245.0	6399.0	57757.0	2362.0	2545.0	12473.0	558.0	465.0	756.4	886.0	985.0	1300.0	941.0	846.0	3491.7
Average	201.5	206.4	1863.1	76.2	82.1	402.4	18.0	15.0	24.4	28.6	31.8	41.9	30.4	27.3	112.6
Min	180.0	188.0	1700.0	69.0	75.0	374.0	18.0	15.0	24.4	23.0	24.0	33.1	25.0	22.0	93.0
Max	234.0	256.0	2250.0	88.0	102.0	481.0	18.0	15.0	24.4	44.0	50.0	67.1	50.0	42.0	162.6

Osoyoos Lift Stations															Month	Mar-19
	Main Lift			Smith Loveless			Northwest Sector			Robert's Point			Inkaneep Point			
Date	Pump 1	Pump 2	Flow	Pump 1	Pump 2	Flow	Pump 1	Pump 2	Flow	Pump 1	Pump 2	Flow	Pump 1	Pump 2	Flow	
	Min	Min	m3	Min	Min	m3	Min	Min	m3	Min	Min	m3	Min	Min	m3	
1-Mar-19	195.0	208.0	1862.0	79.0	87.0	425.0	18.0	15.0	24.4	26.0	30.0	37.7	29.0	25.0	107.9	
2-Mar-19	205.0	213.0	1931.0	80.0	86.0	426.0	18.0	15.0	24.4	25.0	27.0	35.1	27.0	25.0	99.3	
3-Mar-19	209.0	208.0	1945.0	83.0	87.0	430.0	18.0	15.0	24.4	28.0	30.0	38.7	29.0	25.0	108.8	
4-Mar-19	219.0	199.0	1909.0	88.0	97.0	473.0	18.0	15.0	24.4	30.0	32.0	41.9	32.0	29.0	118.7	
5-Mar-19	217.0	207.0	1915.0	89.0	97.0	476.0	18.0	15.0	24.4	28.0	29.0	39.2	29.0	26.0	112.9	
6-Mar-19	213.0	205.0	1867.0	76.0	84.0	413.0	18.0	15.0	24.4	24.0	27.0	34.1	27.0	24.0	102.3	
7-Mar-19	222.0	208.0	1960.0	81.0	90.0	432.0	18.0	15.0	24.4	24.0	25.0	32.8	25.0	23.0	88.0	
8-Mar-19	226.0	216.0	2002.0	81.0	87.0	425.0	18.0	15.0	24.4	24.0	27.0	34.0	26.0	23.0	91.4	
9-Mar-19	220.0	205.0	1902.0	83.0	88.0	432.0	18.0	15.0	24.4	26.0	27.0	36.0	27.0	24.0	94.6	
10-Mar-19	214.0	210.0	1893.0	82.0	88.0	432.0	18.0	15.0	24.4	32.0	34.0	45.4	36.0	32.0	132.1	
11-Mar-19	212.0	208.0	1892.0	86.0	94.0	454.0	18.0	15.0	24.4	28.0	30.0	38.3	29.0	25.0	105.1	
12-Mar-19	207.0	200.0	1825.0	78.0	83.0	409.0	18.0	15.0	24.4	24.0	28.0	35.7	26.0	26.0	102.9	
13-Mar-19	211.0	207.0	1871.0	79.0	87.0	420.0	18.0	15.0	24.4	25.0	26.0	34.3	27.0	23.0	95.1	
14-Mar-19	231.0	214.0	1983.0	80.0	91.0	432.0	18.0	15.0	24.4	23.0	26.0	32.9	24.0	22.0	86.8	
15-Mar-19	227.0	221.0	2022.0	81.0	85.0	418.0	18.0	15.0	24.4	23.0	23.0	31.0	23.0	21.0	87.4	
16-Mar-19	232.0	219.0	2083.0	81.0	88.0	423.0	18.0	15.0	24.4	26.0	29.0	36.7	27.0	26.0	98.9	
17-Mar-19	228.0	225.0	2061.0	82.0	90.0	436.0	18.0	15.0	24.4	25.0	27.0	35.7	27.0	23.0	96.9	
18-Mar-19	215.0	213.0	1914.0	77.0	86.0	414.0	18.0	15.0	24.4	23.0	25.0	32.6	25.0	21.0	82.6	
19-Mar-19	222.0	215.0	1940.0	79.0	85.0	411.0	18.0	15.0	24.4	22.0	24.0	31.1	23.0	21.0	80.4	
20-Mar-19	220.0	214.0	1930.0	76.0	81.0	394.0	18.0	15.0	24.4	25.0	27.0	35.1	23.0	21.0	81.5	
21-Mar-19	227.0	237.0	2074.0	78.0	87.0	419.0	18.0	15.0	24.4	25.0	28.0	35.5	21.0	19.0	75.9	
22-Mar-19	229.0	224.0	2022.0	78.0	85.0	416.0	18.0	15.0	24.4	17.0	19.0	24.8	19.0	17.0	67.7	
23-Mar-19	226.0	226.0	1990.0	79.0	82.0	410.0	18.0	15.0	24.4	22.0	22.0	29.4	22.0	19.0	74.2	
24-Mar-19	242.0	215.0	1997.0	79.0	87.0	422.0	18.0	15.0	24.4	20.0	22.0	28.9	22.0	20.0	75.1	
25-Mar-19	227.0	214.0	1956.0	80.0	86.0	424.0	18.0	15.0	24.4	20.0	22.0	28.4	19.0	19.0	75.5	
26-Mar-19	227.0	211.0	1935.0	80.0	89.0	427.0	18.0	15.0	24.4	19.0	21.0	27.2	21.0	18.0	73.7	
27-Mar-19	220.0	207.0	1929.0	76.0	79.0	394.0	18.0	15.0	24.4	21.0	23.0	29.9	21.0	19.0	78.2	
28-Mar-19	235.0	225.0	2042.0	80.0	86.0	424.0	18.0	15.0	24.4	20.0	22.0	28.5	21.0	18.0	76.4	
29-Mar-19	240.0	231.0	2087.0	81.0	88.0	429.0	18.0	15.0	24.4	21.0	23.0	29.9	22.0	19.0	77.5	
30-Mar-19	244.0	222.0	2049.0	80.0	87.0	426.0	18.0	15.0	24.4	20.0	22.0	28.0	20.0	19.0	72.4	
31-Mar-19	234.0	221.0	1984.0	81.0	85.0	423.0	18.0	15.0	24.4	18.0	18.0	24.5	19.0	17.0	64.5	
Total	6896.0	6648.0	60772.0	2493.0	2702.0	13189.0	558.0	465.0	756.4	734.0	795.0	1033.3	768.0	689.0	2784.7	
Average	222.5	214.5	1960.4	80.4	87.2	425.5	18.0	15.0	24.4	23.7	25.6	33.3	24.8	22.2	89.8	
Min	195.0	199.0	1825.0	76.0	79.0	394.0	18.0	15.0	24.4	17.0	18.0	24.5	19.0	17.0	64.5	
Max	244.0	237.0	2087.0	89.0	97.0	476.0	18.0	15.0	24.4	32.0	34.0	45.4	36.0	32.0	132.1	

Osoyoos Lift Stations															Month	May-19
	Main Lift			Smith Loveless			Northwest Sector			Robert's Point			Inkaneep Point			
Date	Pump 1	Pump 2	Flow	Pump 1	Pump 2	Flow	Pump 1	Pump 2	Flow	Pump 1	Pump 2	Flow	Pump 1	Pump 2	Flow	
	Min	Min	m3	Min	Min	m3	Min	Min	m3	Min	Min	m3	Min	Min	m3	
1-May-19	225.0	214.0	1948.0	77.0	75.0	400.0	18.0	15.0	24.4	20.0	23.0	29.4	19.0	19.0	72.8	
2-May-19	219.0	203.0	1903.0	81.0	77.0	417.0	18.0	15.0	24.4	19.0	22.0	28.4	20.0	18.0	72.4	
3-May-19	235.0	217.0	2016.0	83.0	81.0	434.0	18.0	15.0	24.4	26.0	27.0	36.7	24.0	23.0	82.4	
4-May-19	235.0	227.0	2097.0	80.0	77.0	410.0	18.0	15.0	24.4	25.0	28.0	36.2	27.0	24.0	93.6	
5-May-19	246.0	213.0	2069.0	82.0	79.0	426.0	18.0	15.0	24.4	27.0	30.0	39.5	25.0	25.0	92.1	
6-May-19	211.0	206.0	1903.0	79.0	78.0	418.0	18.0	15.0	24.4	25.0	28.0	36.2	26.0	25.0	103.5	
7-May-19	231.0	219.0	2038.0	82.0	82.0	432.0	18.0	15.0	24.4	27.0	29.0	39.6	29.0	26.0	102.8	
8-May-19	220.0	210.0	1932.0	78.0	74.0	404.0	18.0	15.0	24.4	22.0	25.0	33.4	22.0	20.0	84.4	
9-May-19	237.0	199.0	1992.0	82.0	82.0	431.0	18.0	15.0	24.4	26.0	27.0	36.2	25.0	23.0	89.4	
10-May-19	246.0	200.0	2052.0	82.0	81.0	433.0	18.0	15.0	24.4	25.0	30.0	37.9	28.0	25.0	98.9	
11-May-19	250.0	219.0	2224.0	78.0	77.0	409.0	18.0	15.0	24.4	26.0	28.0	37.7	26.0	25.0	97.6	
12-May-19	234.0	204.0	2085.0	81.0	80.0	423.0	18.0	15.0	24.4	32.0	36.0	46.3	32.0	28.0	117.0	
13-May-19	223.0	195.0	1964.0	80.0	77.0	413.0	18.0	15.0	24.4	29.0	31.0	41.5	29.0	28.0	104.4	
14-May-19	217.0	196.0	1989.0	76.0	74.0	397.0	18.0	15.0	24.4	21.0	24.0	31.3	23.0	19.0	75.4	
15-May-19	216.0	206.0	2022.0	83.0	84.0	442.0	18.0	15.0	24.4	43.0	49.0	66.9	45.0	41.0	155.7	
16-May-19	231.0	237.0	2209.0	84.0	82.0	437.0	18.0	15.0	24.4	21.0	23.0	30.1	21.0	19.0	75.7	
17-May-19	246.0	242.0	2306.0	83.0	85.0	441.0	18.0	15.0	24.4	24.0	26.0	34.0	23.0	20.0	81.2	
18-May-19	258.0	268.0	2487.0	85.0	83.0	440.0	18.0	15.0	24.4	30.0	32.0	43.6	30.0	27.0	99.4	
19-May-19	257.0	269.0	2493.0	90.0	86.0	458.0	18.0	15.0	24.4	34.0	39.0	50.3	32.0	30.0	111.7	
20-May-19	254.0	265.0	2448.0	91.0	89.0	474.0	18.0	15.0	24.4	29.0	32.0	42.2	27.0	24.0	96.8	
21-May-19	230.0	248.0	2246.0	87.0	85.0	449.0	18.0	15.0	24.4	22.0	24.0	32.6	21.0	20.0	80.3	
22-May-19	263.0	174.0	2056.0	85.0	87.0	450.0	18.0	15.0	24.4	23.0	26.0	33.8	24.0	22.0	86.3	
23-May-19	249.0	208.0	2168.0	85.0	82.0	434.0	18.0	15.0	24.4	22.0	25.0	32.5	23.0	23.0	91.2	
24-May-19	255.0	207.0	2188.0	76.0	77.0	399.0	18.0	15.0	24.4	23.0	26.0	33.3	24.0	22.0	88.4	
25-May-19	288.0	219.0	2378.0	82.0	81.0	424.0	18.0	15.0	24.4	20.0	23.0	29.9	22.0	19.0	82.5	
26-May-19	280.0	213.0	2302.0	79.0	80.0	414.0	18.0	15.0	24.4	22.0	24.0	31.6	22.0	21.0	87.7	
27-May-19	267.0	208.0	2231.0	83.0	80.0	424.0	18.0	15.0	24.4	27.0	30.0	40.6	30.0	26.0	109.4	
28-May-19	248.0	202.0	2138.0	81.0	81.0	420.0	18.0	15.0	24.4	29.0	32.0	42.8	30.0	26.0	115.4	
29-May-19	231.0	201.0	2073.0	81.0	79.0	418.0	18.0	15.0	24.4	29.0	33.0	43.5	31.0	29.0	120.3	
30-May-19	241.0	202.0	2121.0	83.0	83.0	430.0	18.0	15.0	24.4	30.0	33.0	43.5	32.0	28.0	124.9	
31-May-19	266.0	220.0	2312.0	91.0	85.0	457.0	18.0	15.0	24.4	29.0	33.0	43.1	30.0	27.0	113.8	
Total	7509.0	6711.0	66390.0	2550.0	2503.0	13258.0	558.0	465.0	756.4	807.0	898.0	1184.6	822.0	752.0	3007.4	
Average	242.2	216.5	2141.6	82.3	80.7	427.7	18.0	15.0	24.4	26.0	29.0	38.2	26.5	24.3	97.0	
Min	211.0	174.0	1903.0	76.0	74.0	397.0	18.0	15.0	24.4	19.0	22.0	28.4	19.0	18.0	72.4	
Max	288.0	269.0	2493.0	91.0	89.0	474.0	18.0	15.0	24.4	43.0	49.0	66.9	45.0	41.0	155.7	

Osoyoos Lift Stations													Month	Jul-19	
Date	Main Lift			Smith Loveless			Northwest Sector			Robert's Point			Inkaneep Point		
	Pump 1	Pump 2	Flow	Pump 1	Pump 2	Flow									
	Min	Min	m3	Min	Min	m3	Min	Min	m3	Min	Min	m3	Min	Min	m3
1-Jul-19	396.0	314.0	3479.0	107.0	102.0	552.0	18.0	15.0	24.4	48.0	55.0	75.8	48.0	43.0	124.5
2-Jul-19	359.0	316.0	3329.0	103.0	99.0	538.0	18.0	15.0	24.4	41.0	45.0	60.0	43.0	34.0	119.5
3-Jul-19	311.0	292.0	2984.0	95.0	91.0	491.0	18.0	15.0	24.4	37.0	42.0	61.0	37.0	32.0	111.7
4-Jul-19	330.0	287.0	3027.0	93.0	92.0	484.0	18.0	15.0	24.4	31.0	34.0	46.4	30.0	27.0	92.8
5-Jul-19	336.0	301.0	3154.0	101.0	98.0	517.0	18.0	15.0	24.4	53.0	60.0	83.0	58.0	50.0	178.0
6-Jul-19	360.0	281.0	3078.0	95.0	92.0	481.0	18.0	15.0	24.4	31.0	36.0	46.7	30.0	27.0	116.7
7-Jul-19	318.0	288.0	2935.0	94.0	92.0	481.0	18.0	15.0	24.4	37.0	40.0	54.5	37.0	33.0	141.9
8-Jul-19	339.0	284.0	2977.0	91.0	87.0	464.0	18.0	15.0	24.4	33.0	36.0	50.0	33.0	27.0	117.4
9-Jul-19	337.0	277.0	2938.0	92.0	90.0	474.0	18.0	15.0	24.4	33.0	38.0	51.8	31.0	30.0	131.7
10-Jul-19	341.0	275.0	2968.0	101.0	96.0	512.0	18.0	15.0	24.4	31.0	33.0	46.3	32.0	28.0	114.1
11-Jul-19	329.0	276.0	2927.0	90.0	93.0	476.0	18.0	15.0	24.4	31.0	35.0	45.7	33.0	27.0	127.6
12-Jul-19	344.0	271.0	2946.0	91.0	88.0	464.0	18.0	15.0	24.4	32.0	36.0	50.2	32.0	29.0	122.4
13-Jul-19	360.0	282.0	3015.0	89.0	90.0	468.0	18.0	15.0	24.4	33.0	37.0	49.5	34.0	29.0	125.9
14-Jul-19	368.0	273.0	3020.0	94.0	96.0	489.0	18.0	15.0	24.4	36.0	42.0	56.1	38.0	33.0	142.5
15-Jul-19	317.0	277.0	2888.0	89.0	89.0	462.0	23.0	21.0	31.0	32.0	35.0	46.9	32.0	28.0	121.4
16-Jul-19	362.0	279.0	3038.0	92.0	90.0	470.0	23.0	21.0	31.0	36.0	39.0	56.8	37.0	33.0	144.7
17-Jul-19	326.0	274.0	2880.0	88.0	3452.0	467.0	23.0	21.0	31.0	32.0	36.0	47.9	32.0	28.0	124.6
18-Jul-19	328.0	280.0	2959.0	92.0	90.0	472.0	23.0	21.0	31.0	38.0	43.0	57.2	40.0	36.0	157.4
19-Jul-19	325.0	287.0	2982.0	90.0	88.0	462.0	23.0	21.0	31.0	35.0	40.0	53.4	36.0	30.0	125.6
20-Jul-19	325.0	302.0	3115.0	91.0	91.0	475.0	23.0	21.0	31.0	41.0	48.0	63.2	41.0	37.0	160.3
21-Jul-19	337.0	306.0	3179.0	91.0	92.0	473.0	23.0	21.0	31.0	48.0	52.0	75.6	45.0	40.0	171.4
22-Jul-19	395.0	300.0	3304.0	117.0	114.0	600.0	23.0	21.0	31.0	82.0	96.0	139.8	96.0	80.0	311.0
23-Jul-19	375.0	269.0	3023.0	88.0	87.0	451.0	23.0	21.0	31.0	36.0	42.0	58.4	38.0	33.0	137.9
24-Jul-19	355.0	273.0	2975.0	94.0	93.0	486.0	23.0	21.0	31.0	38.0	42.0	57.5	40.0	35.0	147.8
25-Jul-19	372.0	265.0	2951.0	89.0	88.0	460.0	23.0	21.0	31.0	35.0	40.0	53.7	35.0	30.0	127.1
26-Jul-19	410.0	269.0	3111.0	96.0	96.0	500.0	23.0	21.0	31.0	45.0	50.0	78.4	46.0	41.0	170.5
27-Jul-19	394.0	277.0	3112.0	102.0	101.0	523.0	23.0	21.0	31.0	48.0	53.0	77.5	48.0	44.0	188.0
28-Jul-19	369.0	273.0	3016.0	94.0	92.0	484.0	23.0	21.0	31.0	44.0	54.0	74.3	45.0	41.0	178.7
29-Jul-19	378.0	278.0	3073.0	98.0	101.0	514.0	23.0	21.0	31.0	62.0	70.0	115.1	67.0	59.0	267.0
30-Jul-19	411.0	264.0	3049.0	97.0	93.0	495.0	23.0	21.0	31.0	61.0	70.0	114.3	62.0	56.0	254.1
31-Jul-19	439.0	255.0	2982.0	101.0	97.0	508.0	23.0	21.0	31.0	45.0	51.0	80.9	46.0	40.0	176.7
Total	11046.0	8745.0	94414.0	2945.0	6260.0	15193.0	643.0	567.0	868.6	1265.0	1430.0	2027.9	1302.0	1140.0	4730.9
Average	356.3	282.1	3045.6	95.0	201.9	490.1	20.7	18.3	28.0	40.8	46.1	65.4	42.0	36.8	152.6
Min	311.0	255.0	2880.0	88.0	87.0	451.0	18.0	15.0	24.4	31.0	33.0	45.7	30.0	27.0	92.8
Max	439.0	316.0	3479.0	117.0	3452.0	600.0	23.0	21.0	31.0	82.0	96.0	139.8	96.0	80.0	311.0

Osoyoos Lift Stations														Month	Aug-19
	Main Lift			Smith Loveless			Northwest Sector			Robert's Point			Inkaneep Point		
Date	Pump 1	Pump 2	Flow	Pump 1	Pump 2	Flow	Pump 1	Pump 2	Flow	Pump 1	Pump 2	Flow	Pump 1	Pump 2	Flow
	Min	Min	m3	Min	Min	m3	Min	Min	m3	Min	Min	m3	Min	Min	m3
1-Aug-19	460.0	257.0	3159.0	103.0	101.0	518.0	23.0	21.0	31.0	46.0	54.0	97.6	45.0	41.0	182.3
2-Aug-19	256.0	456.0	3295.0	108.0	106.0	548.0	23.0	21.0	31.0	46.0	54.0	94.4	47.0	41.0	176.5
3-Aug-19	220.0	526.0	3435.0	107.0	108.0	553.0	23.0	21.0	31.0	52.0	58.0	91.9	51.0	45.0	189.2
4-Aug-19	255.0	495.0	3468.0	107.0	103.0	534.0	23.0	21.0	31.0	54.0	63.0	88.0	57.0	50.0	213.4
5-Aug-19	184.0	537.0	3459.0	106.0	106.0	543.0	23.0	21.0	31.0	58.0	67.0	109.3	60.0	54.0	225.9
6-Aug-19	121.0	524.0	3220.0	102.0	100.0	518.0	23.0	21.0	31.0	50.0	57.0	95.8	60.0	54.0	225.9
7-Aug-19	98.0	525.0	3146.0	95.0	95.0	485.0	23.0	21.0	31.0	43.0	51.0	83.5	46.0	39.0	174.5
8-Aug-19	101.0	515.0	3110.0	94.0	94.0	476.0	23.0	21.0	31.0	44.0	51.0	93.8	44.0	41.0	174.3
9-Aug-19	100.0	525.0	3144.0	95.0	99.0	492.0	23.0	21.0	31.0	43.0	48.0	72.7	43.0	37.0	168.6
10-Aug-19	110.0	501.0	3057.0	97.0	94.0	478.0	23.0	21.0	31.0	46.0	53.0	74.9	48.0	43.0	181.5
11-Aug-19	103.0	504.0	3028.0	95.0	94.0	480.0	23.0	21.0	31.0	44.0	50.0	66.8	48.0	40.0	173.2
12-Aug-19	97.0	490.0	2900.0	89.0	89.0	452.0	23.0	21.0	31.0	40.0	45.0	60.5	41.0	38.0	155.1
13-Aug-19	95.0	499.0	2951.0	97.0	95.0	485.0	23.0	21.0	31.0	39.0	46.0	63.4	43.0	38.0	163.6
14-Aug-19	109.0	475.0	2894.0	93.0	96.0	475.0	23.0	21.0	31.0	44.0	50.0	68.1	46.0	41.0	170.5
15-Aug-19	97.0	485.0	2907.0	91.0	86.0	448.0	23.0	21.0	31.0	40.0	46.0	67.3	45.0	39.0	172.2
16-Aug-19	94.0	496.0	2974.0	89.0	92.0	460.0	23.0	21.0	31.0	40.0	47.0	61.5	44.0	39.0	164.6
17-Aug-19	98.0	507.0	3044.0	94.0	93.0	474.0	23.0	21.0	31.0	40.0	45.0	62.4	43.0	38.0	159.6
18-Aug-19	100.0	490.0	2978.0	97.0	97.0	489.0	23.0	21.0	31.0	45.0	51.0	71.0	47.0	42.0	181.4
19-Aug-19	88.0	506.0	3000.0	99.0	96.0	495.0	23.0	21.0	31.0	41.0	45.0	68.5	43.0	39.0	165.2
20-Aug-19	89.0	480.0	2874.0	88.0	86.0	441.0	23.0	21.0	31.0	38.0	42.0	61.2	40.0	35.0	147.9
21-Aug-19	85.0	472.0	2812.0	86.0	86.0	435.0	23.0	21.0	31.0	38.0	45.0	58.7	42.0	36.0	153.1
22-Aug-19	84.0	486.0	2889.0	87.0	86.0	438.0	23.0	21.0	31.0	39.0	45.0	58.6	43.0	37.0	156.8
23-Aug-19	92.0	477.0	2867.0	90.0	92.0	456.0	23.0	21.0	31.0	36.0	41.0	53.6	38.0	34.0	142.1
24-Aug-19	89.0	498.0	2961.0	87.0	88.0	449.0	23.0	21.0	31.0	39.0	43.0	57.9	42.0	37.0	161.6
25-Aug-19	87.0	477.0	2836.0	87.0	85.0	437.0	23.0	21.0	31.0	35.0	40.0	53.4	40.0	34.0	139.2
26-Aug-19	83.0	474.0	2794.0	93.0	91.0	467.0	23.0	21.0	31.0	37.0	43.0	55.6	39.0	34.0	140.8
27-Aug-19	83.0	461.0	2738.0	109.0	105.0	547.0	23.0	21.0	31.0	81.0	95.0	131.2	101.0	81.0	294.9
28-Aug-19	80.0	473.0	2787.0	92.0	93.0	472.0	23.0	21.0	31.0	37.0	42.0	55.5	38.0	36.0	146.4
29-Aug-19	83.0	450.0	2683.0	90.0	87.0	450.0	23.0	21.0	31.0	37.0	41.0	55.0	39.0	35.0	147.2
30-Aug-19	86.0	458.0	2728.0	91.0	89.0	445.0	23.0	21.0	31.0	36.0	41.0	53.9	38.0	32.0	134.2
31-Aug-19	96.0	511.0	3044.0	95.0	93.0	462.0	23.0	21.0	31.0	44.0	50.0	66.2	45.0	42.0	179.7
Total	3823.0	15030.0	93182.0	2953.0	2925.0	14902.0	713.0	651.0	961.0	1352.0	1549.0	2252.2	1446.0	1272.0	5361.4
Average	123.3	484.8	3005.9	95.3	94.4	480.7	23.0	21.0	31.0	43.6	50.0	72.7	46.6	41.0	172.9
Min	80.0	257.0	2683.0	86.0	85.0	435.0	23.0	21.0	31.0	35.0	40.0	53.4	38.0	32.0	134.2
Max	460.0	537.0	3468.0	109.0	108.0	553.0	23.0	21.0	31.0	81.0	95.0	131.2	101.0	81.0	294.9

Osoyoos Lift Stations															Month	Oct-19
	Main Lift			Smith Loveless			Northwest Sector			Robert's Point			Inkaneep Point			
Date	Pump 1	Pump 2	Flow	Pump 1	Pump 2	Flow	Pump 1	Pump 2	Flow	Pump 1	Pump 2	Flow	Pump 1	Pump 2	Flow	
	Min	Min	m3	Min	Min	m3	Min	Min	m3	Min	Min	m3	Min	Min	m3	
1-Oct-19	71.0	344.0	2019.0	77.0	76.0	397.0	23.0	21.0	31.0	16.0	17.0	23.1	17.0	14.0	55.2	
2-Oct-19	57.0	342.0	1946.0	72.0	69.0	369.0	23.0	21.0	31.0	18.0	22.0	28.0	20.0	18.0	73.7	
3-Oct-19	62.0	338.0	1946.0	75.0	76.0	391.0	23.0	21.0	31.0	18.0	20.0	26.2	18.0	16.0	66.3	
4-Oct-19	63.0	355.0	2051.0	73.0	72.0	382.0	23.0	21.0	31.0	17.0	20.0	25.6	19.0	16.0	61.0	
5-Oct-19	60.0	355.0	2042.0	75.0	74.0	389.0	23.0	21.0	31.0	18.0	22.0	27.4	19.0	17.0	68.9	
6-Oct-19	66.0	354.0	2057.0	73.0	75.0	385.0	23.0	21.0	31.0	22.0	25.0	32.1	22.0	18.0	72.9	
7-Oct-19	70.0	367.0	2150.0	84.0	84.0	440.0	23.0	21.0	31.0	17.0	18.0	24.6	18.0	16.0	66.5	
8-Oct-19	63.0	338.0	1952.0	73.0	72.0	382.0	23.0	21.0	31.0	16.0	21.0	24.8	16.0	16.0	58.1	
9-Oct-19	64.0	351.0	2014.0	72.0	72.0	377.0	23.0	21.0	31.0	17.0	18.0	24.5	17.0	15.0	59.8	
10-Oct-19	64.0	353.0	2030.0	77.0	77.0	400.0	23.0	21.0	31.0	17.0	21.0	26.2	18.0	16.0	62.0	
11-Oct-19	64.0	359.0	2064.0	76.0	76.0	399.0	23.0	21.0	31.0	17.0	19.0	24.6	19.0	16.0	69.3	
12-Oct-19	68.0	369.0	2130.0	81.0	78.0	417.0	23.0	21.0	31.0	22.0	26.0	32.6	24.0	21.0	81.3	
13-Oct-19	63.0	362.0	2080.0	76.0	79.0	407.0	23.0	21.0	31.0	22.0	26.0	33.8	21.0	21.0	72.9	
14-Oct-19	68.0	387.0	2228.0	79.0	77.0	407.0	23.0	21.0	31.0	24.0	26.0	34.5	26.0	21.0	77.8	
15-Oct-19	61.0	342.0	1962.0	73.0	71.0	377.0	23.0	21.0	31.0	19.0	22.0	28.0	19.0	16.0	70.0	
16-Oct-19	64.0	339.0	1965.0	71.0	71.0	372.0	23.0	21.0	31.0	16.0	19.0	24.6	17.0	15.0	62.9	
17-Oct-19	60.0	342.0	1965.0	71.0	72.0	374.0	23.0	21.0	31.0	17.0	20.0	25.3	17.0	16.0	66.8	
18-Oct-19	64.0	358.0	2057.0	73.0	76.0	392.0	23.0	21.0	31.0	20.0	22.0	28.4	21.0	17.0	73.5	
19-Oct-19	64.0	356.0	2046.0	74.0	73.0	388.0	23.0	21.0	31.0	19.0	20.0	27.3	19.0	17.0	74.2	
20-Oct-19	68.0	350.0	2033.0	77.0	75.0	395.0	23.0	21.0	31.0	22.0	27.0	34.0	24.0	21.0	91.7	
21-Oct-19	58.0	345.0	1960.0	73.0	76.0	391.0	23.0	21.0	31.0	17.0	17.0	22.7	16.0	14.0	64.7	
22-Oct-19	61.0	326.0	1880.0	75.0	74.0	392.0	23.0	21.0	31.0	14.0	16.0	22.0	15.0	14.0	53.5	
23-Oct-19	61.0	322.0	1860.0	71.0	69.0	365.0	23.0	21.0	31.0	15.0	19.0	22.6	17.0	15.0	58.1	
24-Oct-19	56.0	341.0	1935.0	70.0	72.0	370.0	23.0	21.0	31.0	16.0	17.0	22.9	17.0	15.0	61.9	
25-Oct-19	61.0	326.0	1877.0	74.0	72.0	378.0	23.0	21.0	31.0	14.0	16.0	20.7	13.0	13.0	45.8	
26-Oct-19	58.0	321.0	1839.0	70.0	69.0	364.0	23.0	21.0	31.0	18.0	21.0	25.6	18.0	16.0	60.4	
27-Oct-19	59.0	323.0	1856.0	73.0	75.0	388.0	23.0	21.0	31.0	18.0	22.0	27.0	19.0	18.0	71.5	
28-Oct-19	64.0	354.0	2035.0	72.0	72.0	373.0	23.0	21.0	31.0	17.0	19.0	25.1	19.0	16.0	68.3	
29-Oct-19	55.0	310.0	1764.0	71.0	70.0	370.0	23.0	21.0	31.0	17.0	21.0	25.9	17.0	14.0	58.0	
30-Oct-19	62.0	314.0	1772.0	73.0	70.0	374.0	23.0	21.0	31.0	23.0	25.0	32.6	23.0	20.0	84.8	
31-Oct-19	55.0	302.0	1718.0	71.0	72.0	368.0	23.0	21.0	31.0	16.0	19.0	23.4	17.0	15.0	56.5	
Total	1934.0	10645.0	61233.0	2295.0	2286.0	11973.0	713.0	651.0	961.0	559.0	643.0	826.1	582.0	513.0	2068.3	
Average	62.4	343.4	1975.3	74.0	73.7	386.2	23.0	21.0	31.0	18.0	20.7	26.6	18.8	16.5	66.7	
Min	55.0	302.0	1718.0	70.0	69.0	364.0	23.0	21.0	31.0	14.0	16.0	20.7	13.0	13.0	45.8	
Max	71.0	387.0	2228.0	84.0	84.0	440.0	23.0	21.0	31.0	24.0	27.0	34.5	26.0	21.0	91.7	

Osoyoos Lift Stations															Month	Dec-19
	Main Lift			Smith Loveless			Northwest Sector			Robert's Point			Inkaneep Point			
Date	Pump 1	Pump 2	Flow	Pump 1	Pump 2	Flow	Pump 1	Pump 2	Flow	Pump 1	Pump 2	Flow	Pump 1	Pump 2	Flow	
	Min	Min	m3	Min	Min	m3	Min	Min	m3	Min	Min	m3	Min	Min	m3	
1-Dec-19	57.0	306.0	1784.0	75.0	77.0	382.0	23.0	21.0	31.0	26.0	34.0	37.6	26.0	22.0	94.9	
2-Dec-19	52.0	301.0	1735.0	80.0	80.0	404.0	23.0	21.0	31.0	36.0	54.0	59.3	42.0	37.0	137.5	
3-Dec-19	59.0	330.0	1912.0	81.0	85.0	419.0	23.0	21.0	31.0	17.0	25.0	27.5	19.0	17.0	66.7	
4-Dec-19	53.0	294.0	1713.0	73.0	71.0	363.0	23.0	21.0	31.0	20.0	26.0	29.3	22.0	18.0	70.4	
5-Dec-19	57.0	301.0	1762.0	77.0	78.0	392.0	23.0	21.0	31.0	20.0	27.0	29.8	20.0	19.0	74.2	
6-Dec-19	55.0	303.0	1760.0	83.0	86.0	430.0	23.0	21.0	31.0	16.0	22.0	24.6	18.0	14.0	62.6	
7-Dec-19	56.0	303.0	1759.0	76.0	76.0	383.0	23.0	21.0	31.0	17.0	22.0	24.5	16.0	16.0	62.7	
8-Dec-19	51.0	309.0	1766.0	80.0	77.0	401.0	23.0	21.0	31.0	20.0	25.0	28.8	17.0	15.0	58.8	
9-Dec-19	56.0	320.0	1839.0	81.0	81.0	410.0	23.0	21.0	31.0	19.0	29.0	30.4	20.0	18.0	78.5	
10-Dec-19	52.0	298.0	1715.0	73.0	77.0	382.0	23.0	21.0	31.0	20.0	27.0	30.1	22.0	20.0	78.1	
11-Dec-19	55.0	291.0	1696.0	76.0	74.0	387.0	23.0	21.0	31.0	19.0	25.0	28.3	20.0	18.0	80.0	
12-Dec-19	51.0	295.0	1701.0	76.0	78.0	388.0	23.0	21.0	31.0	18.0	24.0	26.6	19.0	16.0	65.6	
13-Dec-19	52.0	295.0	1696.0	80.0	77.0	388.0	23.0	21.0	31.0	20.0	27.0	29.5	21.0	19.0	78.0	
14-Dec-19	57.0	296.0	1738.0	77.0	80.0	388.0	23.0	21.0	31.0	19.0	25.0	28.0	19.0	19.0	68.4	
15-Dec-19	52.0	301.0	1727.0	77.0	76.0	377.0	23.0	21.0	31.0	24.0	32.0	36.4	26.0	21.0	81.7	
16-Dec-19	60.0	320.0	1868.0	80.0	80.0	397.0	23.0	21.0	31.0	23.0	27.0	31.9	23.0	19.0	83.2	
17-Dec-19	58.0	320.0	1858.0	86.0	87.0	428.0	23.0	21.0	31.0	50.0	78.0	85.8	62.0	54.0	187.0	
18-Dec-19	54.0	298.0	1722.0	78.0	82.0	401.0	23.0	21.0	31.0	24.0	28.0	34.7	26.0	22.0	90.1	
19-Dec-19	52.0	313.0	1798.0	76.0	77.0	380.0	23.0	21.0	31.0	23.0	30.0	34.0	25.0	22.0	86.3	
20-Dec-19	56.0	313.0	1812.0	83.0	84.0	410.0	23.0	21.0	31.0	23.0	28.0	32.9	25.0	22.0	86.2	
21-Dec-19	57.0	305.0	1778.0	82.0	78.0	386.0	23.0	21.0	31.0	22.0	28.0	33.0	24.0	21.0	89.5	
22-Dec-19	54.0	311.0	1795.0	84.0	80.0	391.0	23.0	21.0	31.0	23.0	29.0	33.7	25.0	22.0	89.7	
23-Dec-19	61.0	327.0	1909.0	84.0	79.0	396.0	23.0	21.0	31.0	23.0	28.0	33.8	24.0	21.0	92.4	
24-Dec-19	55.0	315.0	1814.0	101.0	90.0	463.0	23.0	21.0	31.0	22.0	28.0	32.6	23.0	22.0	86.0	
25-Dec-19	52.0	270.0	1581.0	72.0	69.0	338.0	23.0	21.0	31.0	25.0	28.0	35.5	26.0	22.0	92.9	
26-Dec-19	51.0	292.0	1683.0	80.0	72.0	368.0	23.0	21.0	31.0	25.0	30.0	36.6	25.0	23.0	91.9	
27-Dec-19	58.0	307.0	1796.0	79.0	76.0	377.0	23.0	21.0	31.0	23.0	28.0	34.2	27.0	23.0	95.3	
28-Dec-19	56.0	315.0	1821.0	83.0	76.0	386.0	23.0	21.0	31.0	26.0	30.0	36.7	25.0	23.0	94.8	
29-Dec-19	59.0	311.0	1819.0	84.0	78.0	392.0	23.0	21.0	31.0	25.0	31.0	37.6	28.0	24.0	96.5	
30-Dec-19	59.0	320.0	1860.0	86.0	78.0	393.0	23.0	21.0	31.0	25.0	28.0	35.2	26.0	23.0	91.8	
31-Dec-19	55.0	324.0	1866.0	86.0	79.0	394.0	23.0	21.0	31.0	24.0	28.0	35.3	26.0	22.0	92.4	
Total	1712.0	9504.0	55083.0	2489.0	2438.0	12194.0	713.0	651.0	961.0	717.0	931.0	1074.2	767.0	674.0	2704.1	
Average	55.2	306.6	1776.9	80.3	78.6	393.4	23.0	21.0	31.0	23.1	30.0	34.7	24.7	21.7	87.2	
Min	51.0	270.0	1581.0	72.0	69.0	338.0	23.0	21.0	31.0	16.0	22.0	24.5	16.0	14.0	58.8	
Max	61.0	330.0	1912.0	101.0	90.0	463.0	23.0	21.0	31.0	50.0	78.0	85.8	62.0	54.0	187.0	

APPENDIX B

Operational Certificate No. ME-12214

December 18, 1998

File: 76750-40/ME-12214(01)
PE-00086(02)

REGISTERED MAIL

Town of Osoyoos
PO Box 3010
Osoyoos BC V0H 1V0

Dear Ms. Elsie Lemke:

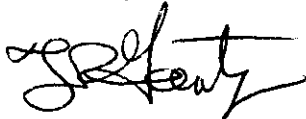
Enclosed is Operational Certificate ME-12214 issued under the provisions of the *Waste Management Act*. This Operational Certificate supercedes Permit PE-86 which is hereby cancelled in accordance with Section 18(12) of the *Waste Management Act*. Your attention is respectfully directed to the terms and conditions outlined in the Operational Certificate. An annual fee will be determined according to the *Waste Management Permit Fees Regulation*.

This Operational Certificate does not authorize entry upon, crossing over, or use for any purpose of private or Crown lands or works, unless and except as authorized by the owner of such lands or works. The responsibility for obtaining such authority shall rest with the holder of the Operational Certificate. This Operational Certificate is issued pursuant to the provisions of the *Waste Management Act*, which makes it an offence to discharge waste without proper authorization. It is also the responsibility of the holder of the Operational Certificate to ensure that all activities conducted under this authorization are carried out with regard to the rights of third parties, and comply with other applicable legislation that may be in force.

This Operational Certificate may be appealed by persons who consider themselves aggrieved by this decision in accordance with Part 7 of the *Waste Management Act*. Written notice of intent to appeal must be received by the Regional Waste Manager within thirty (30) days.

Administration of this Operational Certificate will be carried out by staff from our Regional Office located at Suite 201, 3547 Skaha Lake Road, Penticton, B.C., V2A 7K2. Plans, data and reports pertinent to the Operational Certificate are to be submitted to the Regional Waste Manager at this address.

Yours truly,



T.R. Forty, P.Eng.
Assistant Regional Waste Manager
Pollution Prevention
Southern Interior Region

Enclosure



MINISTRY OF ENVIRONMENT,
LANDS AND PARKS

OPERATIONAL CERTIFICATE

ME-12214

Under the Provisions of the Waste Management Act

TOWN OF OSOYOOS

PO BOX 3010

OSOYOOS BRITISH COLUMBIA

VOH 1VO

is authorized to discharge effluent, from a municipal sewage collection and treatment system, to the ground by irrigation and infiltration, at Osoyoos, British Columbia, subject to the conditions listed below. Contravention of any of these conditions is a violation of the Waste Management Act and may result in prosecution.

1. AUTHORIZED DISCHARGES

- 1.1.** This subsection applies to the discharge of effluent from the municipal sewage treatment facility to the reclaimed water storage reservoirs. The flow is measured at the Legion Beach Lift Station, the Environmental Monitoring (EMS) site reference number for this site is E230277 and at the Desert Park lift station EMS site reference number E232882.

T.R. Forty, P.Eng.
Assistant Regional Waste Manager

- 1.1.1. The maximum authorized rate of sewage wastes received, and therefore the maximum authorized rate of effluent to be discharged from the aerated sewage treatment lagoon system to the reclaimed water storage reservoirs, averaged on a monthly basis is the total of the flow from the Legion Beach Lift Station and the Desert Park lift station:

Year	Projection Annual Average	Projection Maximum Month Average
1997	1760 m ³ /day	2820 m ³ /day
1998	1800 m ³ /day	2880 m ³ /day
1999	1830 m ³ /day	2930 m ³ /day
2000	2030 m ³ /day	3250 m ³ /day
2001	2240 m ³ /day	3580 m ³ /day
2002	2410 m ³ /day	3860 m ³ /day
2003	2460 m ³ /day	3930 m ³ /day
2004	2510 m ³ /day	4010 m ³ /day
2005	2560 m ³ /day	4090 m ³ /day
2006	2610 m ³ /day	4170 m ³ /day
2007	2660 m ³ /day	4260 m ³ /day
2008	2720 m ³ /day	4340 m ³ /day

- 1.1.2. The authorized works are sewage collection system, sewage and effluent pumping stations, pressure forcemain, and related appurtenances approximately located as shown on Site Plan A.

- 1.1.3. The location of the sewage collection system is described generally as Osoyoos and surrounding area.

- 1.2. This subsection applies to the discharge of effluent from the aerated sewage treatment lagoon system, after Cell #3, prior to storage. The Environmental Monitoring (EMS) site reference number for this discharge is E105001.

- 1.2.1. The characteristics of the effluent discharged from the aerated sewage treatment lagoon system, after Cell #3, prior to storage, shall be equivalent to, or better than:

5 Day Biochemical Oxygen Demand	45 mg/L; and
Total Suspended Solids	60 mg/L.



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Assistant Regional Waste Manager

- 1.2.2. The authorized works are aerated sewage treatment lagoon system and related appurtenances approximately located as shown on attached Site Plan A.
 - 1.2.3. The location of the aerated sewage treatment lagoon system facilities is Lot 766, Plan 2476 and Lot 974, Plan 16985, SDYD.
 - 1.3. This subsection applies to the reclaimed water which is beneficially used for trickle and spray irrigation, after storage and chlorination. The EMS site reference number for this discharge is E207444.
 - 1.3.1. There is no maximum authorized rate of reclaimed water which may be beneficially used for irrigation.
 - 1.3.2. The authorized works are two (2) effluent storage reservoirs, chlorination facilities, spray and trickle irrigation facilities, and related appurtenances approximately as shown on attached Site Plan A.
 - 1.3.3. The locations where reclaimed wastewater may be irrigated are described generally as Osoyoos and surrounding area, as indicated in the approved Town of Osoyoos Liquid Waste Management Plan.
 - 1.4. This subsection applies to the discharge of surplus effluent to the infiltration basin facilities. The EMS site reference number for this discharge is E218460.
 - 1.4.1. The Town of Osoyoos is authorized to discharge effluent that is surplus to the needs of the effluent irrigation system to an infiltration basin facility. There is no maximum authorized amount, as this is, in effect, a safety valve for the system.
 - 1.4.2. The authorized works are infiltration facilities and related appurtenances approximately as shown on attached Site Plan A.
 - 1.4.3. The location of the point of discharge is Lot 766, Plan 2476, and Lot 974, Plan 16985, SDYD.

2. ANNUAL PERMIT FEE CALCULATION

For the purposes of permit fee calculation, the following discharge factors have been assumed for the characteristics of the reclaimed wastewater discharged from the reclaimed wastewater storage reservoirs and beneficially used for irrigation:

- 2.1. The reclaimed water flow irrigated is assumed to equal the flow of sewage into the aerated sewage treatment system, as measured at the Legion Beach Lift Station (E230277) and Desert Park lift station (E232882).



T.R. Forty, P.Eng.
Assistant Regional Waste Manager

2.2. The quality parameters to be used for permit fee calculation purposes are:

5 Day Biochemical Oxygen Demand	10 mg/L; and
Total Suspended Solids	10 mg/L.

3. REQUIREMENTS - GENERAL

3.1. Maintenance of Works, Emergency Procedures and Non-Compliance Reporting

Inspect the pollution control works regularly and maintain them in good working order. In the event of an emergency or condition which prevents the Town of Osoyoos from complying with a requirement of the Operating Certificate that would otherwise be applicable, that requirement will be suspended for such time as the emergency exists or as otherwise directed by the Regional Waste Manager provided that:

3.1.2. The Town can demonstrate the exercise of due diligence in relation to the process, operation or event which has caused the emergency, and that the emergency has occurred notwithstanding this exercise of due diligence;

3.1.3. The Regional Waste Manager has been immediately notified of the emergency; and,

3.1.4. The Town is proceeding with due diligence to correct the emergency condition.

3.2. Bypasses

The discharge of effluent which has bypassed the designated treatment works is prohibited unless the approval of the Regional Waste Manager is obtained and confirmed in writing.

3.3. Process Modifications

The Town shall notify the Regional Waste Manager prior to implementing changes to any process that may affect the quality and/or quantity of the discharge. The approval of the Regional Waste Manager shall be received prior to implementing the process modifications.

3.4. Alternate Water Supply

The Town shall provide alternate water supplies if any privately owned well should be adversely affected by irrigation with reclaimed water, as determined by the Regional Waste Manager.



T.R. Forty, P.Eng.
Assistant Regional Waste Manager

3.5. Plans - New Works

- 3.5.1. Plans and specifications of any proposed new works, modifications or additions to the existing works authorized in this Operational Certificate, with the exception of the sewage collection system, shall be submitted to the Regional Waste Manager, and his written consent obtained before construction commences. Plans shall be signed and sealed by a Professional Engineer licensed to practise in the Province of British Columbia. The works shall be constructed in accordance with such plans.
- 3.5.2. Copies of all "as-built" plans and drawings for the sewage treatment system, signed and sealed by a Professional Engineer licensed to practise in the Province of British Columbia, shall be submitted to the Regional Waste Manager.
- 3.5.3. Retain a copy of all "as-built", plans of modifications and/or extensions to the sewage collection system for perusal by the Regional Waste Manager, or his designate, upon request.
- 3.5.4. Design and construct the irrigation works in accordance with best current agricultural practice, and in accord with:

The "Pollution Control Guidelines for Municipal Effluent Application to Land", dated January 1983, and any amendments thereto, issued by the Ministry of Environment of British Columbia.

The "B.C. Sprinkler Irrigation Manual" 1989 issue, prepared by the B.C. Ministry of Agriculture and Fisheries.

The "B.C. Trickle Irrigation Manual" 1987 issue, prepared by the B.C. Ministry of Agriculture and Fisheries.

The "Health and Safety Criteria for the Use of Reclaimed Wastewater", 1991, developed by the Ministry of Health and the Ministry of Environment.

3.6. Operation and Maintenance

- 3.6.1. Operate and maintain a system of preventative maintenance for the sewage treatment, reclaimed wastewater utilization and infiltration works.
- 3.6.2. Develop and maintain an Operation and Maintenance Manual for the sewage treatment, reclaimed wastewater utilization and infiltration works. The Operation and Maintenance Manual shall be completed by **December 31, 2003**. A copy of the Operation and Maintenance Manuals shall be retained at the treatment plant for inspection, by the Regional Waste Manager or designate.



T.R. Forty, P.Eng.
Assistant Regional Waste Manager

3.7. Facility Classification

Maintain the wastewater treatment facility classification as authorized in this Operational Certificate with the "Environmental Operator's Certification Program" (EOCP). The sewage treatment plant, reclaimed wastewater utilization system and the effluent disposal works are presently classified as a Level I facility.

3.8. Operator Certification

3.8.1. The works shall be operated and maintained by persons certified within and according to the program provided by the EOCP. Certification must be completed to the satisfaction of the Regional Waste Manager. In addition, the Regional Waste Manager shall be notified of the classification level of the facility and certification level of the operators, and changes of operators and/or operator certification levels within 30 days of any change. List of current Certified Operators shall be included in the annual report.

3.8.2. All operators in training (OIT) working at this facility currently classified by the EOCP as Level I, shall be required to successfully pass an OIT examination within three (3) months of commencement of employment at the facility. The OIT certificate shall be valid for fifteen (15) months from the date of issue. Prior to the expiry date of the OIT certificate, but not sooner than twelve (12) months from the date when the OIT commenced facility operation, the OIT shall successfully complete a Class I certification examination in order to continue to operate at the facility.

3.9. Improvement of Works

The Town shall acquire and/or reserve sufficient land for the construction or expansion of future sewage treatment facilities. The phasing of new works shall be in accord with the Town of Osoyoos Liquid Waste Management Plan.

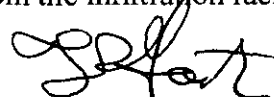
3.10. Infiltration Facilities

3.10.1. Details regarding any proposed discharge to infiltration shall be under the direction of a suitably qualified consultant. A copy of the proposed discharge details, including rate, volume and quality, and rationale for the discharge, is to be submitted to the Regional Waste Manager.

3.10.2. The use of the infiltration facilities shall occur only with the written authorization of the Regional Waste Manager.

3.10.3. The Town shall maintain a minimum freeboard of 0.5 m and ensure that there is no overflow from the infiltration facilities to the environment.

3.10.4. Surface drainage shall be diverted away from the infiltration facilities.



T.R. Forty, P.Eng.
Assistant Regional Waste Manager

3.10.5. Any residue removed from the infiltration facility shall be disposed of in a manner approved by the Regional Waste Manager.

3.10.6. Details of discharges to infiltration to be included in the Annual Report each year.

3.11. Fencing

The Operational Certificate holder shall erect a fence around the treatment plant facilities and such other areas, as required by the Regional Waste Manager. The height and type of fencing shall meet the approval of the Regional Waste Manager.

3.12. Odours

Should odours become objectionable, additional works shall be provided when so directed in writing by the Regional Waste Manager.

3.13. Influent Wastes Bylaw

In order to minimize the potential effect of heavy metals or other toxic materials in the effluent and/or sludge, amend as required, the Influent Wastes Bylaw, Building Bylaw, or other bylaws, to regulate the input of such wastes to the sewage collection system. The Town is encouraged to discourage the installation of devices to process household putrescible waste for disposal to the sewage collection system. Any amendments made to the Influent Bylaw shall be noted in the Annual Report.

3.14. Surface Water Diversionary Works

Surface water shall be intercepted and diverted away from the effluent treatment facilities to the greatest extent possible.

3.15. Signage

3.15.1. A suitable sign erected at the main entrance to the treatment plant site shall have the appropriate emergency phone numbers for use by the general public and others.

3.15.2. Prominent "No Trespassing" signs, acceptable to the Regional Waste Manager shall be erected and maintained around the reclaimed wastewater reservoir advising of the contents of the reservoir.

3.15.3. Prominent "NO TRESPASSING", signs shall be erected around agricultural and silvicultural sites irrigated with reclaimed wastewater, warning persons of the possible health hazard during the irrigation season and advising that the water used for irrigation is NOT POTABLE. The wording shall be in language or symbols readily comprehensible by the general public. e.g. "NO TRESPASSING - RECLAIMED WASTEWATER - DO NOT DRINK".



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3.16. Leakage

Operate and maintain the aerated lagoons and the reclaimed wastewater storage reservoirs to minimize fluid leakage. Leakage shall not aggravate or produce soil or bedrock instability or erosion, or contaminate ground or surface water.

3.17. Contingency Plan

The Town is to prepare a Contingency Plan that will address the appropriate course of action to be taken in any particular preconceived emergency situation. The Contingency Plan shall include Spill Procedures including other leaks and any potential point of concern in the collection, treatment and disposal systems. Attention is to be given to public safety and the protection of the environment. The Contingency Plan is to be completed by **December 31, 2003**, and updated annually, or as necessary, to reflect the current operation. A copy of the Contingency Plan, when complete shall be submitted to the Regional Waste Manager. Any changes or amendments to the Contingency Plan shall be included in the annual report.

3.18. Irrigation Plan

The Town is required to submit an Irrigation Plan of all new areas of land to be irrigated. The Irrigation Plan shall include: property location, owner, acreage, irrigation type, duration, rates, crops and intensity, or other wastewater use where reclaimed wastewater is beneficially used (i.e. dust control purposes).

To be included in the Irrigation Plan, a detailed Soils Assessment is required for any new areas of land to be irrigated.

Written authorization from the Regional Waste Manager is required prior to commencement of irrigation with reclaimed wastewater on any new areas.

A plan is to be submitted with the Annual Report each year showing all areas irrigated with reclaimed water during the previous year.

3.19. Soils Assessment

A detailed Soil Assessment shall be completed of any new agricultural areas to be irrigated. The Soils Assessment shall be submitted to the Regional Waste Manager and is to be included in the "Irrigation Plan", which shall be performed by a suitably qualified professional (Agrologist or Pedologist), using best current climate and soils data to substantiate that the proposed irrigation land is capable of accepting reclaimed wastewater for irrigation purposes. The Soils Assessment is to include any suggested restrictions or recommendations, also the assessment will include the recommendation as to the frequency required for further soil assessments of the agricultural areas irrigated.



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Written authorization from the Regional Waste Manager, to proceed with irrigation on any new agricultural area(s), must be received prior to commencing irrigation.

3.20. Sludge Management Plan

The frequency of withdrawal of sludge from the sewage treatment plant facilities and used for disposal and/or utilization shall be developed into a Sludge Management Plan. The Sludge Management Plan shall be prepared and submitted to the Regional Waste Manager for approval on or before **December 31, 1999**. The Sludge Management Plan shall be amended as required. Any changes or amendments to the Sludge Management Plan shall be included in the Annual Report.

4. REQUIREMENTS - RECLAIMED WASTEWATER IRRIGATION

4.1. Disinfection - Chlorination

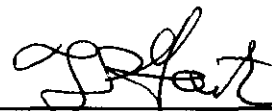
- 4.1.1. Disinfection shall be maintained in the reclaimed water discharged from the reclaimed water storage reservoirs to the irrigation system.
- 4.1.2. Reclaimed water used for irrigation must have at least one hour of chlorine contact time at average flow rate. A chlorine residual of at least 1 mg/L must be maintained at all times, immediately prior to irrigating.
- 4.1.3. Reclaimed water utilized for irrigation shall conform to the effluent irrigation guidelines developed by the B.C. Ministry of Health and Ministry of Environment, Lands and Parks. Fecal coliforms shall not exceed 200 MPN per 100 mL for agricultural, silvicultural and low public use lands, or exceed 2.2 MPN per 100 mL for high public use lands.

4.2. Annual Irrigation Period

- 4.2.1. The authorized discharge period for irrigation using spray/trickle irrigation techniques is during the period **March 15 to November 15** each year.
- 4.2.2. With the written authorization of the Regional Waste Manager, the irrigation schedule may be extended on a weekly basis beyond these limits. Any extension will be considered only upon receipt of a substantiated written request and submission of a soils assessment produced by a suitably qualified professional agrologist for those areas to receive irrigation.

4.3. Buffer Zones

- 4.3.1. The requirement for formal buffer zones surrounding lands irrigated with reclaimed water is no longer in effect, however, buffer zones may be specified by the Regional Waste Manager.



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4.3.2. Reclaimed water applied by irrigation shall not be applied to the ground any closer than 15 metres from the edge of flowing streams or bodies of water.

4.3.3. There shall be no reclaimed water irrigated within 30 metres of any well or in-ground reservoir used for domestic supply purposes.

4.4. Surface Runoff

There shall be no surface runoff of irrigated reclaimed water from the irrigated lands.

4.5. Surfacing Reclaimed Water

Irrigation shall be managed in such a fashion as to preclude surfacing of irrigation tailwater downslope of the point of irrigation.

4.6. Spray Irrigation Drift

The following strategy shall be followed to minimize the necessity to shut down the irrigation system, or portions thereof, during windy conditions:

4.6.1. The reclaimed water irrigation system shall be managed in such a fashion as to preclude aerosol drift from leaving the irrigated lands.

4.7. Irrigation Rates

4.7.1. The general philosophy of the operation of the irrigation system shall be for beneficial utilization of reclaimed water, not disposal. This philosophy is necessary to prevent excessive irrigation and subsequent negative impact on the irrigated lands and lands downgradient of the irrigated lands.

4.7.2. Irrigation rates for spray irrigation shall not exceed the rates given in "B.C. Sprinkler Irrigation Manual", dated 1989, prepared by the B.C. Ministry of Agriculture and Fisheries.

4.7.3. Irrigation rates for trickle irrigation shall not exceed the rates given in "B.C. Trickle Irrigation Manual", dated 1987, prepared by the B.C. Ministry of Agriculture and Fisheries.

4.7.4. Irrigated lands shall be monitored to prevent saturation, erosion, surfacing tailwater, and instability both in the irrigated areas and downgradient of the irrigated lands.

4.8. Agricultural Products Lag Time

4.8.1. A three day lag time is required before uninspected livestock intended for human consumption are permitted on areas irrigated with reclaimed water. No lag time is required if livestock are subjected to the federal meat inspection program.



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- 4.8.2. A six day lag time is required before dairy cattle are permitted in areas irrigated with reclaimed water.
- 4.8.3. A three day lag time, after irrigation has ceased, is required before a crop intended for animal feed is harvested.

5. MONITORING PROGRAMS

5.1. Wastewater Flow - Monitoring Program

5.1.1. Flow Measurement - Legion Beach Lift Station

Provide and maintain a suitable flow measuring device and **record once per day**, at the **Legion Beach lift station**, the water discharged to the sewage treatment facility over a 24-hour period. The EMS site reference number for this site is **E230277**.

5.1.2. Flow Measurement - Desert Park Lift Station

Provide and maintain a suitable flow measuring device and record once per day, at the **Desert Park Lift Station**, the water discharged to the sewage treatment facility over a 24-hour period. The EMS site reference number for this site is **E232882**.

5.2. Influent - Monitoring Program

5.2.1. Grab Sampling

Install and maintain a suitable sampling facility at the **headworks of the plant** and obtain a grab sample of the plant influent **semi-annually** (a proportional continuous sampler is desirable, but not mandatory). The EMS site reference number for this site is **E230037**.

5.2.2. Analyses

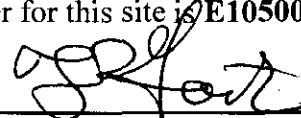
Obtain analyses of the influent sample for the following:

- (a) total phosphorus and ortho phosphorus, expressed as P in mg/L; and
- (b) 5-day biochemical oxygen demand, mg/L.

5.3. Effluent - Monitoring Program

5.3.1. Grab Sampling

The Town shall install and maintain a suitable sampling facility and obtain a grab sample of the effluent **from the aerated lagoons, after Cell #3 prior to storage**. The EMS site reference number for this site is **E105001**.



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5.3.2. Analyses

Obtain analyses of the sample for the following:

- a) 5-day biochemical oxygen demand, mg/L, **monthly**;
- b) total suspended solids (non-filterable residue), mg/L, **monthly**;
- c) total phosphorus, ortho phosphorus and total dissolved phosphorus, all expressed as mg/L P, **semi-annually**; and
- d) total nitrogen, ammonia nitrogen, nitrate nitrogen, nitrite nitrogen, and organic nitrogen, all expressed as mg/L N, **semi-annually**.

5.3.3. Occasional full chemical analysis of the main cations and anions and other characteristics may be required at the discretion of the Regional Waste Manager.

5.4. Storage Reservoir - Monitoring Program

5.4.1. Water Levels

Provide and maintain suitable staff gauges or other similar devices, as approved by the Regional Waste Manager, **in the two (2) reclaimed water storage reservoirs**. Take **weekly measurements** of the water levels in the storage reservoirs on a year round basis. The EMS site reference numbers for the reservoirs are as follows:

Storage Reservoir #1 (older reservoir to south) - **E230038**

Storage Reservoir #2 (new reservoir to north) - **E230039**

5.4.2. Storage Volumes

Calculate and record the corresponding volumes of reclaimed water contained in each storage reservoir on a **weekly basis** for graphical analysis.

5.5. Irrigation - Monitoring Program

5.5.1. Flow Measurement

Provide and maintain a suitable flow measuring device and record, on a **weekly basis**, the **reclaimed water irrigation volumes**, location/area, property owner, irrigation type, duration, rate, and crop or other use. Submit the monthly and annual summaries to the Regional Waste Manager with the Annual Report.

5.5.2. Grab Sampling

The Town shall obtain a grab sample of the reclaimed water, **during the irrigation season, from the discharge end of the chlorine contact chamber**. The EMS site reference number is **E207444**.



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5.5.3. Analyses

Obtain analyses of the sample for the following:

- a) fecal coliforms MPN/100 ml, **monthly**;
- b) total coliforms MPN/100 ml, **monthly**;
- c) total phosphorus mg/L, **monthly**;
- d) total nitrogen, mg/L, **monthly**; and
- e) chlorine residual, mg/L, **weekly**.

5.6. Sludge - Monitoring Program

5.6.1. Sampling

Obtain a representative sample of the sludge produced at the treatment plant **once per year from the first aerated lagoon, Cell #1**. The EMS site reference number is **E230278**.

5.6.2. Analyses

Obtain analyses of the sludge sample for the following:

Total solids (TS), g/L;
Moisture content, %;
Volatile suspended solids (V.S.S), g/L;
Total Kjeldahl Nitrogen (T.K.N.), g/L and g/kg dry solids;
Aluminum, mg/kg;
Arsenic, mg/kg;
Cadmium, mg/kg;
Calcium, mg/kg;
Chromium, mg/kg;
Cobalt, mg/kg;
Copper, mg/kg;
Iron, mg/kg;
Manganese, mg/kg;
Mercury, mg/kg;
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Nickel, mg/kg;
Lead, mg/kg;
Silver, mg/kg;
Sodium, mg/kg; and
Zinc, mg/kg.

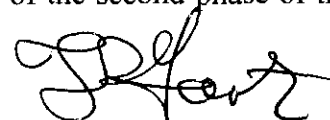


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- 5.6.3. Occasional full chemical analysis of the main cations and anions and other characteristics may be required at the discretion of the Regional Waste Manager.

5.7. Ground And Surface Water - Monitoring Program

- 5.7.1. A Ground and Surface Water Monitoring Program, shall be submitted to the Regional Waste Manager. The Monitoring Program shall be designed by a suitably qualified Professional Engineer (Hydrogeologist) or a Hydrogeological Technologist licensed to practice in the Province of British Columbia. The Monitoring Program is to establish with acceptable scientific accuracy, the groundwater flow pattern and nutrient removal capability of the soil to ensure reasonable notice of impending high phosphorus or nitrate levels that may adversely affect surface water, groundwater or domestic waterwells. The sampling, measurement frequency, water level elevations and analyses shall be conducted in accordance with the Monitoring Program upon its written authorization by the Regional Waste Manager.
- 5.7.2. The Monitoring Program will consist of two phases. The **first phase** will consist of an inventory of all existing ground and surface water monitoring sites. This inventory is to be completed and submitted to the Regional Waste Manager by **March 31, 1999**. The **second phase** of the program will assess and determine the most appropriate sites for monitoring; upgrade wells, if required; establish and install any additional new recommended monitoring sites; and submit the outline for Ground and Surface Water Monitoring Program. The second phase of the monitoring program is to be complete and submitted to the Regional Waste Manager by **December 31, 1999**.
- 5.7.3. The results of the Ground and Surface Water Monitoring Program is to be reviewed annually by a suitably qualified Professional Engineer (Hydrogeologist) or a Hydrogeological Technologist licensed to practice in the Province of British Columbia and any recommendations for changes to the Monitoring Program are to be included with the Annual Report each year.
- 5.7.4. The Ground and Surface Water Monitoring Program is to incorporate the existing EMS groundwater monitoring wells and the surface water monitoring sites that were previously monitored by the Ministry of Environment, Lands and Parks, or other agencies, and any proposed or future monitoring sites, as authorized by the Regional Waste Manager.
- 5.7.5. The Town shall provide precise latitude and longitude values, with an accuracy of at least plus or minus 10 metres, for each ground and surface water monitoring site established as part of the second phase of the Ground



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and Surface Water Monitoring Program, and for any additional sites that may be added each year. The data is to be submitted to the Regional Waste Manager with the Annual Report.

6. SAMPLING AND ANALYTICAL REQUIREMENTS

- 6.1. Proper care should be taken in sampling, storing and transporting the samples to adequately control temperature and avoid contamination, breakage, etc.
- 6.2. Occasional full chemical analysis of the main cations and anions and other characteristics may be required at the discretion of the Regional Waste Manager.
- 6.3. The Town is required to follow the terms and conditions of the Quality Assurance Regulation (EQDA), or other legislation that may be in effect at the time. Ten percent of the samples collected shall be duplicated to provide data quality assurance. Quality control information generated by the Permittee lab while analyzing parameters required by this Operational Certificate shall also be provided with the raw data required to be reported.
- 6.4. The sampling, flow and monitoring requirements specified in Section 8 (including all subsections) above shall be carried out in accordance with the appropriate procedures listed in the table below. Alternative test methods may be used provided that the alternative test methods are authorized by the Regional Waste Manager prior to performing the actual source testing. Test methods for parameters not listed below require the consent of the Regional Waste Manager.

LIQUID EFFLUENTS, SURFACE WATER, GROUND WATER, SOILS, SEDIMENTS, VEGETATIVE MATTER:		
Parameter	Source Testing Procedure	Analytical Procedure
Metals Nutrients Organics Toxicity	British Columbia Field Sampling Manual for Continuous Monitoring plus the Collection of Air, Air-Emission, Water, Wastewater, Soil, Sediment, and Biological Samples, 1996 Permittee Edition	British Columbia Environmental Laboratory Manual for the Analysis of Water, Wastewater, Sediment and Biological Materials, March, 1994, Permittee Edition

The above manuals are available from Queen's Printer Publications Centre, P.O. Box 9452, Stn. Prov. Govt, Victoria, BC, V8W 9V7 (1-800-663-6105 or (250)387-4609). The above manuals are also available for inspection at all Pollution Prevention offices.



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7. REPORTING

7.1. General Reporting

- 7.1.1. Maintain all monitoring data required for inspection by the Regional Waste Manager or his designate.
- 7.1.2. The influent, effluent, spray/trickle reclaimed water irrigation, infiltration and sludge analyses and related flow data is to be submitted to the Regional Waste Manager such that they are received by the Regional Waste Manager within 30 days of the results being received, or produced, by the Town.
- 7.1.3. Monitoring data shall be entered into EMS electronically and submitted in electronic and printed format satisfactory to the Regional Waste Manager.

7.2. Annual Reporting

- 7.2.1. Submit an Annual Report which includes a summary of the results of all sampling and monitoring programs as specified in this Operational Certificate. Provide data interpretation and trend analyses where appropriate.
- 7.2.2. The Annual Report is to be in a format which is suitable for review by the public and/or other government agencies.
- 7.2.3. The Annual Report is due on or before 90 days following the end of a calendar year for that year's monitoring. Raw data, suitably tabulated, including the EDQA quality control information, are to be attached as appendices to the report.
- 7.2.4. Maintain and submit records of the following, each year, which are to be part of the Annual Report:
 - 7.2.4.1. Records of sewage flow to the aerated treatment lagoons as required under the Wastewater Flow - Monitoring Program.
 - 7.2.4.2. Records of sewage treatment plant influent quality, as required under the Influent - Monitoring Program.
 - 7.2.4.3. Records of effluent quality prior to the storage reservoirs as required in the Effluent - Monitoring Program.
 - 7.2.4.4. Records of the elevations for both reclaimed water storage reservoirs and the corresponding annual storage volumes available, as required under the Storage Reservoir - Monitoring Program.
 - 7.2.4.5. Records of the reclaimed water quality and volumes beneficially used, as well as, property location, owner, acreage, irrigation type,



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duration, rate, crop and intensity, or other use, where irrigation occurs, as required under the Irrigation - Monitoring Program.

- 7.2.4.6. Records of effluent quantity and quality for discharges to the infiltration facilities.
- 7.2.4.7. Records of sludge quality as per the Sludge - Monitoring Program.
- 7.2.4.8. Frequency of withdrawal and volumes for disposal and/or utilization, as required in the Sludge Management Plan.
- 7.2.4.9. Records of groundwater well elevations and ground and surface water quality, as required under the Ground and Surface Water - Monitoring Program.
- 7.2.4.10. Copy of the Annual Flow Summaries.
- 7.2.4.11. Copy of the Annual Irrigation Summaries.
- 7.2.4.12. Copy of monthly precipitation records for Osoyoos area (arrangements can be made to obtain precipitation information, contact Gary Myers, Climate Services, Environmental Canada, at 604-664-9067).



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APPENDIX A

Requirements of Reclaimed Wastewater Users

The holder of this Operational Certificate (The reclaimed wastewater supplier) shall be responsible for ensuring that contractual agreement(s) with each Reclaimed Wastewater User are in accordance with the Operational Certificate.

A copy of this Appendix is to be provided to EACH USER prior to the commencement of irrigation EACH YEAR.

8. GENERAL REQUIREMENTS

8.1. Plans - New Works - New Agricultural Areas

8.1.1. Plans for modifications and/or extensions to the reclaimed water irrigation system shall be approved by a person qualified in the design of irrigation systems and the Irrigation Plan and the Soils Assessment is to be submitted to the Regional Waste Manager for authorization prior to the commencement of irrigation on new agricultural areas.

8.1.2. Design and construct the irrigation works in accordance with best current agricultural practice and the "Pollution Control Guidelines for Municipal Effluent Application to Land", dated January 1983, and any amendments thereto, issued by the Ministry of Environment of British Columbia, and also in accordance with the "B.C. Sprinkler Irrigation Manual", dated 1989, prepared by the B.C. Ministry of Agriculture and Fisheries or the "B.C. Trickle Irrigation Manual", dated 1987, prepared by the B.C. Ministry of Agriculture and Fisheries.

8.2. Construction Criteria

8.2.1. All reclaimed water user valves, shall be of a type, or secured in a manner, that permits operation by only personnel authorized by each wastewater user. All piping, valves and outlets should be clearly marked to differentiate reclaimed wastewater from domestic water. All reclaimed wastewater controllers, valves, etc., shall be affixed with reclaimed water warning signs. It is recommended that, where possible purple coloured pipe and fixtures be utilized to facilitate identification of reclaimed water piping and fixtures.



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- 8.2.2. Use or installation of hose-bibs on any irrigation system presently operating, or designated to operate with reclaimed wastewater, regardless of the hose-bib construction or identification, is not permitted.
- 8.2.3. There shall be at least a 3 metre horizontal and a 0.3 metre vertical separation (with domestic water pipeline above the reclaimed water pipeline) between all pipelines transporting reclaimed water and those transporting domestic water.
- 8.2.4. There shall be no connection between a potable water supply, irrigation water or industrial well, and piping containing reclaimed wastewater, except through an air gap separation or reduced pressure principle device.

8.3. Fencing

The reclaimed water user **may be** required by the Regional Waste Manager to erect a fence around the disposal area to restrict public access. The height and type of fencing shall meet the approval of the Regional Waste Manager.

8.4. Signage

- 8.4.1. Prominent "NO TRESPASSING", signs shall be erected around agricultural and silvicultural sites irrigated with reclaimed water, warning persons of the possible health hazard during the irrigation season and advising that the water used for irrigation is NOT POTABLE. The wording shall be in language or symbols readily comprehensible by the general public. e.g. "NO TRESPASSING - RECLAIMED WASTEWATER - DO NOT DRINK"
- 8.4.2. Warning signs shall be posted in sufficient numbers and size and at strategic locations to advise the public that reclaimed water is being used. Additional signage may be required as directed by the Regional Waste Manager.

9. GENERAL REQUIREMENTS - RECLAIMED WASTEWATER IRRIGATION

9.1. Buffer Zones

- 9.1.1. The requirement for formal buffer zones surrounding lands irrigated with reclaimed water is no longer in effect, however, a buffer zone may be specified by the Regional Waste Manager.
- 9.1.2. Reclaimed water applied by irrigation shall not be applied to the ground any closer than 15 metres from the edge of flowing streams or bodies of water.
- 9.1.3. There shall be no reclaimed water irrigated within 30 metres of any well or in-ground reservoir for domestic supply.



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9.2. Surface Runoff

- 9.2.1. There shall be no surface runoff of irrigated reclaimed wastewater from the irrigated lands.
- 9.2.2. The maximum ground slope shall not exceed 20% without the written consent of the Regional Waste Manager.

9.3. Surfacing Reclaimed Water

- 9.3.1. Irrigation shall be managed in such a fashion as to preclude surfacing of irrigation tail water down slope of the point of irrigation.
- 9.3.2. Irrigation shall be managed as to prevent ponding.

9.4. Spray Irrigation Drift

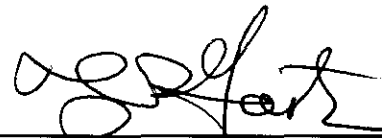
- 9.4.1. Reclaimed water shall be confined to the area designated and approved for irrigation with reclaimed water. The reclaimed water irrigation system shall be managed in such a fashion as to prevent aerosol drift from leaving the irrigated lands.
- 9.4.2. Precautions shall be taken to ensure that reclaimed water will not have contact with any facility or area not designated for reclamation, such as passing vehicles, buildings, domestic water facilities, fruit and vegetable gardens, or food handling facilities.
- 9.4.3. Drinking water facilities shall be protected from direct or wind blown reclaimed water spray.

9.5. Irrigation Rates

- 9.5.1. Irrigation rates for spray irrigation shall not exceed the rates given in "B.C. Sprinkler Irrigation Manual", dated 1989, prepared by the B.C. Ministry of Agriculture and Fisheries and irrigation rates for trickle irrigation shall not exceed the rates given in those given in "B.C. Trickle Irrigation Manual", dated 1987, prepared by the B.C. Ministry of Agriculture and Fisheries.
- 9.5.2. Soils of the irrigated lands will be monitored periodically or as otherwise directed by the Regional Waste Manager or the Town, to prevent saturation, erosion, and instability.

9.6. Agricultural Products Lag Time

- 9.6.1. A three day lag time is required before uninspected livestock intended for human consumption are permitted on areas irrigated with reclaimed water. No lag time is required if livestock are subjected to the federal meat inspection program.



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9.6.2. A six day lag time is required before dairy cattle are permitted in areas irrigated with reclaimed wastewater.

9.6.3. A three day lag time, after irrigation has ceased, is required before a crop intended for animal feed is harvested.

9.7. Insect and Vector Control

Adequate measures shall be taken to prevent the breeding of insects and other vectors of health significance, and the creation of odours, slimes or unsightly deposits.

9.8. Irrigation of Public Areas

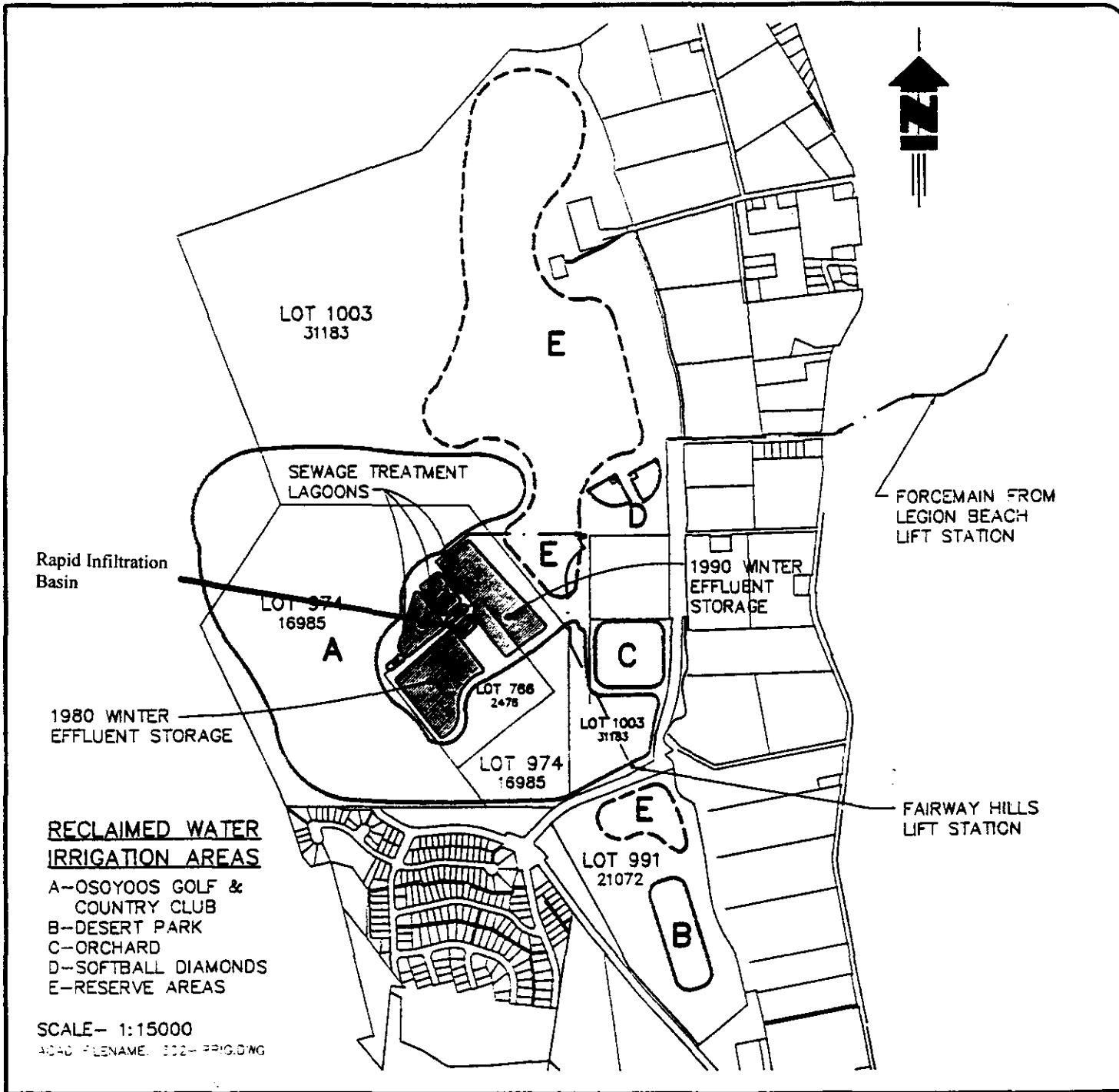
9.8.1. Irrigation on golf courses or cemeteries shall only be practised when the public are not present.

9.8.2. Golf score cards shall indicate that reclaimed water is used for irrigation on the golf course lands.



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SITE PLAN A

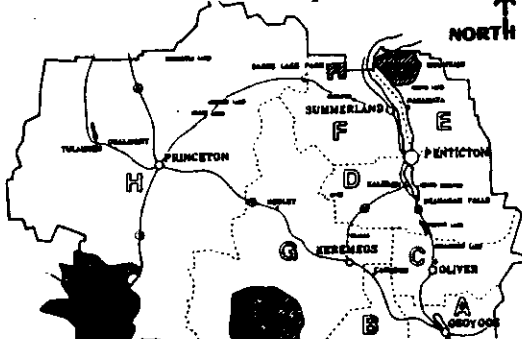


RECLAIMED WATER IRRIGATION AREAS

- A--OSOYOOS GOLF & COUNTRY CLUB
- B--DESERT PARK
- C--ORCHARD
- D--SOFTBALL DIAMONDS
- E--RESERVE AREAS

SCALE-- 1:15000
A340 -FILENAME. 002-PRIG.DWG

Location Map



Operational Certificate No.: ME-12214

Date: December 18, 1998

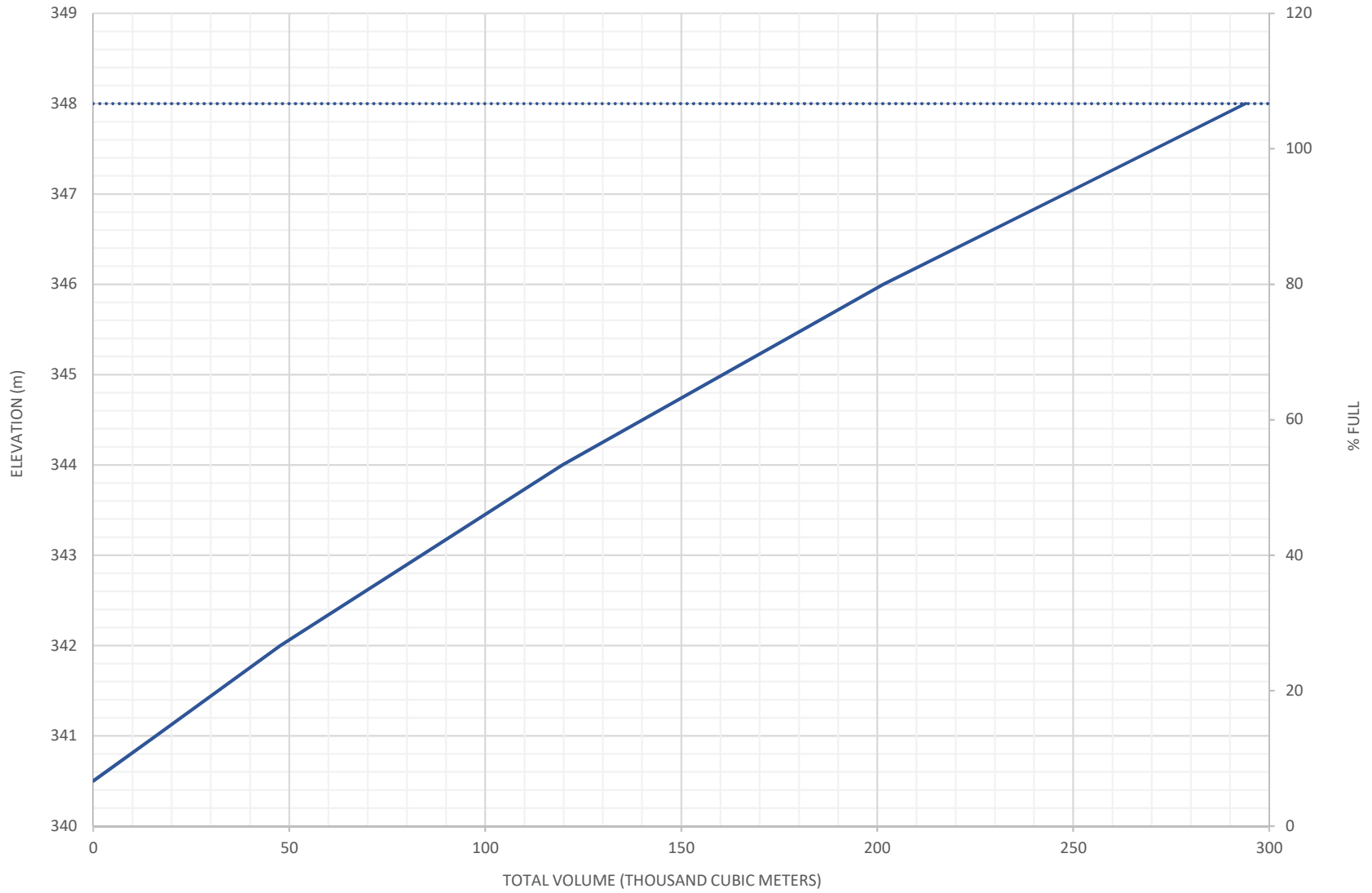
T.R. Forty, P.Eng.
Assistant Regional Waste Manager

APPENDIX C

Winter Effluent Storage Lagoon Calibration Curves

(OC 7.2.4.4)

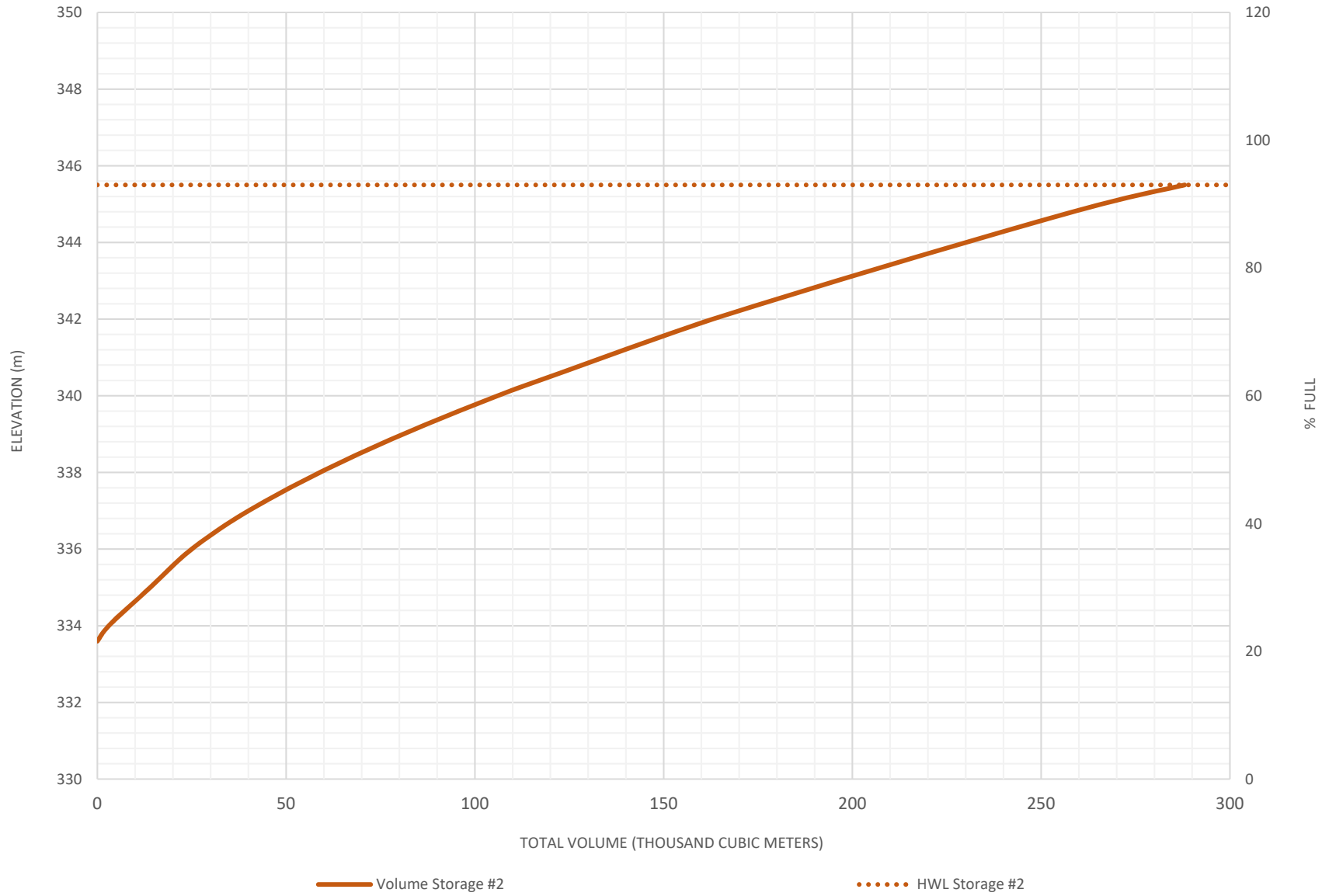
EFFLUENT STORAGE CURVE
TOWN OF OSOYOOS
STORAGE #1



— Volume Storage #1

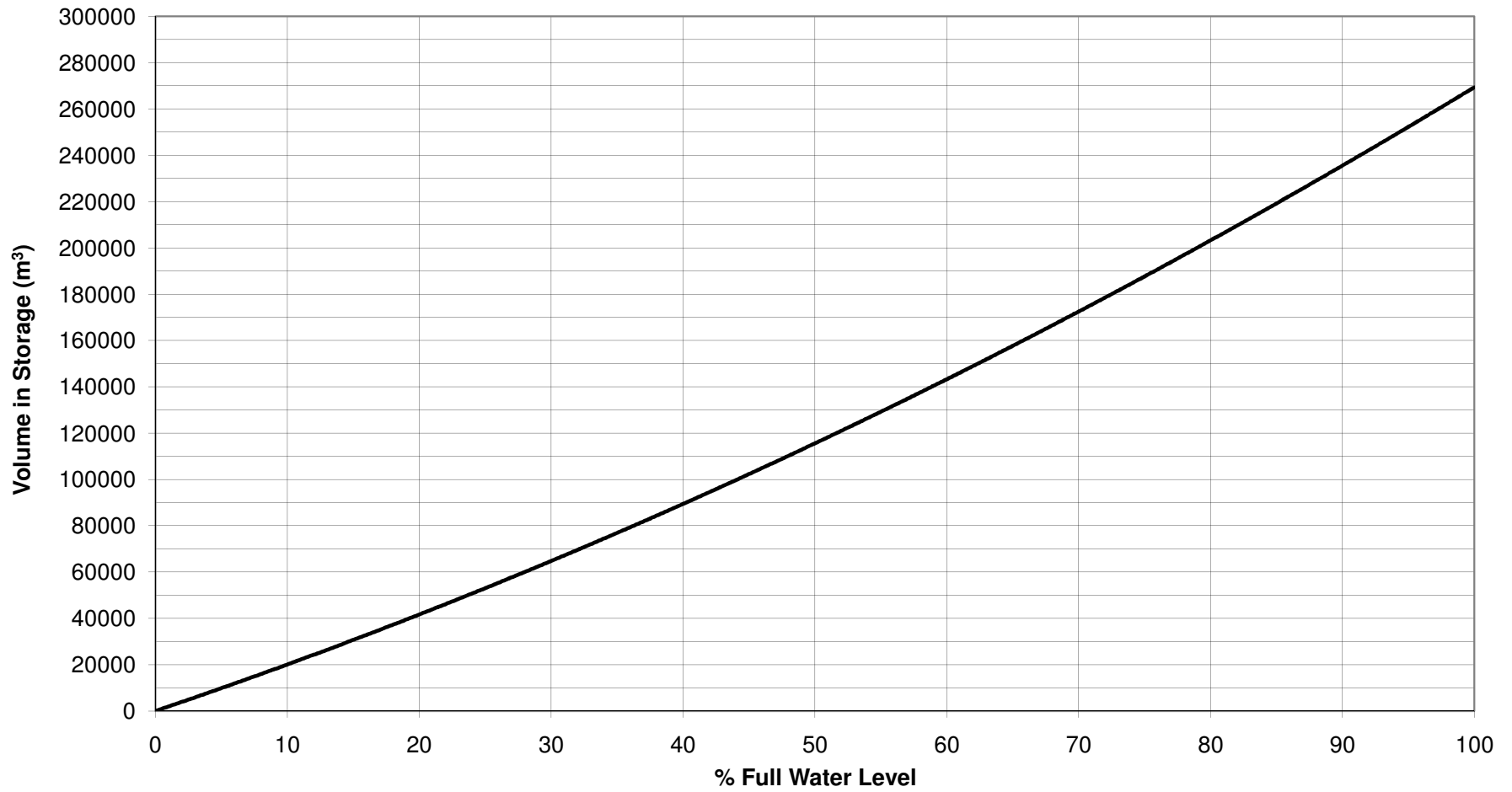
..... HWL Storage #1

EFFLUENT STORAGE CURVE
TOWN OF OSOYOOS
STORAGE #2



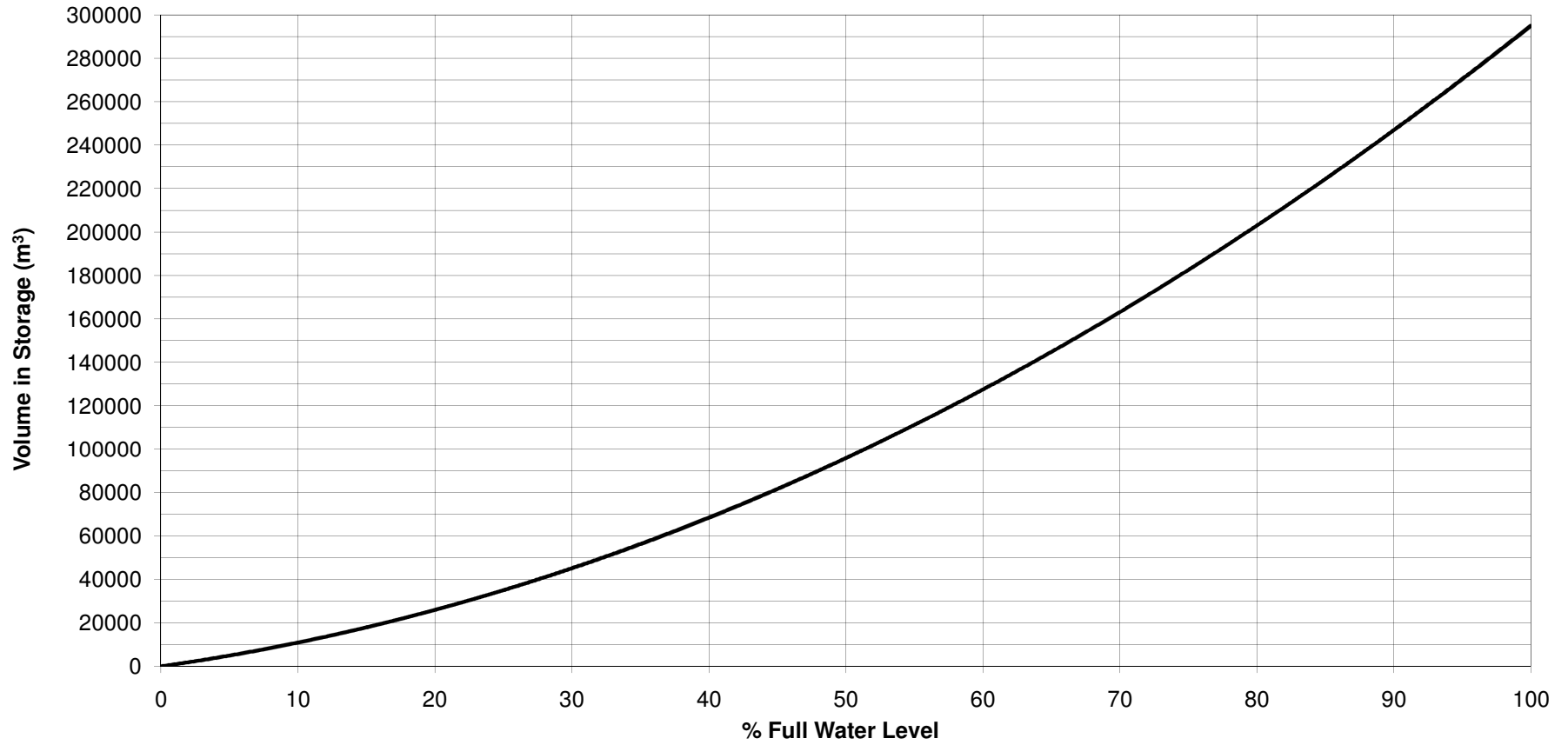
Winter Storage Lagoon #1 Calibration Curve

$$\text{vol} = 7.6499x^2 + 1928.6x$$



Winter Storage Lagoon # 2 Calibration Curve

$$\text{vol} = 20.646x^2 + 885.85x$$



APPENDIX D

Reclaimed Water Irrigation 2020 Total Flow Summary
(OC 7.2.4.11)

Mar. 1/21

2021

LAGOONS

DATE	OPT	TIME	TEMP	STORAGE 1 %	STORAGE 2 %	DESERT TOTAL FLOW m ³	MEADOW TOTAL FLOW m ³	#1 TOTAL HRS	#1 DAILY HRS	#2 TOTAL HRS	#2 DAILY HRS	#3 TOTAL HRS	#3 DAILY HRS	#4 TOTAL HRS (9A)	#4 DAILY HRS (9A)
1	DS	8:20	19	80.3	91.9	333766	277083	1351	0	904	0	615	0	-	-
3	DS	9:05	20	81.5	91.9	✓	✓	✓	0	✓	0	✓	0		
4	KF	11:40	18	82.1	91.9	✓	✓	✓	0	✓	0	✓	0		
5	KF	9:00	20	82.7	91.9	✓	✓	✓	0	✓	0	✓	0		
8	DG	11:24	19	84.6	91.9	✓	✓	✓	0	✓	0	✓	0	✓	✓
9	KF	2:15	19	85.2	91.5	✓	✓	1354	3	✓	0	616	1		
10	F2	11:10	20	85.7	91.3	✓	✓	1356	2	✓	0	✓	0		
11	DG	12:53	21	86.3	90.8	✓	✓	1359	3	✓	0	616	0	✓	✓
12	DS	1:45	18	86.8	90.8	333766	277083	1363	4	✓	0	✓	0	✓	✓
15	DG	9:45	20	88.5	89.2	✓	✓	1372	9	✓	0	✓	0	✓	✓
16	DG	11:25	19	89.1	88.8	✓	277108	1375	3	904	0	616	1	-	-
18	F2	8:36	18	90.3	86.9	334632	281206	1390	15	✓	0	✓	0		
19	F2	11:00	17	90.9	85.8	337585	281206	1399	9	✓	0	616	0		
22	F2	11:15	17	89.2	87.2	337675	281206	1408	9	✓	0	✓	0		
23	F2	10:50	15	88.6	87.6	337818	281230	1412	4	✓	0	✓	0		
24	F2	13:15	21	87.2	88.1	340418	281304	1419	7	✓	0	✓	0		
25	DS	11:40	23	86.0	88.6	340418	284099	1427	8	✓	0	✓	0		
26	DS	11:15	18	85.4	89.0	340534	284099	1430	3	✓	0	✓	0		
29	DG	11:30	17	81.9	90.3	345273	289680	1448	18	904		616	1	-	-
30	DS	11:00	16	81.8	90.8	345574	289680	1449	1	✓	0	✓	0		
31	DS	10:40	12	80.1	91.2	347830	292482	1458	9	✓	0	✓	0		

April

90% MAX 95% 2021

LAGOONS

DATE	OPT	TIME	TEMP	STORAGE 1 %	STORAGE 2 %	DESERT TOTAL FLOW m ³	MEADOW TOTAL FLOW m ³	#1 TOTAL HRS	#1 DAILY HRS	#2 TOTAL HRS	#2 DAILY HRS	#3 TOTAL HRS	#3 DAILY HRS	#4 TOTAL HRS (9A)	#4 DAILY HRS (9A)
1	KF	2:35	18	72.9	91.8	347830	292482	1459	1	904	0	616	0		
6	KF	11:30	17	76.0	93.8	353213	298045	1479	20	✓	0	✓	0		
8	DG	2:40	17	75.7	94.7	353364	298077	1481	2	904	✓	616	✓		
9	DG	8:40	22	75.7	95.	353489	298077	1481	—	904	—	616	—		
12	DG	1:12	22	77.4	93.6	356067	300840	1492	3	904	—	617	1		
13	DG	2:50	21	78	92.3	358514	303624	1501	9	✓	0	✓	0		
14	DG	11:50	21	78.5	92.2	358722	303701	1502	1	✓	—	✓	—		
15	FZ	11:30	21°	79.0	90.9	361123	306375	1512	10	✓	0	✓	0		
16	KF	2:20	24	79.6	90.6	361520	306785	1514	2	✓	0	✓	0		
17	FZ	11:35	26°	80.2	89.3	364076	309638	1524	10	✓	0	610	1		
18	FZ	10:05	25°	80.7	89.2	364751	309638	1526	2	✓	0	✓	0		
19	FZ	13:45	24°	81.3	88.9	364751	309716	1527	1	✓	0	✓	0		
20	FZ	11:15		81.9	87.7	367091	312438	1536	9	✓	0	619	1		
22	KF	1:00	28	83.1	86.0	369873	315865	1549	13	✓	0	✓	0		
23	DS	11:20	22	83.4	84.6	372530	318815	1558	9	✓	0	621	2		
24	DS	9:40	23	84.0	84.4	372955	318872	1560	2	✓	0	✓	0		
25	DS	8:20	21	84.7	84.4	373526	318876	1561	1	✓	0	✓	0		
26	DS	1:50	21	85.6	84.3	373526	318889	1562	1	✓	0	✓	0		
27	DS	2:30	26	86.2	84.2	373939	318946	1563	1	✓	0	✓	0		
28	DS	11:15	25	86.7	84.0	374356	318946	1564	1	✓	0	✓	0		
29	DG	11:35	26	87.2	83.9	374392	318951	1564	0	✓	0	✓	0		
30	FZ	13:15	29°	87.8	83.7	374806	318951	1566	2	✓	0	✓	0		

MAY

2021

LAGOONS

DATE	OPT	TIME	TEMP	STORAGE 1 %	STORAGE 2 %	DESERT TOTAL FLOW m ³	MEADOW TOTAL FLOW m ³	#1 TOTAL HRS	#1 DAILY HRS	#2 TOTAL HRS	#2 DAILY HRS	#3 TOTAL HRS	#3 DAILY HRS	#4 TOTAL HRS (9A)	#4 DAILY HRS (9A)
1	FZ	10:15	26°	88.2	83.6	375260	318973	1567	1	904	0	621	0		
2	FZ	9:25	25°	88.8	82.0	378158	322280	1577	10	✓	0	623	2		
3	FZ	13:40	27°	89.3	81.0	379867	324393	1585	8	✓	0	✓	0		
4	FZ	9:25	23°	89.8	80.8	380280	324393	1586	1	✓	0	✓	0		
5	FZ	14:10	28°	90.4	79.5	382892	326595	1595	9	✓	0	624	1		
6	DG	10:50	28	90.8	79.3	382893	327065	1597	2	✓	0	✓	0		
8	DG	10:50	22	88.7	80.0	386249	329929	1608	11	✓	0	✓	0		
9	DG	10:50	23	88.5	80.4	386665	329929	1609	1	✓	0	✓	0		
10	DS	10:40	23	87.0	80.8	389281	331270	1617	8	✓	0	✓	0		
14	DS	9:15	24	84.6	82.4	393070	333724	1629	12	✓	0	625	1		
15	KF	11:15	31	82.8	82.8	396108	336066	1639	10	✓	0	✓	0		
16	KF	9:20	29	80.7	83.1	399094	339238	1649	10	✓	0	✓	0		
17	KF	2:45	35	80.5	83.7	399134	339343	1650	1	✓	0	✓	0		
18	KF	10:30	27	79.2	84.0	401008	341136	1657	7	✓	0	626	1		
19	KF	11:45	26	77.5	84.11	403629	343316	1665	8	✓	0	627	1		
20	DG	11:00	23	77.3	84.8	403629	343316	1666	1	✓	0	✓	0		
21	DS	1:15	24	77.1	85.2	404117	343316	1667	1	✓	0	✓	0		
22	DS	8:30	21	75.1	85.4	407215	346248	1677	10	✓	0	✓	0		
23	DS	8:45	21	74.8	85.9	407630	346286	1679	2	✓	0	✓	0		
24	DS	9:10	24	73.2	86.2	409900	348915	1687	8	✓	0	✓	0		
25	DS	2:10	27	72.8	86.8	410362	348985	1689	2	✓	0	✓	0		
26	DS	8:00	24	71.3	87.1	412503	351176	1697	8	✓	0	628	1		
28	KF	9:00	23	68.9	87.9	415978	354221	1708	11	✓	0	✓	0		
29	KF	10:00	19	67.3	88.4	418391	355941	1716	8	✓	0	✓	0		
30	KF	9:10	21	66.7	88.8	418924	357019	1720	4	✓	0	✓	0		
31	KF	6:30	22	64.9	89.0	421191	359550	1729	9	✓	0	✓	0		

June

2021

LAGOONS

DATE	OPT	TIME	TEMP	STORAGE 1 %	STORAGE 2 %	DESERT TOTAL FLOW m ³	MEADOW TOTAL FLOW m ³	#1 TOTAL HRS	#1 DAILY HRS	#2 TOTAL HRS	#2 DAILY HRS	#3 TOTAL HRS	#3 DAILY HRS	#4 TOTAL HRS (9A)	#4 DAILY HRS (9A)
1	KF	1100	29	63.2	89.7	423481	361725	1737	8	904	∅	629	1		
2	KF	930	26	61.8	90.3	425643	363169	1244	7	✓	∅	✓	∅		
3	FZ	13:00	30°	59.6	91.0	428563	365791	1754	10	✓	∅	630	1		
4	FZ	10:35	26°	57.9	91.5	431188	367925	1763	9	✓	∅	631	1		
5	FZ	8:30	22°	55.7	91.8	434267	370850	1773	10	✓	∅	632	1		
6	FZ	9:45	17°	55.4	92.3	434816	370862	1775	2	✓	∅	✓	∅		
7	FZ	12:45	17°	54.0	92.8	436849	372936	1783	8	✓	∅	✓	∅		
8	FZ	13:15	20°	53.9	92.9	437469	373129	1784	1	✓	∅	✓	∅		
9	DS	1:00	21°	54.3	92.0	438472	375318	1790	6	✓	∅	✓	∅		
11	DG	10:30	18	55.5	89.7	444715	379327	1808	18	✓	∅	✓	∅		
12	DG	11:20	18	56.2	89.3	445408	379856	1811	3	✓	∅	✓	∅		
13	DG	10:20	25	56.8	89.2	445939	380856	1813	2	✓	∅	✓	∅		
14	DG	9:30	24	57.7	88.0	448059	382470	1822	9	✓	∅	✓	∅		
15	DG	12:45	22	58.5	87.7	449774	382486	1824	2	904	∅	632	∅		
17	DS	9:00	21	60.1	87.5	449305	382597	1826	2	✓	∅	✓	∅		
18	DS	8:20	23	60.8	87.3	449909	382597	1827	1	✓	∅	✓	∅		
19	DS	8:45	26	61.5	85.6	453005	385681	1838	11	✓	∅	634	2		
20	DS	8:30	25	62.2	85.4	453536	385681	1839	1	✓	∅	✓	∅		
21	DS	11:15	27	63.1	84.1	455977	388739	1849	10	✓	∅	635	1		
23	DS	8:30	27	64.6	81.7	460912	392984	1866	17	✓	∅	638	3		
24	KF	1140	29	65.4	80.3	463126	395540	1876	10	✓	∅	639	1		
25	KF	1050	29	66.1	78.7	466108	398225	1886	10	✓	∅	641	2		
26	KF	1050	32	66.8	77.1	469288	401403	1897	11	✓	∅	644	3		
27	KF	930	31	67.8	75.6	472155	404264	1907	10	✓	∅	648	4		
28	KF	920	32	68.5	74.3	474922	406892	1917	10	✓	∅	649	1		
29	KF	1040	34	69.4	71.0	476958	409293	1926	9	✓	∅	652	2		
30	FZ	12:50	37°	70.3	68.2	480299	412358	1937	11	✓	∅	655	3		

July

2021

LAGOONS

DATE	OPT	TIME	TEMP	STORAGE 1 %	STORAGE 2 %	DESERT TOTAL FLOW m ³	MEADOW TOTAL FLOW m ³	#1 TOTAL HRS	#1 DAILY HRS	#2 TOTAL HRS	#2 DAILY HRS	#3 TOTAL HRS	#3 DAILY HRS	#4 TOTAL HRS (9A)	#4 DAILY HRS (9A)
7	DG	10:10	33	71	70	492537	415020	1947	10	904	∅	657	2		
4	DG	8:00	29	73	64	491567	423407	1979	32	✓	∅	669	12		
5	DG	1:25	32	75	63	493856	425849	1989	10	✓	∅	672	3		
7	DS	12:50	27	76	59	499942	431549	2010	21	✓	∅	683	11		
8	F.2	10:35	27°	77.0	57.4	503349	434387	2022	12	✓	∅	687	4		
9	F.2	10:40	29°	77.9	55.8	506272	437010	2032	10	✓	∅	692	5		
10	F.2	10:30	29°	78.8	54.4	508542	439468	2041	9	✓	∅	695	3		
11	F.2	10:20	30°	79.5	52.8	510877	441619	2049	8	✓	∅	700	5		
12	F.2	10:50	30°	80.0	51.8	512525	443289	2057	8	✓	∅	702	2		
13	F.2	10:50	29°	78.9	52.2	514007	446013	2063	6	✓	∅	✓	∅		
14	F.2	13:15	32°	76.9	53.5	517270	447693	2073	10	✓	∅	703	1		
15	DS	8:50	29°	75.0	53.5	519987	450340	2084	11	✓	∅	✓	∅		
17	DS	8:20	27°	70.5	55.3	526047	456689	2105	21	✓	∅	709	6		
18	DS	8:45	27°	68.4	55.8	529051	458846	2116	11	✓	∅	709	∅		
19	KF	11:15	29	66.2	57.5	531452	462247	✓	∅	✓	∅	720	1		
20	DS	8:15	28	64.6	57.9	533502	464524	✓	∅	905	1	728	8		
21	DS	9:00		62.1	59.0	536568	467814	✓	∅	907	2	739	11		
23	KF	11:10	27	58.6	60.4	540476	472614	✓	∅	909	2	756	17		
24	KF	9:25	26	56.3	60.6	542249	475930	✓	∅	910	1	767	11		
25	KF	9:50	28	54.9	61.7	544094	477596	✓	∅	911	1	773	6		
26	KF	9:20	29	53.8	62.2	545358	478282	✓	∅	✓	∅	779	6		
27	DG	11:15	30	52.2	63.0	546720	480260	✓	∅	✓	∅	786	7		
28	F.3	10:05	29°	50.4	63.9	548686	482858	✓	∅	✓	∅	795	9		
29	F.3	12:50	30°	48.8	64.4	549980	484748	✓	∅	✓	∅	802	7		
30	F.2	11:30	30°	48.4	65.2	549980	484924	✓	∅	✓	∅	804	2		

AUG

2021

LAGOONS

DATE	OPT	TIME	TEMP	STORAGE 1 %	STORAGE 2 %	DESERT TOTAL FLOW m ³	MEADOW TOTAL FLOW m ³	#1 TOTAL HRS	#1 DAILY HRS	#2 TOTAL HRS	#2 DAILY HRS	#3 TOTAL HRS	#3 DAILY HRS	#4 TOTAL HRS (9A)	#4 DAILY HRS (9A)
1	FZ	10:30	32°	50.3	62.3	553122	488421	2116	∅	917	6	818	14		
2	FZ	10:50	30°	51.4	62.3	553122	488676	✓	∅	✓	∅	820	2		
3	FZ	11:25	30°	52.4	62.2	553122	488676	✓	∅	✓	∅	822	2		
4	FZ	11:38	31°	53.3	60.3	555767	491468	✓	∅	921	4	832	10		
5	DG	9:30	31	54.2	60.1	555767	491470	✓	∅	✓	∅	833	1		
6	DG	11:40	31	55.1	57.7	558627	494830	✓	∅	927	6	844	11		
7	DG	6:15	28	55.8	55.7	560247	496912	✓	∅	930	3	852	8		
8	DG	9:50	25	56.8	56.2	560247	496948	✓	∅	930	∅	854	2		
9	DG	12:40	27	57.7	56.4	560247	496948	✓	∅	✓	∅	✓	∅		
10	DG	8:55	✓	58.5	53.3	562952	500316	✓	∅	936	6	865	4		
11	DG	9:38	30	59.5	52.5	563048	503058	✓	∅	✓	∅	872	7		
12	DS	8:30	31	60.5	51.3	565508	504068	✓	∅	✓	∅	879	7		
13	DS	10:40	29	61.3	49.8	568470	507129	✓	∅	938	2	891	12		
14	DS	8:20	27	62.2	48.0	568643	509527	✓	∅	✓	∅	898	7		
15	DS	8:30	28	63.2	46.6	571340	511724	✓	∅	939	1	907	9		
16	DS	8:15	29	64.1	45.3	573705	513733	✓	∅	✓	∅	916	9		
17	DS	8:30	27	62.9	46.3	575697	515480	✓	∅	✓	∅	923	7		
18	DS	8:50	25	61.3	47.3	578287	517156	✓	∅	939	∅	930	7		
19	DS	8:50	26	59.8	48.0	581131	518838	✓	∅	✓	∅	938	8		
20	KF	11:35	28	59.2	49.5	581456	518924	✓	∅	✓	∅	940	2		
21	KF	9:25	27	57.8	49.8	584110	520777	✓	∅	✓	∅	948	8		
22	KF	9:15	26	57.5	50.9	584110	520986	✓	∅	✓	∅	950	2		
23	KF	10:35	25	56.7	52.0	✓	522697	✓	∅	✓	∅	953	3		
24	KF	10:45	24	55.3	52.8	586666	524256	✓	∅	✓	∅	960	7		
25	KF	11:25	24	54.1	54.0	588868	525612	✓	∅	✓	∅	966	6		
26	DG	12:50	27	52.8	54.3	591043	527092	✓	∅	✓	∅	973	7		
27	DG	9:50	25	51.8	54.8	591269	528870	2116	∅	939	∅	978	5		
28	DG	10:40	24	51.5	55.9	591269	528870	✓	∅	✓	∅	979	1		
29	DG	6:05	26	51.0	56.7	591274	529087	✓	∅	✓	∅	981	2		
30	DG	12:05	26	49.5	57.4	593274	530954	✓	✓	✓	✓	989	6		
31	DG	9:05	24	49.3	57.9	✓	✓	✓	✓	✓	✓	✓	∅		

Sept

2021

LAGOONS

DATE	OPT	TIME	TEMP	STORAGE 1 %	STORAGE 2 %	DESERT TOTAL FLOW m ³	MEADOW TOTAL FLOW m ³	#1 TOTAL HRS	#1 DAILY HRS	#2 TOTAL HRS	#2 DAILY HRS	#3 TOTAL HRS	#3 DAILY HRS	#4 TOTAL HRS (9A)	#4 DAILY HRS (9A)
1	DG	1:30	15	47.6	58.9	596398	533002	2116	439 0	938	0	998	10		
3	DS	1:30	26	45.6	60.3	599023	535198	2116	0	939	0	1007	9		
4	F2	11:10	25°	45.3	60.9	599023	535198	✓	0	✓	0	1008	1		
5	F2	10:15	28°	43.8	61.3	601144	537048	✓	0	✓	0	1015	7		
6	F2	10:45	26°	44.8	60.0	603738	539238	✓	0	✓	0	1025	10		
7	F2	14:40	29°	45.9	58.7	606362	541403	✓	0	940	1	1034	9		
8	F2	8:05	25°	46.5	58.3	606367	541403	✓	0	✓	0	1035	1		
9	SS	10:30	26°	47.4	58.4	606367	541403	✓	0	✓	0	1036	1		
10	DS	11:00	26°	48.2	56.7	608728	543570	✓	0	✓	0	1046	10		
11	DS	8:50	25°	49.0	56.4	608732	543570	✓	0	✓	0	1047	1		
12	DS	8:20	25°	49.9	56.2	608737	543570	✓	0	✓	0	1049	2		
13	DS	1:30	27°	50.9	56.4	608737	543570	✓	0	✓	0	1050	1		
14	DC	7:40	25	51.6	54.6	611635	545743	✓	0	941	1	1059	9		
15	DS	11:35	25	52.4	54.5	611372	545743	✓	0	✓	0	1061	2		
16	KF	1:15	24	53.0	53.4	612879	547931	✓	0	✓	0	1069	8		
17	KF	12:45	23	53.6	52.3	615468	547931	✓	0	✓	0	1073	4		
18	KF	10:10	23	54.3	52.2	615476	547931	✓	0	✓	0	1075	2		
19	KF	9:35	22	55.1	52.0	615476	✓	✓	0	✓	0	1076	1		
20	KF	10:55	22	55.9	52.3	✓	✓	✓	0	✓	0	✓	0		
21	KF	12:50	24	56.7	52.1	615487	✓	✓	0	✓	0	1077	1		
23	SS	11:00	22	58.0	50.5	618119	549991	✓	0	✓	0	1088	11		
26	DG	11:30	24	60.3	47.9	621222	553055	✓	0	943	2	1101	13		
30	KF	10:35	22	63.1	45.7	624150	555699	✓	0	✓	0	1115	14		

APPENDIX E

Seasonal Precipitation Summary: 2009 - 2020
for Osoyoos, BC (Station: Osoyoos CS, OC 7.2.4.12)

Seasonal Precipitation Summary: 2009 - 2021
Total Monthly Precipitation (mm) for Osoyoos CS

Month	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	Total for Season
Climate Normals 1971-2000	27.8	25.5	22.5	23.5	37.4	35.9	24.3	21.2	16.1	17.1	32.1	34.2	175.5
2009	-	-	-	13.8	35.8	47.0	63.4	61.0	34.2	27.2*	11.8	-	282.4
2010	-	-	12.2	22.6	90.2	61.4	19.0*	5.4*	28.2*	16.8	13.6	-	243.6
2011	-	-	51.4	13.4	65.6	6.2*	19.2*	2.6*	5.0*	18.6	18.8	-	130.6
2012	-	-	54.2*	34.0	17.6	79.8*	49.5*	2.1*	0.7*	35.4*	58.7	61.5	219
2013	18.9	5.3	12.6	15.6	19.5	41.5	4.0	15.9	50.7	7.0	20.7	13.3*	154.2
2014	12.3	31.6	9.1	19.4	15.4	23.7*	24.9	9.8	7.6	28.2	51.5	28.9	129.0
2015	23.7	10.1	14.5	4.8	36.6	33.9	8.2	7.5	0.6	15.2	27.4	74.6*	106.8
2016	34.3*	21.7	42.0	9.3	12.8	32.3	25.0	20.3	7.0	59.7	36.3	15.0	166.4
2017	25.4	19.8	31.2	71.7	52.2	8.2	0.0	0.6	0.9	6.2	48.4	28.9	139.8
2018	65.6	18.0	58.7	39.1	35.9*	35.5	4.5	0.0	5.7	17.8	16.1	33.0	138.5*
2019	22.9	15.9	16.7	10.5	0.4*	M	M	M	M	M	M	M	10.9*
2020	M	M	M	M	M	43.3	5.1	5.7	2.2	30.4	31.8	32.0	150.5*
2021	45.3	22.9	2.3	14.3*	0.0	33.5	2.7	7.5	7.4	53.8	25.6	31.5	246.8*

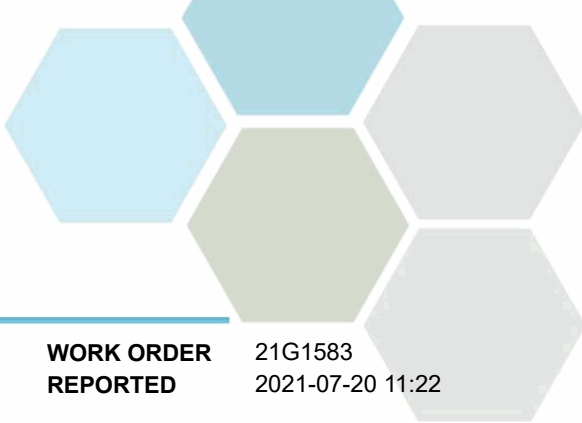
*The value displayed is based on incomplete data

M = Missing Data

Data compiled from Environment Canada

APPENDIX F

Analytical Reports (OC 5.2.2, 5.3.2, 5.5.3, 5.6.2)

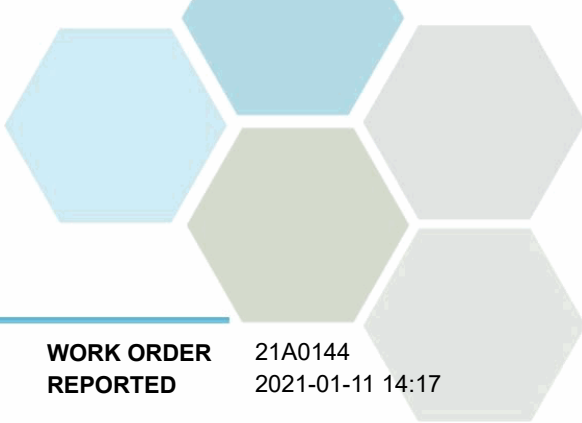


TEST RESULTS

REPORTED TO PROJECT Osoyoos, Town of Lagoons

WORK ORDER REPORTED 21G1583
2021-07-20 11:22

Analyte	Result	Guideline	RL Units	Analyzed	Qualifier
Lagoons-E207444 (21G1583-01) Matrix: Water Sampled: 2021-07-13 13:00					
Anions					
Nitrate (as N)	13.5	MAC = 10	0.010 mg/L	2021-07-14	
Nitrite (as N)	0.938	MAC = 1	0.010 mg/L	2021-07-14	
Calculated Parameters					
Nitrate+Nitrite (as N)	14.4	N/A	0.100 mg/L	N/A	
Nitrogen, Total	18.1	N/A	0.100 mg/L	N/A	
General Parameters					
Nitrogen, Total Kjeldahl	3.68	N/A	0.050 mg/L	2021-07-19	
Phosphorus, Total (as P)	0.826	N/A	0.0050 mg/L	2021-07-16	
Microbiological Parameters					
Coliforms, Total	> 2420	MAC = 0	1 MPN/100 mL	2021-07-14	
Coliforms, Fecal	248	0	1 MPN/100 mL	2021-07-14	

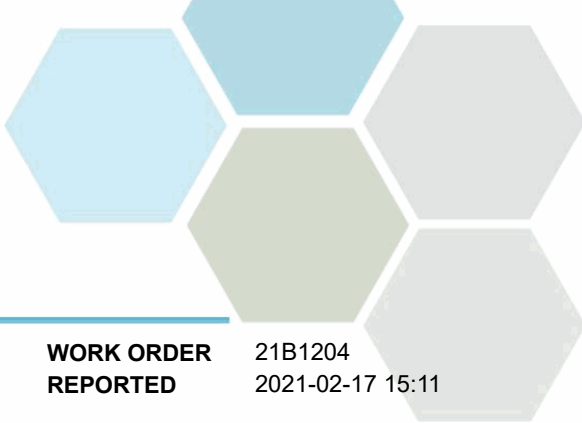


TEST RESULTS

REPORTED TO PROJECT Osoyoos, Town of
Wastewater- PE12214

WORK ORDER REPORTED 21A0144
2021-01-11 14:17

Analyte	Result	RL	Units	Analyzed	Qualifier
Sewer Lagoon E105001 (21A0144-01) Matrix: Wastewater Sampled: 2021-01-05 08:25					
<i>General Parameters</i>					
BOD, 5-day	33.1	2.0	mg/L	2021-01-11	
Solids, Total Suspended	25.7	2.0	mg/L	2021-01-07	

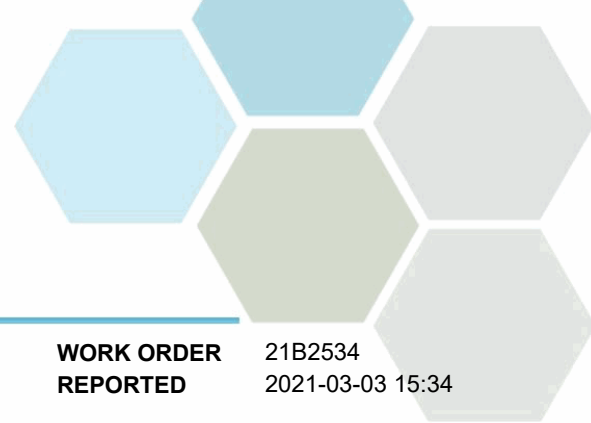


TEST RESULTS

REPORTED TO PROJECT Osoyoos, Town of
Wastewater- PE12214

WORK ORDER REPORTED 21B1204
2021-02-17 15:11

Analyte	Result	RL	Units	Analyzed	Qualifier
Sewer Lagoon E105001 (21B1204-01) Matrix: Wastewater Sampled: 2021-02-09 12:55					
<i>General Parameters</i>					
BOD, 5-day	42.6	2.0	mg/L	2021-02-16	
Solids, Total Suspended	39.3	2.0	mg/L	2021-02-16	



TEST RESULTS

REPORTED TO PROJECT Osoyoos, Town of
Wastewater- PE12214

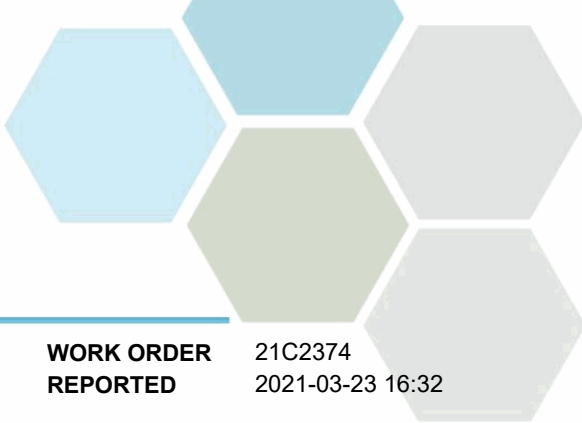
WORK ORDER REPORTED 21B2534
2021-03-03 15:34

Analyte	Result	RL	Units	Analyzed	Qualifier
Sewer Lagoon E105001 (21B2534-01) Matrix: Wastewater Sampled: 2021-02-23 11:05					
<i>General Parameters</i>					
BOD, 5-day	29.6	2.0	mg/L	2021-03-02	
Chemical Oxygen Demand	120	20	mg/L	2021-02-26	
Oil & Grease, Total	2.8	2.0	mg/L	2021-03-01	
Oil & Grease, Mineral	< 2.0	2.0	mg/L	2021-03-01	
pH	7.80	0.10	pH units	2021-02-25	HT2
Solids, Total Suspended	31.0	2.0	mg/L	2021-02-26	

Sample Qualifiers:

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

DRAFT



TEST RESULTS

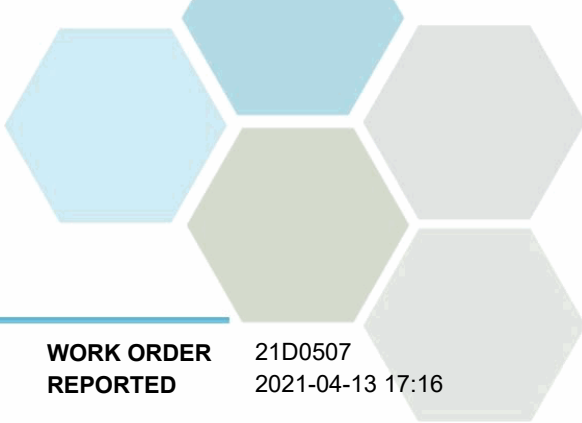
REPORTED TO PROJECT Osoyoos, Town of
Wastewater- PE12214

WORK ORDER REPORTED 21C2374
2021-03-23 16:32

Analyte	Result	RL	Units	Analyzed	Qualifier
Sewer Lagoon E105001 (21C2374-01) Matrix: Wastewater Sampled: 2021-03-16 11:25					FILT, PRES
Anions					
Nitrate (as N)	0.149	0.010	mg/L	2021-03-18	
Nitrite (as N)	0.081	0.010	mg/L	2021-03-18	
Phosphate (as P)	3.70	0.0050	mg/L	2021-03-18	
Calculated Parameters					
Nitrate+Nitrite (as N)	0.230	0.0100	mg/L	N/A	
Nitrogen, Total	45.1	1.00	mg/L	N/A	
General Parameters					
Ammonia, Total (as N)	38.6	0.050	mg/L	2021-03-18	
Nitrogen, Total Kjeldahl	44.8	0.050	mg/L	2021-03-23	
Phosphorus, Total (as P)	5.07	0.0050	mg/L	2021-03-23	
Phosphorus, Total Dissolved	4.76	0.0050	mg/L	2021-03-23	

Sample Qualifiers:

FILT The sample has been filtered for TDP in the laboratory. Results may not reflect conditions at the time of sampling.
PRES Sample has been preserved for TDP in the laboratory and the holding time has been extended.

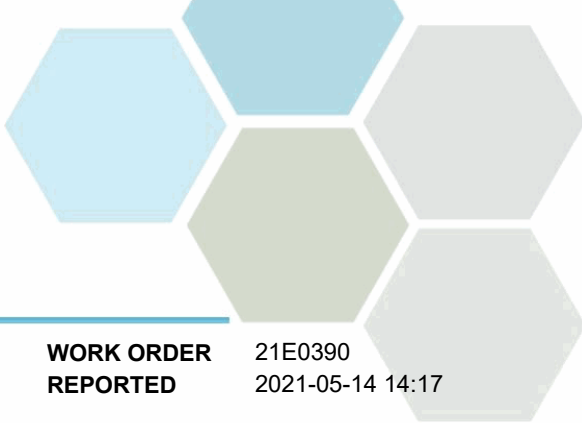


TEST RESULTS

REPORTED TO PROJECT Osoyoos, Town of
Wastewater- PE12214

WORK ORDER REPORTED 21D0507
2021-04-13 17:16

Analyte	Result	RL	Units	Analyzed	Qualifier
Sewer Lagoon E207444 (21D0507-01) Matrix: Water Sampled: 2021-04-06 11:50					
<i>Microbiological Parameters</i>					
Coliforms, Total	33	1	MPN/100 mL	2021-04-07	
Coliforms, Fecal	4	1	MPN/100 mL	2021-04-07	
Sewer Lagoon E105001 (21D0507-02) Matrix: Wastewater Sampled: 2021-04-06 11:45					
<i>General Parameters</i>					
BOD, 5-day	95.0	2.0	mg/L	2021-04-13	
Solids, Total Suspended	21.8	2.0	mg/L	2021-04-09	



TEST RESULTS

REPORTED TO PROJECT Osoyoos, Town of
Wastewater- PE12214

WORK ORDER REPORTED 21E0390
2021-05-14 14:17

Analyte	Result	RL	Units	Analyzed	Qualifier
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Sewer Lagoon E207444 (21E0390-01) | Matrix: Water | Sampled: 2021-05-04 11:35

Microbiological Parameters

Coliforms, Total	< 1	1	MPN/100 mL	2021-05-05	
Coliforms, Fecal	< 1	1	MPN/100 mL	2021-05-05	

Sewer Lagoon E105001 (21E0390-02) | Matrix: Wastewater | Sampled: 2021-05-04 11:25

PRES

Calculated Parameters

Total Trihalomethanes	< 0.00400	0.00400	mg/L	N/A	
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General Parameters

BOD, 5-day Carbonaceous	42.9	2.0	mg/L	2021-05-11	
Solids, Total Suspended	41.5	2.0	mg/L	2021-05-11	

Haloacetic Acids

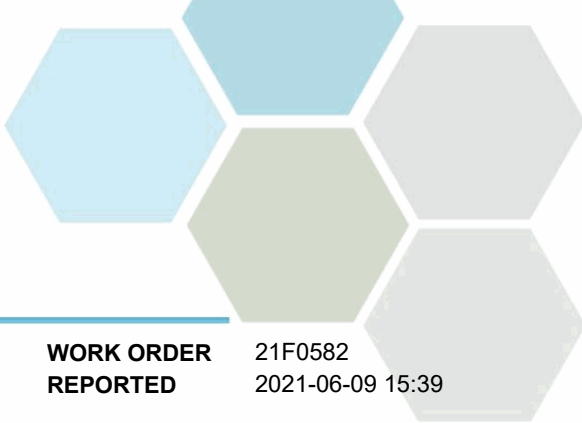
Monochloroacetic Acid	< 0.0020	0.0020	mg/L	2021-05-14	
Monobromoacetic Acid	< 0.0020	0.0020	mg/L	2021-05-14	
Dichloroacetic Acid	< 0.0020	0.0020	mg/L	2021-05-14	
Trichloroacetic Acid	< 0.0020	0.0020	mg/L	2021-05-14	
Dibromoacetic Acid	< 0.0020	0.0020	mg/L	2021-05-14	
Total Haloacetic Acids (HAA5)	< 0.00200	0.00200	mg/L	N/A	
Surrogate: 2-Bromopropionic Acid	104	70-130	%	2021-05-14	

Volatile Organic Compounds (VOC)

Bromodichloromethane	< 0.0010	0.0010	mg/L	2021-05-12	
Bromoform	< 0.0010	0.0010	mg/L	2021-05-12	
Chloroform	< 0.0010	0.0010	mg/L	2021-05-12	
Dibromochloromethane	< 0.0010	0.0010	mg/L	2021-05-12	
Surrogate: Toluene-d8	89	70-130	%	2021-05-12	
Surrogate: 4-Bromofluorobenzene	121	70-130	%	2021-05-12	

Sample Qualifiers:

PRES Sample has been preserved for THM, HAA in the laboratory and the holding time has been extended.

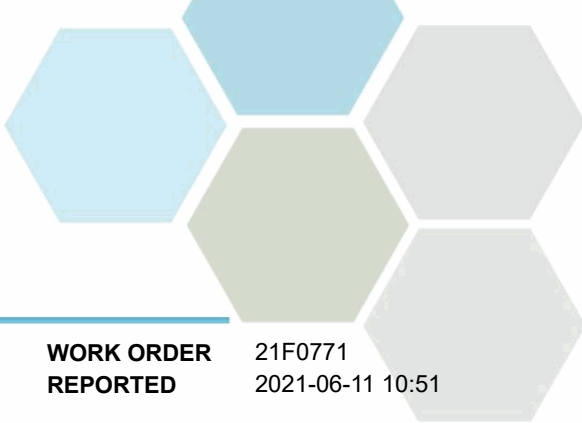


TEST RESULTS

REPORTED TO PROJECT Osoyoos, Town of
Wastewater- PE12214

WORK ORDER REPORTED 21F0582
2021-06-09 15:39

Analyte	Result	RL	Units	Analyzed	Qualifier
Sewer Site E105001 (21F0582-01) Matrix: Water Sampled: 2021-06-01 13:35					
<i>General Parameters</i>					
BOD, 5-day Carbonaceous	13.0	2.0	mg/L	2021-06-09	
Solids, Total Suspended	57.0	2.0	mg/L	2021-06-07	

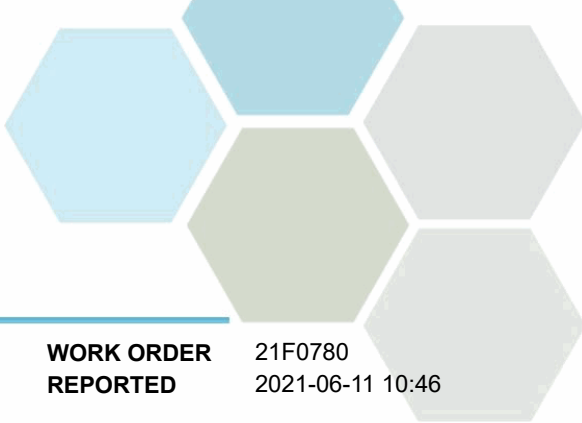


TEST RESULTS

REPORTED TO PROJECT Osoyoos, Town of
Wastewater- PE12214

WORK ORDER REPORTED 21F0771
2021-06-11 10:51

Analyte	Result	RL	Units	Analyzed	Qualifier
Sewer Lagoon E105001 (21F0771-01) Matrix: Wastewater Sampled: 2021-06-04 11:10					
<i>General Parameters</i>					
BOD, 5-day Carbonaceous	6.0	2.0	mg/L	2021-06-10	
Solids, Total Suspended	32.0	2.0	mg/L	2021-06-10	

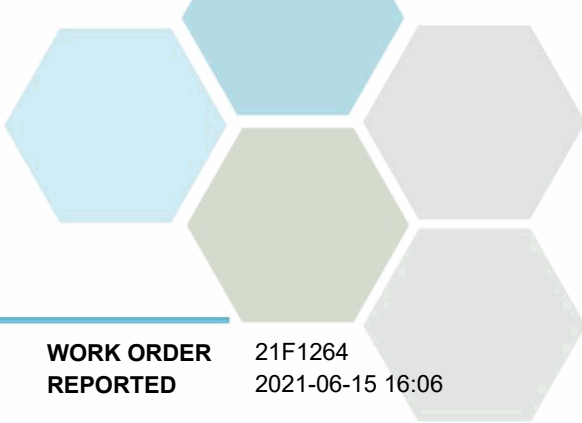


TEST RESULTS

REPORTED TO PROJECT Osoyoos, Town of
Wastewater- PE12214

WORK ORDER REPORTED 21F0780
2021-06-11 10:46

Analyte	Result	RL	Units	Analyzed	Qualifier
Sewer Lagoon E105001 (21F0780-01) Matrix: Wastewater Sampled: 2021-06-03 13:15					
<i>General Parameters</i>					
BOD, 5-day Carbonaceous	10.0	2.0	mg/L	2021-06-10	
Solids, Total Suspended	30.8	2.0	mg/L	2021-06-10	



TEST RESULTS

REPORTED TO PROJECT Osoyoos, Town of
Wastewater- PE12214

WORK ORDER REPORTED 21F1264
2021-06-15 16:06

Analyte	Result	RL	Units	Analyzed	Qualifier
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Sewer Lagoon E207444 (21F1264-01) | Matrix: Water | Sampled: 2021-06-08 12:55

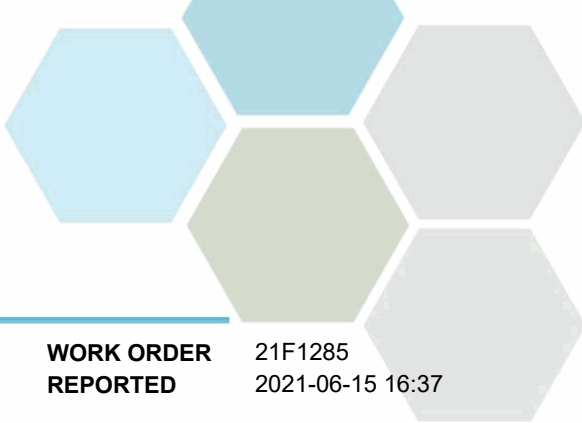
Microbiological Parameters

Coliforms, Total	93	1	MPN/100 mL	2021-06-09	
Coliforms, Fecal	< 1	1	MPN/100 mL	2021-06-09	

Sewer Lagoon E105001 (21F1264-02) | Matrix: Wastewater | Sampled: 2021-06-08 13:05

General Parameters

BOD, 5-day Carbonaceous	10.0	2.0	mg/L	2021-06-15	
Solids, Total Suspended	25.8	2.0	mg/L	2021-06-12	

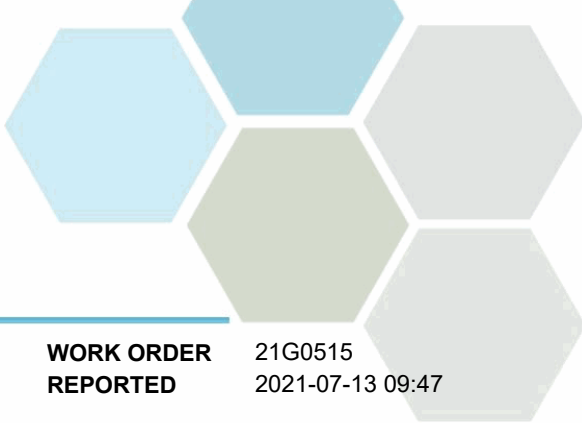


TEST RESULTS

REPORTED TO PROJECT Osoyoos, Town of
Wastewater- PE12214

WORK ORDER REPORTED 21F1285
2021-06-15 16:37

Analyte	Result	RL	Units	Analyzed	Qualifier
Sewer Lagoon E105001 (21F1285-01) Matrix: Wastewater Sampled: 2021-06-07 13:20					
<i>General Parameters</i>					
BOD, 5-day Carbonaceous	7.0	2.0	mg/L	2021-06-15	
Solids, Total Suspended	48.8	2.0	mg/L	2021-06-11	

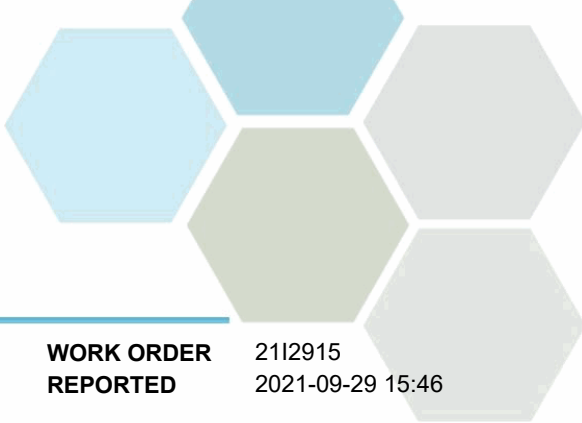


TEST RESULTS

REPORTED TO PROJECT Osoyoos, Town of
Wastewater- PE12214

WORK ORDER REPORTED 21G0515
2021-07-13 09:47

Analyte	Result	RL	Units	Analyzed	Qualifier
Sewer Site E105001 (21G0515-01) Matrix: Water Sampled: 2021-07-06 07:55					
<i>General Parameters</i>					
BOD, 5-day Carbonaceous	7.0	2.0	mg/L	2021-07-12	
Solids, Total Suspended	18.0	2.0	mg/L	2021-07-11	
Sewer Site E207444 (21G0515-02) Matrix: Water Sampled: 2021-07-06 07:50					
<i>Microbiological Parameters</i>					
Coliforms, Total	16	1	MPN/100 mL	2021-07-07	
Coliforms, Fecal	< 1	1	MPN/100 mL	2021-07-07	



TEST RESULTS

REPORTED TO PROJECT Osoyoos, Town of
Wastewater- PE12214

WORK ORDER REPORTED 2112915
2021-09-29 15:46

Analyte	Result	RL	Units	Analyzed	Qualifier
Sewer Lagoon E207444 (2112915-01) Matrix: Water Sampled: 2021-09-21 13:30					
<i>Anions</i>					
Nitrate (as N)	2.78	0.010	mg/L	2021-09-24	
Nitrite (as N)	0.436	0.010	mg/L	2021-09-24	
<i>Calculated Parameters</i>					
Nitrate+Nitrite (as N)	3.22	0.0100	mg/L	N/A	
Nitrogen, Total	23.3	0.400	mg/L	N/A	
<i>General Parameters</i>					
Nitrogen, Total Kjeldahl	20.1	0.050	mg/L	2021-09-28	
Phosphorus, Total (as P)	6.96	0.0050	mg/L	2021-09-28	
<i>Microbiological Parameters</i>					
Coliforms, Total	< 1	1	MPN/100 mL	2021-09-22	
Coliforms, Fecal	< 1	1	MPN/100 mL	2021-09-22	

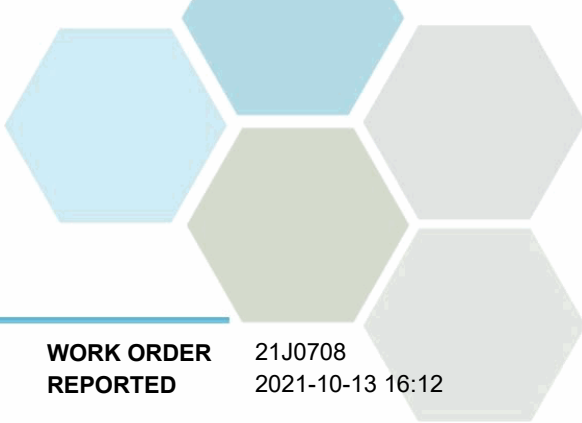
Sewer Site E105001 (2112915-02) | Matrix: Water | Sampled: 2021-09-21 13:05

FILT,
PRES

<i>Anions</i>					
Nitrate (as N)	5.76	0.010	mg/L	2021-09-24	
Nitrite (as N)	3.64	0.010	mg/L	2021-09-24	
Phosphate (as P)	4.95	0.0050	mg/L	2021-09-24	
<i>Calculated Parameters</i>					
Nitrate+Nitrite (as N)	9.40	0.0100	mg/L	N/A	
Nitrogen, Total	22.3	0.500	mg/L	N/A	
<i>General Parameters</i>					
Ammonia, Total (as N)	7.79	0.050	mg/L	2021-09-24	
BOD, 5-day Carbonaceous	< 7.4	2.0	mg/L	2021-09-28	
Nitrogen, Total Kjeldahl	12.9	0.050	mg/L	2021-09-28	
Phosphorus, Total (as P)	5.83	0.0050	mg/L	2021-09-28	
Phosphorus, Total Dissolved	5.73	0.0050	mg/L	2021-09-28	
Solids, Total Suspended	6.8	2.0	mg/L	2021-09-26	

Sample Qualifiers:

FILT The sample has been filtered for TDP in the laboratory. Results may not reflect conditions at the time of sampling.
PRES Sample has been preserved for TDP in the laboratory and the holding time has been extended.

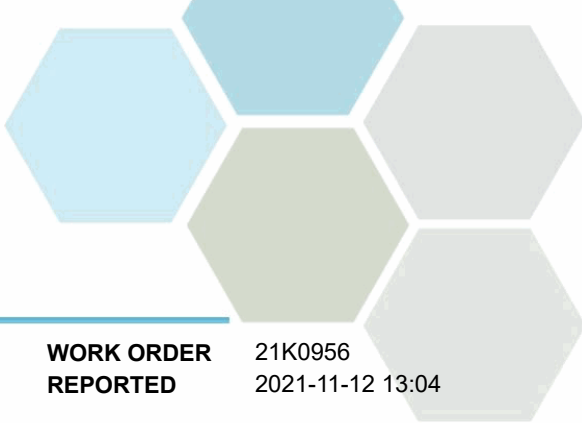


TEST RESULTS

REPORTED TO PROJECT Osoyoos, Town of
Wastewater- PE12214

WORK ORDER REPORTED 21J0708
2021-10-13 16:12

Analyte	Result	RL	Units	Analyzed	Qualifier
Sewer Site E207444 (21J0708-01) Matrix: Water Sampled: 2021-10-05 13:00					
<i>Microbiological Parameters</i>					
Coliforms, Total	< 1	1	MPN/100 mL	2021-10-06	
Coliforms, Fecal	< 1	1	MPN/100 mL	2021-10-06	
Sewer Site E105001 (21J0708-02) Matrix: Water Sampled: 2021-10-05 13:15					
<i>General Parameters</i>					
BOD, 5-day Carbonaceous	< 4.6	2.0	mg/L	2021-10-12	
Solids, Total Suspended	6.4	2.0	mg/L	2021-10-08	

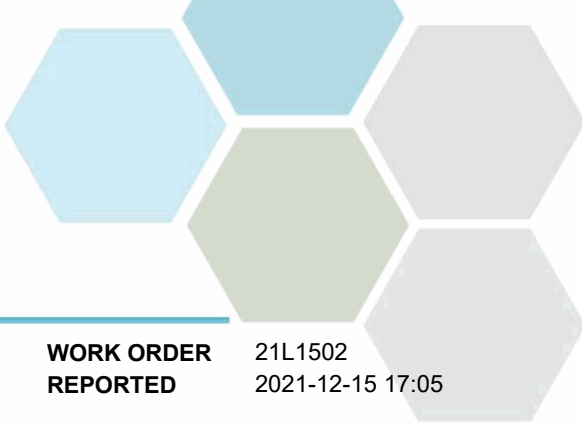


TEST RESULTS

REPORTED TO PROJECT Osoyoos, Town of
Wastewater- PE12214

WORK ORDER REPORTED 21K0956
2021-11-12 13:04

Analyte	Result	RL	Units	Analyzed	Qualifier
Sewer Site E105001 (21K0956-01) Matrix: Water Sampled: 2021-11-05 08:30					
<i>General Parameters</i>					
BOD, 5-day Carbonaceous	7.2	2.0	mg/L	2021-11-11	
Solids, Total Suspended	4.8	2.0	mg/L	2021-11-10	

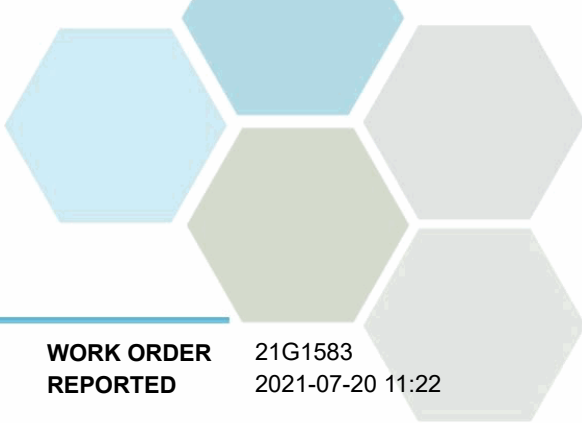


TEST RESULTS

REPORTED TO PROJECT Osoyoos, Town of
Wastewater- PE12214

WORK ORDER REPORTED 21L1502
2021-12-15 17:05

Analyte	Result	RL	Units	Analyzed	Qualifier
Sewer Site E105001 (21L1502-01) Matrix: Water Sampled: 2021-12-09 08:30					
<i>General Parameters</i>					
BOD, 5-day Carbonaceous	16.0	2.0	mg/L	2021-12-15	
Solids, Total Suspended	13.6	2.0	mg/L	2021-12-13	

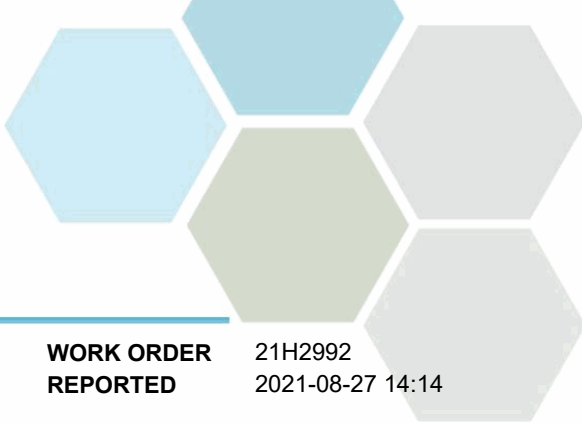


TEST RESULTS

REPORTED TO PROJECT Osoyoos, Town of Lagoons

WORK ORDER REPORTED 21G1583
2021-07-20 11:22

Analyte	Result	Guideline	RL Units	Analyzed	Qualifier
Lagoons-E207444 (21G1583-01) Matrix: Water Sampled: 2021-07-13 13:00					
Anions					
Nitrate (as N)	13.5	MAC = 10	0.010 mg/L	2021-07-14	
Nitrite (as N)	0.938	MAC = 1	0.010 mg/L	2021-07-14	
Calculated Parameters					
Nitrate+Nitrite (as N)	14.4	N/A	0.100 mg/L	N/A	
Nitrogen, Total	18.1	N/A	0.100 mg/L	N/A	
General Parameters					
Nitrogen, Total Kjeldahl	3.68	N/A	0.050 mg/L	2021-07-19	
Phosphorus, Total (as P)	0.826	N/A	0.0050 mg/L	2021-07-16	
Microbiological Parameters					
Coliforms, Total	> 2420	MAC = 0	1 MPN/100 mL	2021-07-14	
Coliforms, Fecal	248	0	1 MPN/100 mL	2021-07-14	

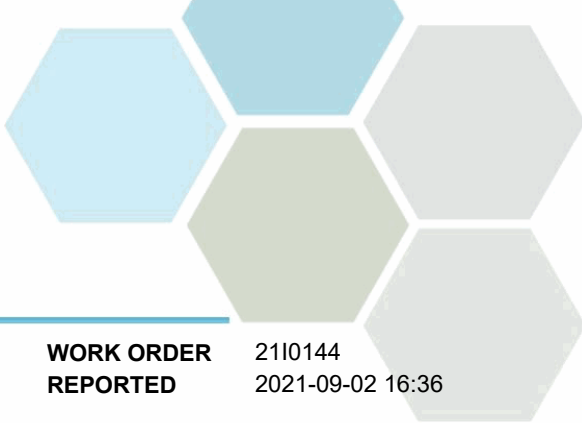


TEST RESULTS

REPORTED TO PROJECT Osoyoos, Town of Lagoons

WORK ORDER REPORTED 21H2992
2021-08-27 14:14

Analyte	Result	Guideline	RL	Units	Analyzed	Qualifier
Lagoons-E207444 (21H2992-01) Matrix: Water Sampled: 2021-08-24 12:00						
<i>Microbiological Parameters</i>						
Coliforms, Total	10	MAC = 0	1	MPN/100 mL	2021-08-25	
Coliforms, Fecal	< 1	0	1	MPN/100 mL	2021-08-25	

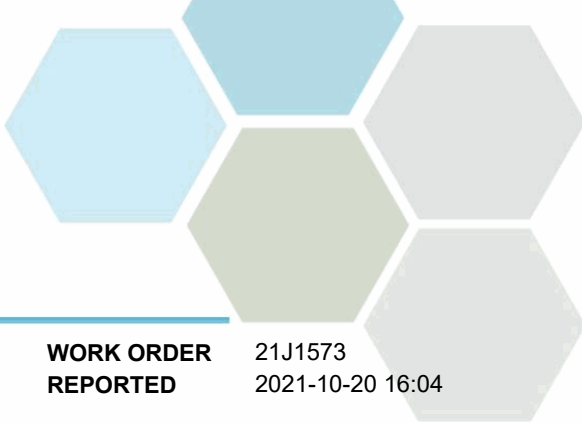


TEST RESULTS

REPORTED TO PROJECT Osoyoos, Town of Lagoons

WORK ORDER REPORTED 2110144
2021-09-02 16:36

Analyte	Result	Guideline	RL	Units	Analyzed	Qualifier
Lagoons-E207444 (2110144-01) Matrix: Water Sampled: 2021-08-31 11:50						
<i>Microbiological Parameters</i>						
Coliforms, Total	< 1	MAC = 0	1	MPN/100 mL	2021-09-01	
Coliforms, Fecal	< 1	0	1	MPN/100 mL	2021-09-01	



TEST RESULTS

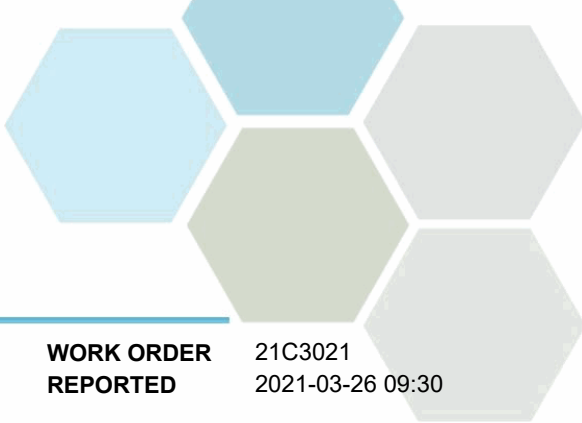
REPORTED TO PROJECT Osoyoos, Town of Lagoons

WORK ORDER REPORTED 21J1573
2021-10-20 16:04

Analyte	Result	Guideline	RL	Units	Analyzed	Qualifier
Sewage Ponds E207444 (21J1573-01) Matrix: Water Sampled: 2021-10-12 11:35						
Anions						
Nitrate+Nitrite (as N)	4.83	N/A	0.0050	mg/L	2021-10-19	
Nitrite (as N)	< 0.0050	MAC = 1	0.0050	mg/L	2021-10-15	CT5, HT1
Calculated Parameters						
Nitrate (as N)	4.83	MAC = 10	0.0500	mg/L		N/A
Nitrogen, Total	15.4	N/A	0.250	mg/L		N/A
General Parameters						
Nitrogen, Total Kjeldahl	10.6	N/A	0.050	mg/L	2021-10-18	
Phosphorus, Total (as P)	6.50	N/A	0.0050	mg/L	2021-10-20	
Microbiological Parameters						
Coliforms, Total	< 1	MAC = 0	1	MPN/100 mL	2021-10-13	
Coliforms, Fecal	< 1	N/A	1	MPN/100 mL	2021-10-13	

Sample Qualifiers:

- CT5 This sample has been incorrectly preserved for Nitrite analysis
- HT1 The sample was prepared and/or analyzed past the recommended holding time.

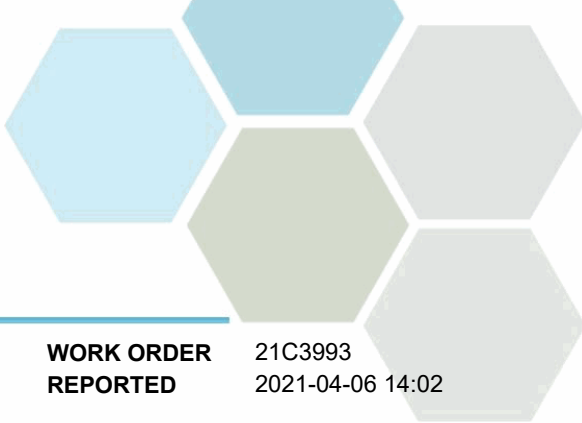


TEST RESULTS

REPORTED TO PROJECT Osoyoos, Town of
Wastewater- PE12214

WORK ORDER REPORTED 21C3021
2021-03-26 09:30

Analyte	Result	RL	Units	Analyzed	Qualifier
Sewer Lagoon E207444 (21C3021-01) Matrix: Water Sampled: 2021-03-23 08:50					
<i>Microbiological Parameters</i>					
Coliforms, Total	< 1	1	MPN/100 mL	2021-03-24	
Coliforms, Fecal	< 1	1	MPN/100 mL	2021-03-24	

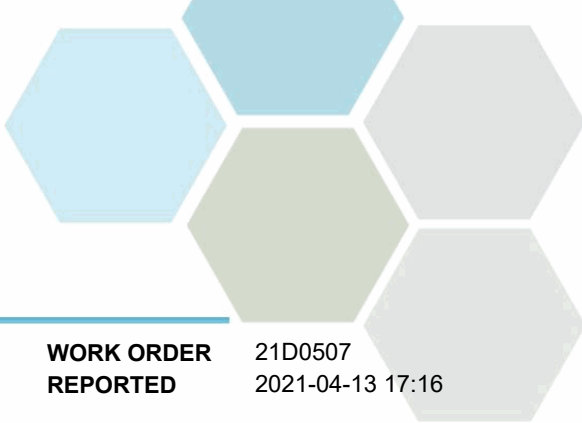


TEST RESULTS

REPORTED TO PROJECT Osoyoos, Town of
Wastewater- PE12214

WORK ORDER REPORTED 21C3993
2021-04-06 14:02

Analyte	Result	RL	Units	Analyzed	Qualifier
Sewer Lagoon E207444 (21C3993-01) Matrix: Water Sampled: 2021-03-30 11:15					
<i>Microbiological Parameters</i>					
Coliforms, Total	< 1	1	MPN/100 mL	2021-03-31	
Coliforms, Fecal	< 1	1	MPN/100 mL	2021-03-31	

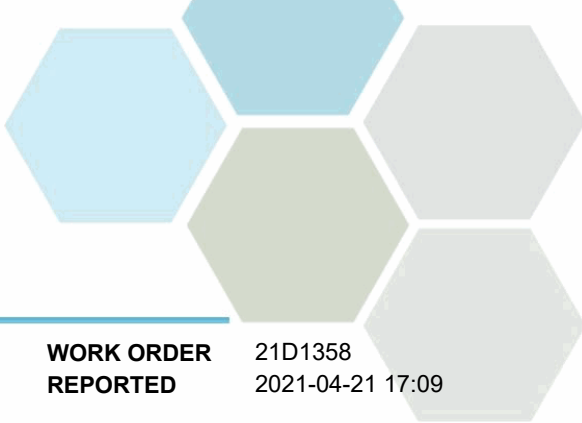


TEST RESULTS

REPORTED TO PROJECT Osoyoos, Town of
Wastewater- PE12214

WORK ORDER REPORTED 21D0507
2021-04-13 17:16

Analyte	Result	RL	Units	Analyzed	Qualifier
Sewer Lagoon E207444 (21D0507-01) Matrix: Water Sampled: 2021-04-06 11:50					
<i>Microbiological Parameters</i>					
Coliforms, Total	33	1	MPN/100 mL	2021-04-07	
Coliforms, Fecal	4	1	MPN/100 mL	2021-04-07	
Sewer Lagoon E105001 (21D0507-02) Matrix: Wastewater Sampled: 2021-04-06 11:45					
<i>General Parameters</i>					
BOD, 5-day	95.0	2.0	mg/L	2021-04-13	
Solids, Total Suspended	21.8	2.0	mg/L	2021-04-09	



TEST RESULTS

REPORTED TO PROJECT Osoyoos, Town of
Wastewater- PE12214

WORK ORDER REPORTED 21D1358
2021-04-21 17:09

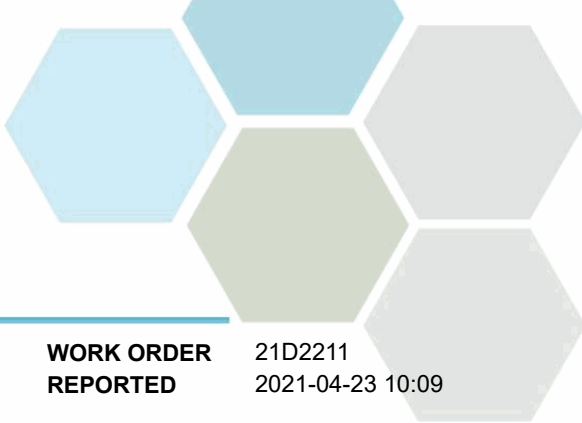
Analyte	Result	RL	Units	Analyzed	Qualifier
Sewer Lagoon E207444 (21D1358-01) Matrix: Water Sampled: 2021-04-13 11:30					
Anions					
Nitrate (as N)	6.22	0.010	mg/L	2021-04-14	
Nitrite (as N)	< 0.010	0.010	mg/L	2021-04-14	
Calculated Parameters					
Nitrate+Nitrite (as N)	6.22	0.0100	mg/L	N/A	
Nitrogen, Total	30.1	0.500	mg/L	N/A	
General Parameters					
BOD, 5-day	< 5.7	2.0	mg/L	2021-04-20	
Nitrogen, Total Kjeldahl	23.9	0.050	mg/L	2021-04-16	
Phosphorus, Total (as P)	4.98	0.0050	mg/L	2021-04-16	
Solids, Total Suspended	< 7.0	2.0	mg/L	2021-04-16	RS2
Microbiological Parameters					
Coliforms, Total	< 1	1	MPN/100 mL	2021-04-14	
Coliforms, Fecal	< 1	1	MPN/100 mL	2021-04-14	

Sewer Lagoon E232882 (21D1358-02) | Matrix: Wastewater | Sampled: 2021-04-13 11:40

General Parameters					
BOD, 5-day	< 5.7	2.0	mg/L	2021-04-20	
Oil & Grease, Total	< 2.0	2.0	mg/L	2021-04-20	
Oil & Grease, Mineral	< 2.0	2.0	mg/L	2021-04-20	
pH	7.94	0.10	pH units	2021-04-16	HT2
Solids, Total Suspended	9.4	2.0	mg/L	2021-04-16	

Sample Qualifiers:

- HT2 The 15 minute recommended holding time (from sampling to analysis) has been exceeded - field analysis is recommended.
- RS2 The Reporting Limits for this sample have been raised due to limited sample volume.

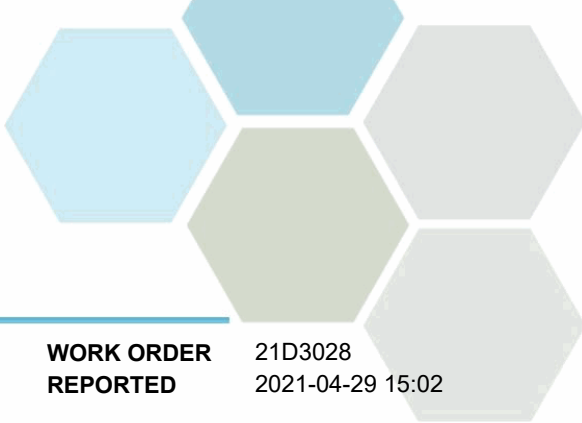


TEST RESULTS

REPORTED TO PROJECT Osoyoos, Town of
Wastewater- PE12214

WORK ORDER REPORTED 21D2211
2021-04-23 10:09

Analyte	Result	RL	Units	Analyzed	Qualifier
Sewer Lagoon E207444 (21D2211-01) Matrix: Water Sampled: 2021-04-20 11:55					
<i>Microbiological Parameters</i>					
Coliforms, Total	< 1	1	MPN/100 mL	2021-04-21	
Coliforms, Fecal	< 1	1	MPN/100 mL	2021-04-21	

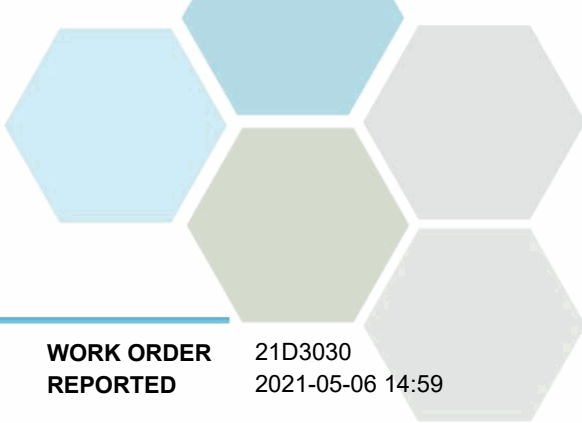


TEST RESULTS

REPORTED TO PROJECT Osoyoos, Town of
Wastewater- PE12214

WORK ORDER REPORTED 21D3028
2021-04-29 15:02

Analyte	Result	RL	Units	Analyzed	Qualifier
Sewer Site E207444 (21D3028-01) Matrix: Water Sampled: 2021-04-27 13:00					
<i>Microbiological Parameters</i>					
Coliforms, Total	< 1	1	MPN/100 mL	2021-04-28	
Coliforms, Fecal	< 1	1	MPN/100 mL	2021-04-28	



TEST RESULTS

REPORTED TO PROJECT Osoyoos, Town of
Wastewater- PE12214

WORK ORDER REPORTED 21D3030
2021-05-06 14:59

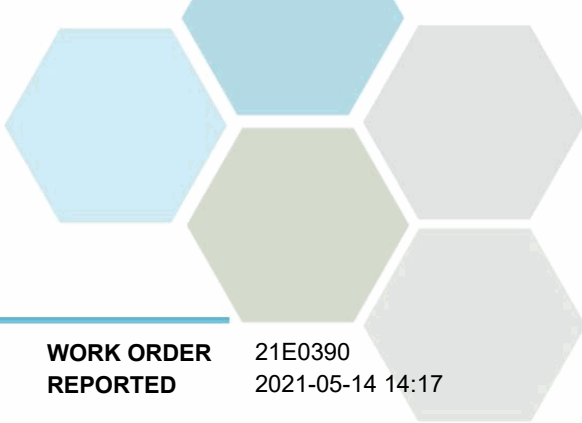
Analyte	Result	RL	Units	Analyzed	Qualifier
Sewer Lagoon E232882 (21D3030-01) Matrix: Wastewater Sampled: 2021-04-27 13:00					
<i>General Parameters</i>					
BOD, 5-day Carbonaceous	< 5.6	2.0	mg/L	2021-05-05	
Oil & Grease, Total	< 2.0	2.0	mg/L	2021-05-01	
Oil & Grease, Mineral	< 2.0	2.0	mg/L	2021-05-01	
pH	7.76	0.10	pH units	2021-05-03	HT2
Solids, Total Suspended	12.2	2.0	mg/L	2021-05-04	

Sewer Lagoon E207444 (21D3030-02) | Matrix: Water | Sampled: 2021-04-27 13:00

<i>General Parameters</i>					
Phosphorus, Total (as P)	5.10	0.0050	mg/L	2021-05-06	
<i>Microbiological Parameters</i>					
Coliforms, Total	< 1	1	MPN/100 mL	2021-04-28	
Coliforms, Fecal	< 1	1	MPN/100 mL	2021-04-28	

Sample Qualifiers:

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



TEST RESULTS

REPORTED TO PROJECT Osoyoos, Town of
Wastewater- PE12214

WORK ORDER REPORTED 21E0390
2021-05-14 14:17

Analyte	Result	RL	Units	Analyzed	Qualifier
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Sewer Lagoon E207444 (21E0390-01) | Matrix: Water | Sampled: 2021-05-04 11:35

Microbiological Parameters

Coliforms, Total	< 1	1	MPN/100 mL	2021-05-05	
Coliforms, Fecal	< 1	1	MPN/100 mL	2021-05-05	

Sewer Lagoon E105001 (21E0390-02) | Matrix: Wastewater | Sampled: 2021-05-04 11:25

PRES

Calculated Parameters

Total Trihalomethanes	< 0.00400	0.00400	mg/L	N/A	
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General Parameters

BOD, 5-day Carbonaceous	42.9	2.0	mg/L	2021-05-11	
Solids, Total Suspended	41.5	2.0	mg/L	2021-05-11	

Haloacetic Acids

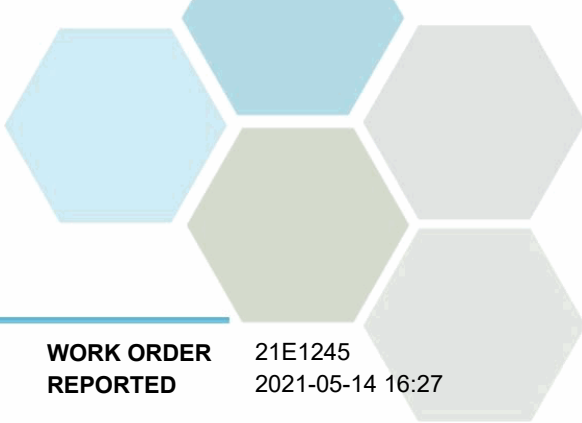
Monochloroacetic Acid	< 0.0020	0.0020	mg/L	2021-05-14	
Monobromoacetic Acid	< 0.0020	0.0020	mg/L	2021-05-14	
Dichloroacetic Acid	< 0.0020	0.0020	mg/L	2021-05-14	
Trichloroacetic Acid	< 0.0020	0.0020	mg/L	2021-05-14	
Dibromoacetic Acid	< 0.0020	0.0020	mg/L	2021-05-14	
Total Haloacetic Acids (HAA5)	< 0.00200	0.00200	mg/L	N/A	
Surrogate: 2-Bromopropionic Acid	104	70-130	%	2021-05-14	

Volatile Organic Compounds (VOC)

Bromodichloromethane	< 0.0010	0.0010	mg/L	2021-05-12	
Bromoform	< 0.0010	0.0010	mg/L	2021-05-12	
Chloroform	< 0.0010	0.0010	mg/L	2021-05-12	
Dibromochloromethane	< 0.0010	0.0010	mg/L	2021-05-12	
Surrogate: Toluene-d8	89	70-130	%	2021-05-12	
Surrogate: 4-Bromofluorobenzene	121	70-130	%	2021-05-12	

Sample Qualifiers:

PRES Sample has been preserved for THM, HAA in the laboratory and the holding time has been extended.

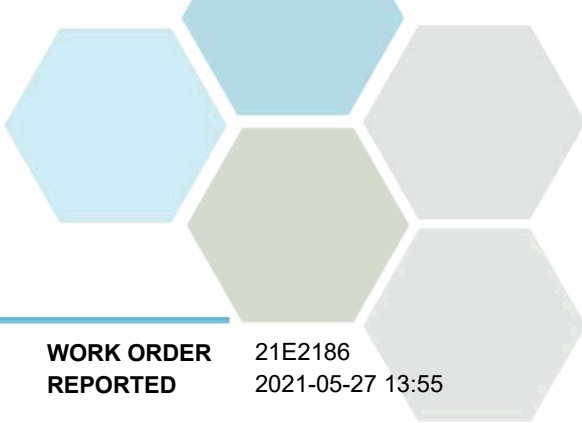


TEST RESULTS

REPORTED TO PROJECT Osoyoos, Town of
Wastewater- PE12214

WORK ORDER REPORTED 21E1245
2021-05-14 16:27

Analyte	Result	RL	Units	Analyzed	Qualifier
Sewer Site E207444 (21E1245-01) Matrix: Water Sampled: 2021-05-11 13:35					
<i>Microbiological Parameters</i>					
Coliforms, Total	13	1	MPN/100 mL	2021-05-12	
Coliforms, Fecal	> 2420	1	MPN/100 mL	2021-05-12	

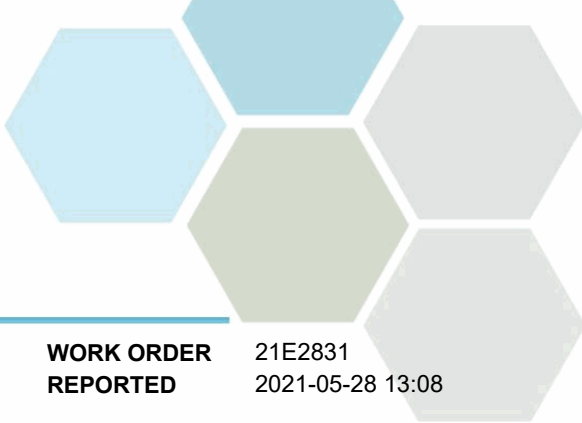


TEST RESULTS

REPORTED TO PROJECT Osoyoos, Town of
Wastewater- PE12214

WORK ORDER REPORTED 21E2186
2021-05-27 13:55

Analyte	Result	RL	Units	Analyzed	Qualifier
Sewer Lagoon E207444 (21E2186-01) Matrix: Water Sampled: 2021-05-18 13:30					
Anions					
Nitrate (as N)	14.0	0.010	mg/L	2021-05-20	
Nitrite (as N)	3.86	0.010	mg/L	2021-05-20	
Calculated Parameters					
Nitrate+Nitrite (as N)	17.9	0.100	mg/L	N/A	
Nitrogen, Total	24.0	1.00	mg/L	N/A	
General Parameters					
Nitrogen, Total Kjeldahl	6.10	0.050	mg/L	2021-05-27	
Phosphorus, Total (as P)	2.54	0.0050	mg/L	2021-05-25	
Microbiological Parameters					
Coliforms, Total	2	1	MPN/100 mL	2021-05-19	
Coliforms, Fecal	< 1	1	MPN/100 mL	2021-05-19	

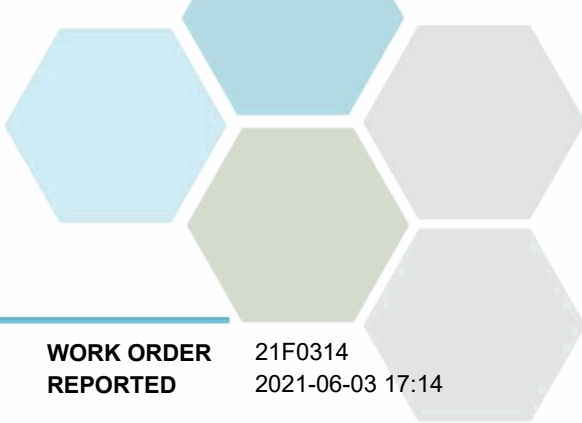


TEST RESULTS

REPORTED TO PROJECT Osoyoos, Town of
Wastewater- PE12214

WORK ORDER REPORTED 21E2831
2021-05-28 13:08

Analyte	Result	RL	Units	Analyzed	Qualifier
Sewer Site E207444 (21E2831-01) Matrix: Water Sampled: 2021-05-25 14:20					
<i>Microbiological Parameters</i>					
Coliforms, Total	1720	1	MPN/100 mL	2021-05-26	
Coliforms, Fecal	< 1	1	MPN/100 mL	2021-05-26	

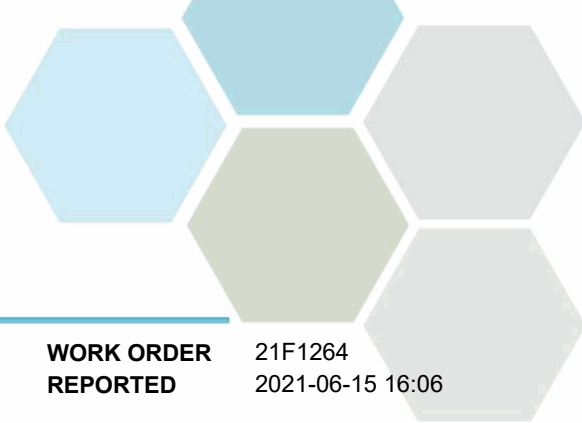


TEST RESULTS

REPORTED TO PROJECT Osoyoos, Town of
Wastewater- PE12214

WORK ORDER REPORTED 21F0314
2021-06-03 17:14

Analyte	Result	RL	Units	Analyzed	Qualifier
Sewer Site E207444 (21F0314-01) Matrix: Water Sampled: 2021-06-01 13:20					
<i>Microbiological Parameters</i>					
Coliforms, Total	479	1	MPN/100 mL	2021-06-02	
Coliforms, Fecal	< 1	1	MPN/100 mL	2021-06-02	

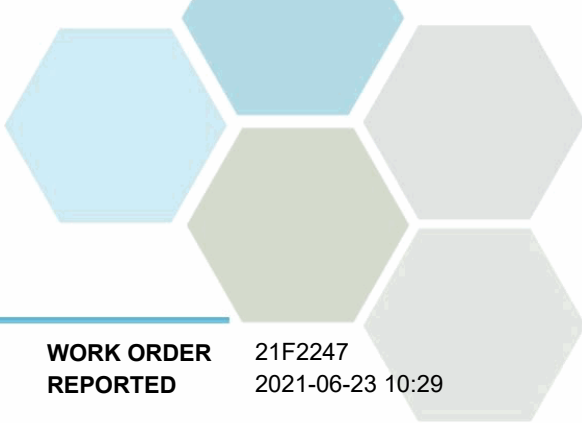


TEST RESULTS

REPORTED TO PROJECT Osoyoos, Town of
Wastewater- PE12214

WORK ORDER REPORTED 21F1264
2021-06-15 16:06

Analyte	Result	RL	Units	Analyzed	Qualifier
Sewer Lagoon E207444 (21F1264-01) Matrix: Water Sampled: 2021-06-08 12:55					
<i>Microbiological Parameters</i>					
Coliforms, Total	93	1	MPN/100 mL	2021-06-09	
Coliforms, Fecal	< 1	1	MPN/100 mL	2021-06-09	
Sewer Lagoon E105001 (21F1264-02) Matrix: Wastewater Sampled: 2021-06-08 13:05					
<i>General Parameters</i>					
BOD, 5-day Carbonaceous	10.0	2.0	mg/L	2021-06-15	
Solids, Total Suspended	25.8	2.0	mg/L	2021-06-12	



TEST RESULTS

REPORTED TO PROJECT Osoyoos, Town of
Wastewater- PE12214

WORK ORDER REPORTED 21F2247
2021-06-23 10:29

Analyte	Result	RL	Units	Analyzed	Qualifier
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Sewer Lagoon E207444 (21F2247-01) | Matrix: Water | Sampled: 2021-06-15 12:55

Microbiological Parameters

Coliforms, Total	< 1	1	MPN/100 mL	2021-06-16	
Coliforms, Fecal	< 1	1	MPN/100 mL	2021-06-16	

Sewer Lagoon E207444 (21F2247-02) | Matrix: Water | Sampled: 2021-06-15 13:10

Anions

Nitrate (as N)	13.5	0.010	mg/L	2021-06-17	
Nitrite (as N)	1.61	0.010	mg/L	2021-06-17	

Calculated Parameters

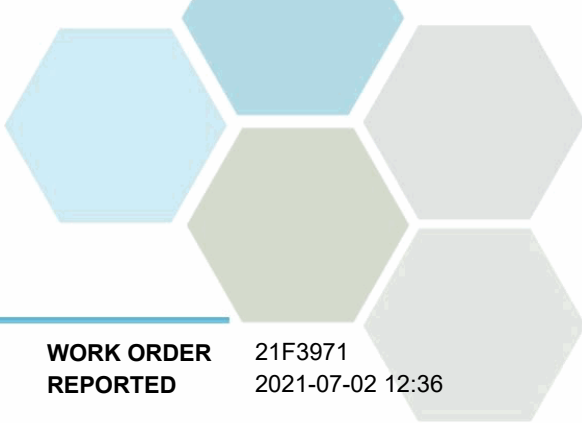
Nitrate+Nitrite (as N)	15.1	0.100	mg/L	N/A	
Nitrogen, Total	25.8	0.500	mg/L	N/A	

General Parameters

Nitrogen, Total Kjeldahl	10.8	0.050	mg/L	2021-06-21	
Phosphorus, Total (as P)	4.96	0.0050	mg/L	2021-06-21	

Microbiological Parameters

Coliforms, Total	< 1	1	MPN/100 mL	2021-06-16	
Coliforms, Fecal	< 1	1	MPN/100 mL	2021-06-16	

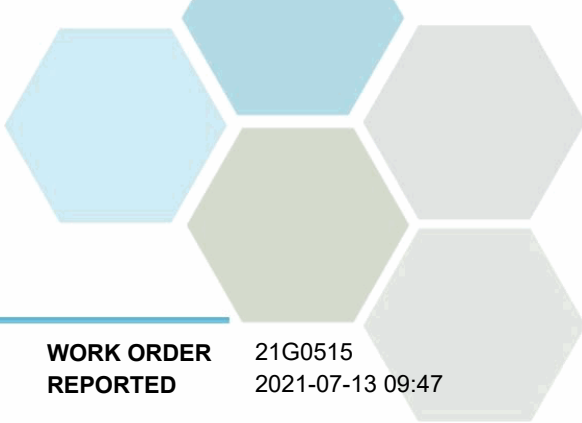


TEST RESULTS

REPORTED TO PROJECT Osoyoos, Town of
Wastewater- PE12214

WORK ORDER REPORTED 21F3971
2021-07-02 12:36

Analyte	Result	RL	Units	Analyzed	Qualifier
Sewer Lagoon E207444 (21F3971-01) Matrix: Water Sampled: 2021-06-29 13:49					
<i>Microbiological Parameters</i>					
Coliforms, Total	1980	1	MPN/100 mL	2021-06-30	
Coliforms, Fecal	< 1	1	MPN/100 mL	2021-06-30	

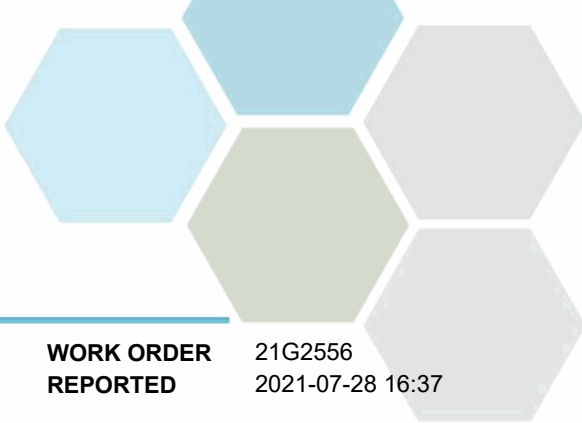


TEST RESULTS

REPORTED TO PROJECT Osoyoos, Town of
Wastewater- PE12214

WORK ORDER REPORTED 21G0515
2021-07-13 09:47

Analyte	Result	RL	Units	Analyzed	Qualifier
Sewer Site E105001 (21G0515-01) Matrix: Water Sampled: 2021-07-06 07:55					
<i>General Parameters</i>					
BOD, 5-day Carbonaceous	7.0	2.0	mg/L	2021-07-12	
Solids, Total Suspended	18.0	2.0	mg/L	2021-07-11	
Sewer Site E207444 (21G0515-02) Matrix: Water Sampled: 2021-07-06 07:50					
<i>Microbiological Parameters</i>					
Coliforms, Total	16	1	MPN/100 mL	2021-07-07	
Coliforms, Fecal	< 1	1	MPN/100 mL	2021-07-07	



TEST RESULTS

REPORTED TO PROJECT Osoyoos, Town of
Wastewater- PE12214

WORK ORDER REPORTED 21G2556
2021-07-28 16:37

Analyte	Result	RL	Units	Analyzed	Qualifier
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Sewer Site E207444 (21G2556-01) | Matrix: Water | Sampled: 2021-07-20 11:40

Microbiological Parameters

Coliforms, Total	74	1	MPN/100 mL	2021-07-21	
Coliforms, Fecal	< 1	1	MPN/100 mL	2021-07-21	

Sewer Site E232882 (21G2556-02) | Matrix: Wastewater | Sampled: 2021-07-20 11:40

General Parameters

BOD, 5-day Carbonaceous	< 3.7	2.0	mg/L	2021-07-27	
Oil & Grease, Mineral	< 2.0	2.0	mg/L	2021-07-24	
pH	9.02	0.10	pH units	2021-07-23	HT2
Solids, Total Suspended	4.4	2.0	mg/L	2021-07-24	

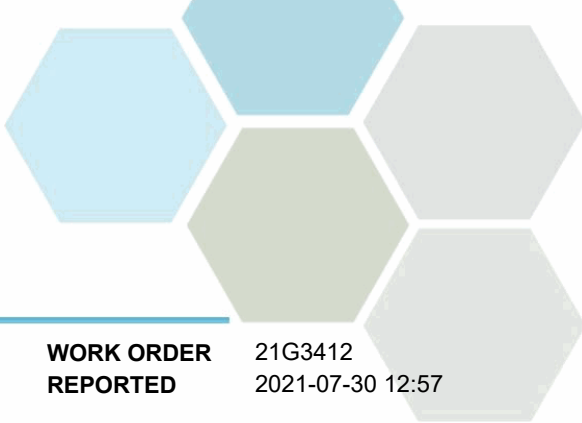
Sewer Site E230277 (21G2556-03) | Matrix: Water | Sampled: 2021-07-20 11:55

General Parameters

BOD, 5-day Carbonaceous	150	2.0	mg/L	2021-07-27	
Oil & Grease, Mineral	3.5	2.0	mg/L	2021-07-24	
pH	7.39	0.10	pH units	2021-07-23	HT2
Solids, Total Suspended	236	2.0	mg/L	2021-07-24	

Sample Qualifiers:

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

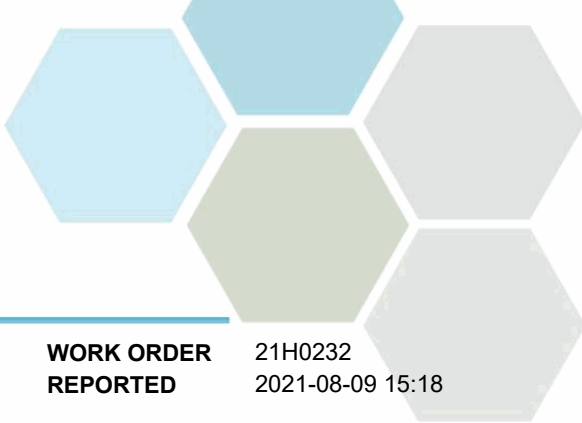


TEST RESULTS

REPORTED TO PROJECT Osoyoos, Town of
Wastewater- PE12214

WORK ORDER REPORTED 21G3412
2021-07-30 12:57

Analyte	Result	RL	Units	Analyzed	Qualifier
Sewer Site E207444 (21G3412-01) Matrix: Water Sampled: 2021-07-27 13:00					
<i>Microbiological Parameters</i>					
Coliforms, Total	1120	1	MPN/100 mL	2021-07-28	
Coliforms, Fecal	< 1	1	MPN/100 mL	2021-07-28	

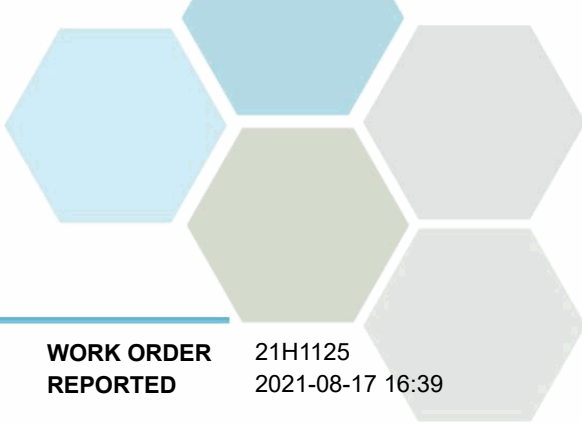


TEST RESULTS

REPORTED TO PROJECT Osoyoos, Town of
Wastewater- PE12214

WORK ORDER REPORTED 21H0232
2021-08-09 15:18

Analyte	Result	RL	Units	Analyzed	Qualifier
Sewer Lagoon E207444 (21H0232-01) Matrix: Water Sampled: 2021-08-03 11:46					
<i>Microbiological Parameters</i>					
Coliforms, Total	1140	1	MPN/100 mL	2021-08-04	
Coliforms, Fecal	< 1	1	MPN/100 mL	2021-08-04	

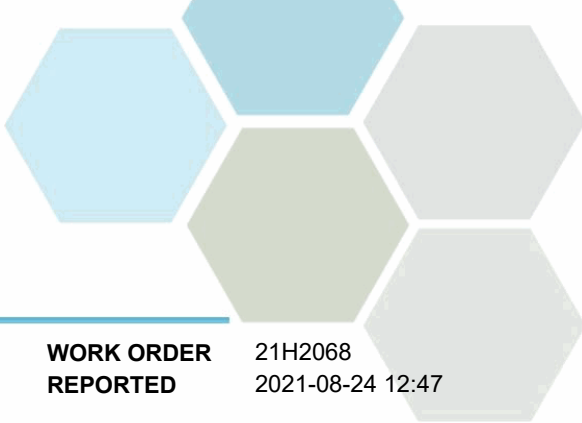


TEST RESULTS

REPORTED TO PROJECT Osoyoos, Town of
Wastewater- PE12214

WORK ORDER REPORTED 21H1125
2021-08-17 16:39

Analyte	Result	RL	Units	Analyzed	Qualifier
Sewer Site E207444 (21H1125-01) Matrix: Water Sampled: 2021-08-10 13:05					
<i>General Parameters</i>					
BOD, 5-day Carbonaceous	< 5.3	2.0	mg/L	2021-08-17	
Solids, Total Suspended	9.6	2.0	mg/L	2021-08-16	
<i>Microbiological Parameters</i>					
Coliforms, Total	2	1	MPN/100 mL	2021-08-11	
Coliforms, Fecal	< 1	1	MPN/100 mL	2021-08-11	



TEST RESULTS

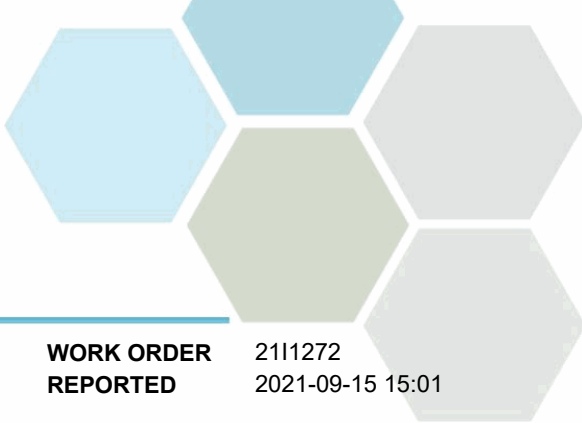
REPORTED TO PROJECT Osoyoos, Town of
Wastewater- PE12214

WORK ORDER REPORTED 21H2068
2021-08-24 12:47

Analyte	Result	RL	Units	Analyzed	Qualifier
Sewer Lagoon E207444 (21H2068-01) Matrix: Water Sampled: 2021-08-17 11:40					
Anions					
Nitrate (as N)	9.44	0.010	mg/L	2021-08-21	HT1
Nitrite (as N)	0.883	0.010	mg/L	2021-08-21	HT1
Calculated Parameters					
Nitrate+Nitrite (as N)	10.3	0.0100	mg/L	N/A	
Nitrogen, Total	18.8	0.500	mg/L	N/A	
General Parameters					
Nitrogen, Total Kjeldahl	8.45	0.050	mg/L	2021-08-23	
Phosphorus, Total (as P)	3.00	0.0050	mg/L	2021-08-23	
Microbiological Parameters					
Coliforms, Total	1	1	MPN/100 mL	2021-08-18	
Coliforms, Fecal	< 1	1	MPN/100 mL	2021-08-18	

Sample Qualifiers:

HT1 The sample was prepared and/or analyzed past the recommended holding time.



TEST RESULTS

REPORTED TO PROJECT Osoyoos, Town of
Wastewater- PE12214

WORK ORDER REPORTED 2111272
2021-09-15 15:01

Analyte	Result	RL	Units	Analyzed	Qualifier
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Sewer Site E207444 (2111272-01) | Matrix: Water | Sampled: 2021-09-07 11:40

Microbiological Parameters

Coliforms, Total	542	1	MPN/100 mL	2021-09-10	HT1
Coliforms, Fecal	< 1	1	MPN/100 mL	2021-09-10	HT1

Sewer Site E230037 (2111272-02) | Matrix: Water | Sampled: 2021-09-07 11:25

PRES

Anions

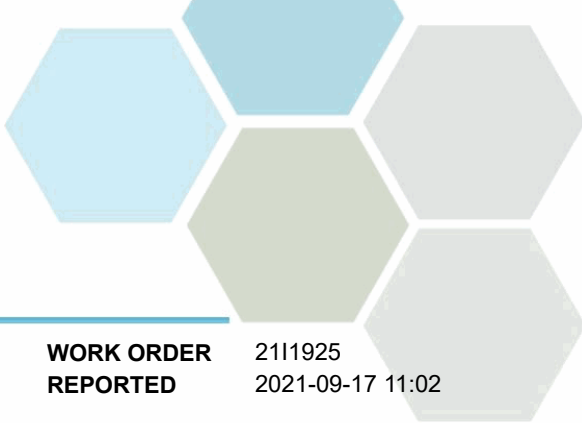
Phosphate (as P)	4.74	0.0050	mg/L	2021-09-11	HT1
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General Parameters

BOD, 5-day Carbonaceous	371	2.0	mg/L	2021-09-15	
Phosphorus, Total (as P)	7.69	0.0050	mg/L	2021-09-15	

Sample Qualifiers:

HT1 The sample was prepared and/or analyzed past the recommended holding time.
PRES Sample has been preserved for TP in the laboratory and the holding time has been extended.

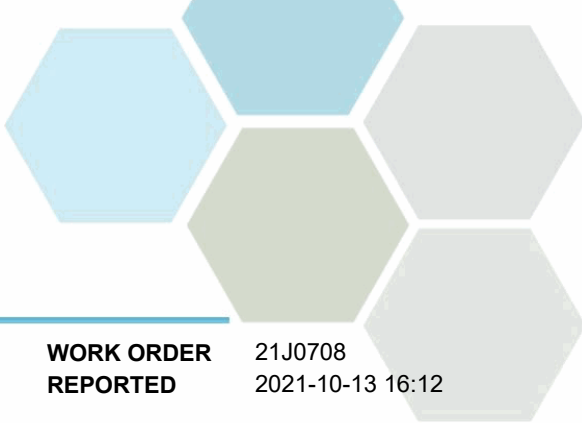


TEST RESULTS

REPORTED TO PROJECT Osoyoos, Town of
Wastewater- PE12214

WORK ORDER REPORTED 2111925
2021-09-17 11:02

Analyte	Result	RL	Units	Analyzed	Qualifier
Sewer Site E207444 (2111925-01) Matrix: Water Sampled: 2021-09-14 13:30					
<i>Microbiological Parameters</i>					
Coliforms, Total	< 1	1	MPN/100 mL	2021-09-15	
Coliforms, Fecal	< 1	1	MPN/100 mL	2021-09-15	

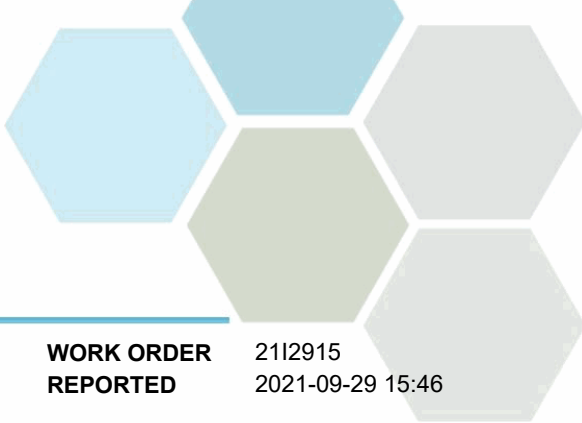


TEST RESULTS

REPORTED TO PROJECT Osoyoos, Town of
Wastewater- PE12214

WORK ORDER REPORTED 21J0708
2021-10-13 16:12

Analyte	Result	RL	Units	Analyzed	Qualifier
Sewer Site E207444 (21J0708-01) Matrix: Water Sampled: 2021-10-05 13:00					
<i>Microbiological Parameters</i>					
Coliforms, Total	< 1	1	MPN/100 mL	2021-10-06	
Coliforms, Fecal	< 1	1	MPN/100 mL	2021-10-06	
Sewer Site E105001 (21J0708-02) Matrix: Water Sampled: 2021-10-05 13:15					
<i>General Parameters</i>					
BOD, 5-day Carbonaceous	< 4.6	2.0	mg/L	2021-10-12	
Solids, Total Suspended	6.4	2.0	mg/L	2021-10-08	



TEST RESULTS

REPORTED TO PROJECT Osoyoos, Town of
Wastewater- PE12214

WORK ORDER REPORTED 2112915
2021-09-29 15:46

Analyte	Result	RL	Units	Analyzed	Qualifier
Sewer Lagoon E207444 (2112915-01) Matrix: Water Sampled: 2021-09-21 13:30					
Anions					
Nitrate (as N)	2.78	0.010	mg/L	2021-09-24	
Nitrite (as N)	0.436	0.010	mg/L	2021-09-24	
Calculated Parameters					
Nitrate+Nitrite (as N)	3.22	0.0100	mg/L	N/A	
Nitrogen, Total	23.3	0.400	mg/L	N/A	
General Parameters					
Nitrogen, Total Kjeldahl	20.1	0.050	mg/L	2021-09-28	
Phosphorus, Total (as P)	6.96	0.0050	mg/L	2021-09-28	
Microbiological Parameters					
Coliforms, Total	< 1	1	MPN/100 mL	2021-09-22	
Coliforms, Fecal	< 1	1	MPN/100 mL	2021-09-22	

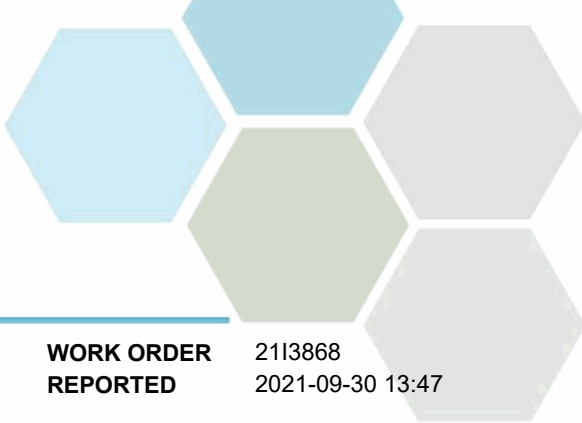
Sewer Site E105001 (2112915-02) | Matrix: Water | Sampled: 2021-09-21 13:05

FILT,
PRES

Anions					
Nitrate (as N)	5.76	0.010	mg/L	2021-09-24	
Nitrite (as N)	3.64	0.010	mg/L	2021-09-24	
Phosphate (as P)	4.95	0.0050	mg/L	2021-09-24	
Calculated Parameters					
Nitrate+Nitrite (as N)	9.40	0.0100	mg/L	N/A	
Nitrogen, Total	22.3	0.500	mg/L	N/A	
General Parameters					
Ammonia, Total (as N)	7.79	0.050	mg/L	2021-09-24	
BOD, 5-day Carbonaceous	< 7.4	2.0	mg/L	2021-09-28	
Nitrogen, Total Kjeldahl	12.9	0.050	mg/L	2021-09-28	
Phosphorus, Total (as P)	5.83	0.0050	mg/L	2021-09-28	
Phosphorus, Total Dissolved	5.73	0.0050	mg/L	2021-09-28	
Solids, Total Suspended	6.8	2.0	mg/L	2021-09-26	

Sample Qualifiers:

FILT The sample has been filtered for TDP in the laboratory. Results may not reflect conditions at the time of sampling.
PRES Sample has been preserved for TDP in the laboratory and the holding time has been extended.

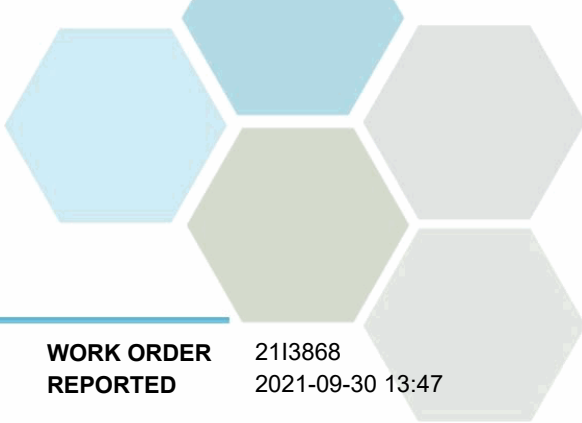


TEST RESULTS

REPORTED TO PROJECT Osoyoos, Town of
Wastewater- PE12214

WORK ORDER REPORTED 2113868
2021-09-30 13:47

Analyte	Result	RL	Units	Analyzed	Qualifier
Sewer Lagoon E207444 (2113868-01) Matrix: Water Sampled: 2021-09-28 11:50					
<i>Microbiological Parameters</i>					
Coliforms, Total	< 1	1	MPN/100 mL	2021-09-29	
Coliforms, Fecal	< 1	1	MPN/100 mL	2021-09-29	

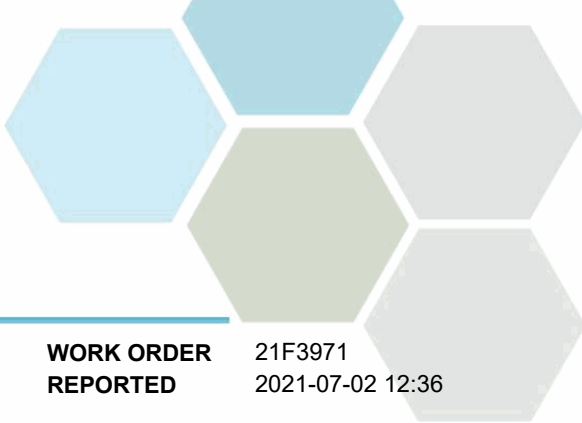


TEST RESULTS

REPORTED TO PROJECT Osoyoos, Town of
Wastewater- PE12214

WORK ORDER REPORTED 2113868
2021-09-30 13:47

Analyte	Result	RL	Units	Analyzed	Qualifier
Sewer Lagoon E207444 (2113868-01) Matrix: Water Sampled: 2021-09-28 11:50					
<i>Microbiological Parameters</i>					
Coliforms, Total	< 1	1	MPN/100 mL	2021-09-29	
Coliforms, Fecal	< 1	1	MPN/100 mL	2021-09-29	

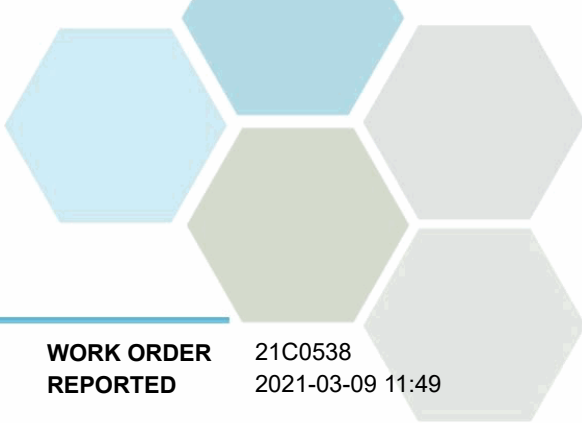


TEST RESULTS

REPORTED TO PROJECT Osoyoos, Town of
Wastewater- PE12214

WORK ORDER REPORTED 21F3971
2021-07-02 12:36

Analyte	Result	RL	Units	Analyzed	Qualifier
Sewer Lagoon E207444 (21F3971-01) Matrix: Water Sampled: 2021-06-29 13:49					
<i>Microbiological Parameters</i>					
Coliforms, Total	1980	1	MPN/100 mL	2021-06-30	
Coliforms, Fecal	< 1	1	MPN/100 mL	2021-06-30	



TEST RESULTS

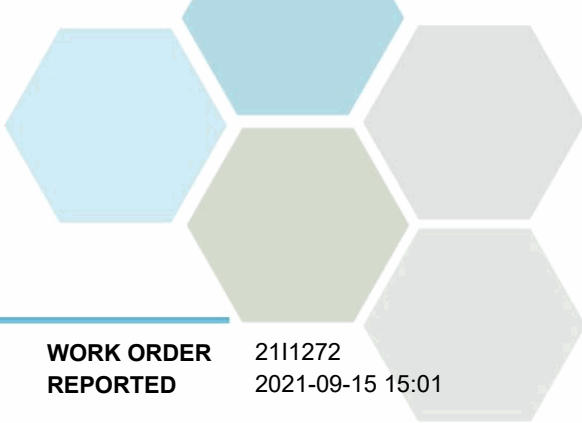
REPORTED TO PROJECT Osoyoos, Town of
Wastewater- PE12214

WORK ORDER REPORTED 21C0538
2021-03-09 11:49

Analyte	Result	RL	Units	Analyzed	Qualifier
Sewer Site E230037 (21C0538-01) Matrix: Water Sampled: 2021-03-02 11:00					PRES
<i>Anions</i>					
Phosphate (as P)	3.55	0.0050	mg/L	2021-03-04	
<i>General Parameters</i>					
BOD, 5-day	272	2.0	mg/L	2021-03-09	
Phosphorus, Total (as P)	9.48	0.0050	mg/L	2021-03-05	

Sample Qualifiers:

PRES Sample has been preserved for TP in the laboratory and the holding time has been extended.



TEST RESULTS

REPORTED TO PROJECT Osoyoos, Town of
Wastewater- PE12214

WORK ORDER REPORTED 2111272
2021-09-15 15:01

Analyte	Result	RL	Units	Analyzed	Qualifier
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Sewer Site E207444 (2111272-01) | Matrix: Water | Sampled: 2021-09-07 11:40

Microbiological Parameters

Coliforms, Total	542	1	MPN/100 mL	2021-09-10	HT1
Coliforms, Fecal	< 1	1	MPN/100 mL	2021-09-10	HT1

Sewer Site E230037 (2111272-02) | Matrix: Water | Sampled: 2021-09-07 11:25

PRES

Anions

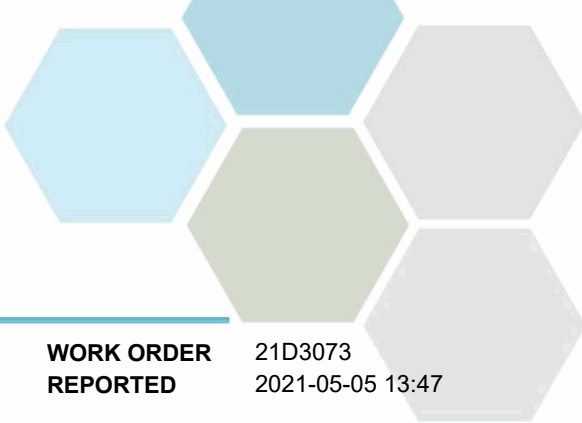
Phosphate (as P)	4.74	0.0050	mg/L	2021-09-11	HT1
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General Parameters

BOD, 5-day Carbonaceous	371	2.0	mg/L	2021-09-15	
Phosphorus, Total (as P)	7.69	0.0050	mg/L	2021-09-15	

Sample Qualifiers:

- HT1 The sample was prepared and/or analyzed past the recommended holding time.
- PRES Sample has been preserved for TP in the laboratory and the holding time has been extended.



TEST RESULTS

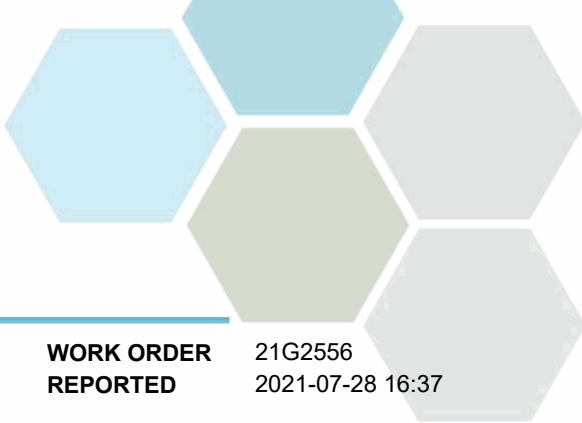
REPORTED TO PROJECT Osoyoos, Town of
Wastewater- PE12214

WORK ORDER REPORTED 21D3073
2021-05-05 13:47

Analyte	Result	RL	Units	Analyzed	Qualifier
Sewer Site E230277 (21D3073-01) Matrix: Water Sampled: 2021-04-27 11:50					
<i>General Parameters</i>					
BOD, 5-day Carbonaceous	352	2.0	mg/L	2021-05-05	
Oil & Grease, Total	58.5	2.0	mg/L	2021-05-01	
Oil & Grease, Mineral	< 2.0	2.0	mg/L	2021-05-01	
pH	7.01	0.10	pH units	2021-05-03	HT2
Solids, Total Suspended	284	2.0	mg/L	2021-05-04	

Sample Qualifiers:

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



TEST RESULTS

REPORTED TO PROJECT Osoyoos, Town of
Wastewater- PE12214

WORK ORDER REPORTED 21G2556
2021-07-28 16:37

Analyte	Result	RL	Units	Analyzed	Qualifier
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Sewer Site E207444 (21G2556-01) | Matrix: Water | Sampled: 2021-07-20 11:40

Microbiological Parameters

Coliforms, Total	74	1	MPN/100 mL	2021-07-21	
Coliforms, Fecal	< 1	1	MPN/100 mL	2021-07-21	

Sewer Site E232882 (21G2556-02) | Matrix: Wastewater | Sampled: 2021-07-20 11:40

General Parameters

BOD, 5-day Carbonaceous	< 3.7	2.0	mg/L	2021-07-27	
Oil & Grease, Mineral	< 2.0	2.0	mg/L	2021-07-24	
pH	9.02	0.10	pH units	2021-07-23	HT2
Solids, Total Suspended	4.4	2.0	mg/L	2021-07-24	

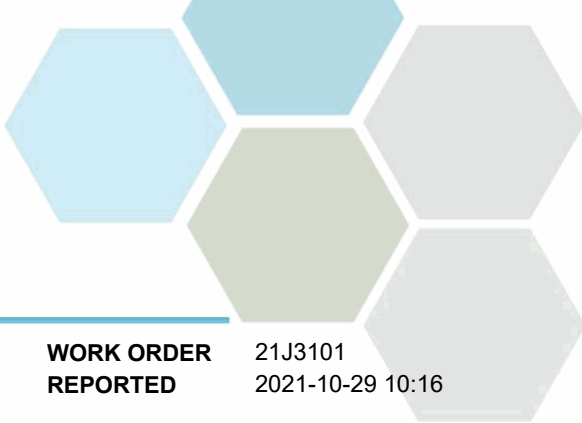
Sewer Site E230277 (21G2556-03) | Matrix: Water | Sampled: 2021-07-20 11:55

General Parameters

BOD, 5-day Carbonaceous	150	2.0	mg/L	2021-07-27	
Oil & Grease, Mineral	3.5	2.0	mg/L	2021-07-24	
pH	7.39	0.10	pH units	2021-07-23	HT2
Solids, Total Suspended	236	2.0	mg/L	2021-07-24	

Sample Qualifiers:

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



TEST RESULTS

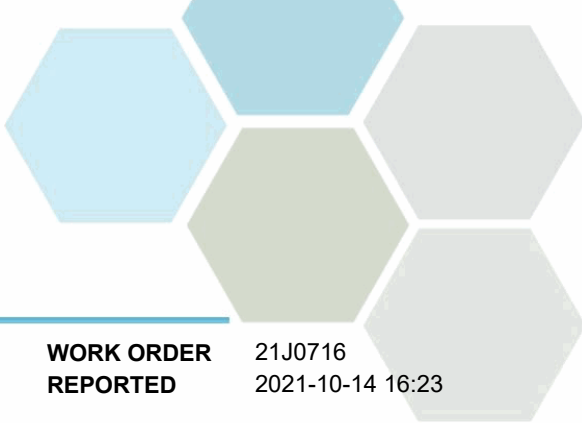
REPORTED TO PROJECT Osoyoos, Town of
Wastewater- PE12214

WORK ORDER REPORTED 21J3101
2021-10-29 10:16

Analyte	Result	RL	Units	Analyzed	Qualifier
Sewer Site E230277 (21J3101-01) Matrix: Water Sampled: 2021-10-19 13:00					
<i>General Parameters</i>					
BOD, 5-day Carbonaceous	224	2.0	mg/L	2021-10-28	HT1
Oil & Grease, Total	64.4	2.0	mg/L	2021-10-27	
Oil & Grease, Mineral	< 2.0	2.0	mg/L	2021-10-27	
pH	7.66	0.10	pH units	2021-10-23	HT2
Solids, Total Suspended	204	2.0	mg/L	2021-10-27	HT1

Sample Qualifiers:

- HT1 The sample was prepared and/or analyzed past the recommended holding time.
- HT2 The 15 minute recommended holding time (from sampling to analysis) has been exceeded - field analysis is recommended.



TEST RESULTS

REPORTED TO PROJECT Osoyoos, Town of
Sewer Comprehensive Test- Solids- PE12214

WORK ORDER REPORTED 21J0716
2021-10-14 16:23

Analyte	Result	RL	Units	Analyzed	Qualifier
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Sewer Site E230278 (21J0716-01) | Matrix: Solid | Sampled: 2021-10-05 13:30

General Parameters

Moisture	96.3	1.0	% wet	2021-10-14	
Nitrogen, Total Kjeldahl	77.2	0.004	g/L dry	2021-10-08	
Solids, Total	16.8	0.1	% wet	2021-10-07	
Solids, Volatile	53.0	0.1	% dry	2021-10-07	

Strong Acid Leachable Metals

Aluminum	2810	40	mg/kg dry	2021-10-14	
Antimony	3.13	0.10	mg/kg dry	2021-10-14	
Arsenic	8.30	0.30	mg/kg dry	2021-10-14	
Barium	129	1.0	mg/kg dry	2021-10-14	
Beryllium	< 0.10	0.10	mg/kg dry	2021-10-14	
Bismuth	20.1	0.10	mg/kg dry	2021-10-14	
Boron	24.3	2.0	mg/kg dry	2021-10-14	
Cadmium	0.644	0.040	mg/kg dry	2021-10-14	
Calcium	23800	100	mg/kg dry	2021-10-14	
Chromium	32.7	1.0	mg/kg dry	2021-10-14	
Cobalt	2.21	0.10	mg/kg dry	2021-10-14	
Copper	866	0.40	mg/kg dry	2021-10-14	
Iron	10900	20	mg/kg dry	2021-10-14	
Lead	23.6	0.20	mg/kg dry	2021-10-14	
Lithium	2.26	0.10	mg/kg dry	2021-10-14	
Magnesium	2860	10	mg/kg dry	2021-10-14	
Manganese	141	0.40	mg/kg dry	2021-10-14	
Mercury	1.38	0.040	mg/kg dry	2021-10-14	
Molybdenum	25.8	0.10	mg/kg dry	2021-10-14	
Nickel	20.0	0.60	mg/kg dry	2021-10-14	
Phosphorus	6940	10	mg/kg dry	2021-10-14	
Potassium	1010	40	mg/kg dry	2021-10-14	
Selenium	3.23	0.20	mg/kg dry	2021-10-14	
Silver	2.62	0.10	mg/kg dry	2021-10-14	
Sodium	4150	50	mg/kg dry	2021-10-14	
Strontium	129	0.20	mg/kg dry	2021-10-14	
Sulfur	8780	1000	mg/kg dry	2021-10-14	
Tellurium	< 0.10	0.10	mg/kg dry	2021-10-14	
Thallium	< 0.10	0.10	mg/kg dry	2021-10-14	
Thorium	< 0.50	0.50	mg/kg dry	2021-10-14	
Tin	23.9	0.20	mg/kg dry	2021-10-14	
Titanium	53.3	1.0	mg/kg dry	2021-10-14	
Tungsten	0.44	0.20	mg/kg dry	2021-10-14	
Uranium	13.2	0.050	mg/kg dry	2021-10-14	
Vanadium	15.7	1.0	mg/kg dry	2021-10-14	
Zinc	1040	2.0	mg/kg dry	2021-10-14	
Zirconium	< 2.0	2.0	mg/kg dry	2021-10-14	

APPENDIX G

Groundwater Monitoring Well Analytical Reports and
Depth Sampling (OC 7.2.4.9)

GROUND MONITORING WELLS GOLF COURSE AREA 2021

For the Month of JANUARY

WELL ID	WELL DEPTH	WATER LEVEL	WATER DEPTH	DATE	OPT	TIME
MW-1-01	16.27 m	8.94	7.33	5	KF/DC	1055
MW-2-01	10.39 m	8.31	2.08	5	KF/DC	1045
MW-5-10	14.82 m	8.74	6.08	5	KF/DC	1120
MW-6-10	8.93 m	None	None	5	KF/DC	1105
MW-7-10	16.1 m	12.47	3.63	5	KF/DC	1100
MW-8-10	10.5 m	8.3	2.2	Jan 5	KF/DC	1030
MW-9-10	25.3 m	14.78	10.52	5	KF/DC	1050

For the Month of FEBRUARY

WELL ID	WELL DEPTH	WATER LEVEL	WATER DEPTH	DATE	OPT	TIME
MW-1-01	16.27 m	8.92	7.35	2	DG	8:10
MW-2-01	10.39 m	8.40	1.99	2	DG	8:49
MW-5-10	14.82 m	8.77	6.05	2	DG	11:45
MW-6-10	8.93 m	None	None	2	DG	11:05
MW-7-10	16.1 m	12.42	3.68	2	DG	9:05
MW-8-10	10.5 m	7.42	3.08	Feb 2	DG	7:38
MW-9-10	25.3 m	14.73	10.57	2	DG	8:00

For the Month of MARCH

WELL ID	WELL DEPTH	WATER LEVEL	WATER DEPTH	DATE	OPT	TIME
MW-1-01	16.27 m	8.78	7.49	Mar 1	DG/FZ	8:02
MW-2-01	10.39 m	8.68	1.71	Mar 1	DG/FZ	7:49
MW-5-10	14.82 m	8.77	6.05	Mar 1	DG/FZ	8:50
MW-6-10	8.93 m	—	—	Mar 1	DG/FZ	8:19
MW-7-10	16.1 m	12.43	3.67	Mar 1	DG/FZ	8:07
MW-8-10	10.5 m	6.32	4.2	Mar 1	DG/FZ	7:35
MW-9-10	25.3 m	14.45	10.85	Mar 1	DG/FZ	7:57

GROUND MONITORING WELLS GOLF COURSE AREA 2021

For the Month of APRIL

WELL ID	WELL DEPTH	WATER LEVEL	WATER DEPTH	DATE	OPT	TIME
MW-1-01	16.27 m	8.82 m	7.45	6	DG	8:35
MW-2-01	10.39 m	8.86 m	1.53	6	DG	7:55
MW-5-10	14.82 m	8.82	6	6	DG	2:51
MW-6-10	8.93 m	None	—	6	DG	9:00
MW-7-10	16.1 m	12.45	3.65	6	DG	8:44
MW-8-10	10.5 m	6.63 m	3.87	6	DG	7:40
MW-9-10	25.3 m	14.42 m	10.88	6	DG	8:25

For the Month of MAY

WELL ID	WELL DEPTH	WATER LEVEL	WATER DEPTH	DATE	OPT	TIME
MW-1-01	16.27 m	9	7.27	3	DG	11:40
MW-2-01	10.39 m	8.9	1.49	3	DG	10:50
MW-5-10	14.82 m	8.87	5.95	3	DG	12:40
MW-6-10	8.93 m	—	—	3	DG	11:50
MW-7-10	16.1 m	12.52	3.58	3	DG	11:30
MW-8-10	10.5 m	6.3	4.2	3	DG	10:35
MW-9-10	25.3 m	14.9	10.4	3	DG	11:15

For the Month of JUNE

WELL ID	WELL DEPTH	WATER LEVEL	WATER DEPTH	DATE	OPT	TIME
MW-1-01	16.27 m	9.37	6.9	1	FZ	7:00
MW-2-01	10.39 m	8.58	1.81	1	FZ	6:50
MW-5-10	14.82 m	8.9	5.92	1	FZ	7:20
MW-6-10	8.93 m	NONE	NONE	1	FZ	7:15
MW-7-10	16.1 m	12.55	3.55	1	FZ	7:10
MW-8-10	10.5 m	6.37	1.13	1	FZ	6:40
MW-9-10	25.3 m	14.48	10.82	1	FZ	6:55

GROUND MONITORING WELLS GOLF COURSE AREA 2021

For the Month of JULY

WELL ID	WELL DEPTH	WATER LEVEL	WATER DEPTH	DATE	OPT	TIME
MW-1-01	16.27 m					
MW-2-01	10.39 m					
MW-5-10	14.82 m					
MW-6-10	8.93 m					
MW-7-10	16.1 m					
MW-8-10	10.5 m					
MW-9-10	25.3 m					

For the Month of AUGUST

WELL ID	WELL DEPTH	WATER LEVEL	WATER DEPTH	DATE	OPT	TIME
MW-1-01	16.27 m	10.9	5.37	5	KF	700
MW-2-01	10.39 m	8.67	1.72	5	KF	640
MW-5-10	14.82 m	8.75	6.07	5	KF	725
MW-6-10	8.93 m	None	None	5	KF	715
MW-7-10	16.1 m	12.71	3.39	5	KF	705
MW-8-10	10.5 m	6.79	3.71	5	KF	630am
MW-9-10	25.3 m	14.51	10.79	5	KF	650

For the Month of SEPTEMBER

WELL ID	WELL DEPTH	WATER LEVEL	WATER DEPTH	DATE	OPT	TIME
MW-1-01	16.27 m	10.82	5.65	1	F.Z.	7:20
MW-2-01	10.39 m	8.77	1.62	1	F.Z.	7:00
MW-5-10	14.82 m	8.65	6.17	1	F.Z.	7:50
MW-6-10	8.93 m	NONE	NONE	1	F.Z.	7:40
MW-7-10	16.1 m	12.65	3.45	1	F.Z.	7:30
MW-8-10	10.5 m	6.86	3.64	1	F.Z.	6:45
MW-9-10	25.3 m	14.38	10.92	1	F.Z.	7:10

GROUND MONITORING WELLS GOLF COURSE AREA 2021

For the Month of OCTOBER

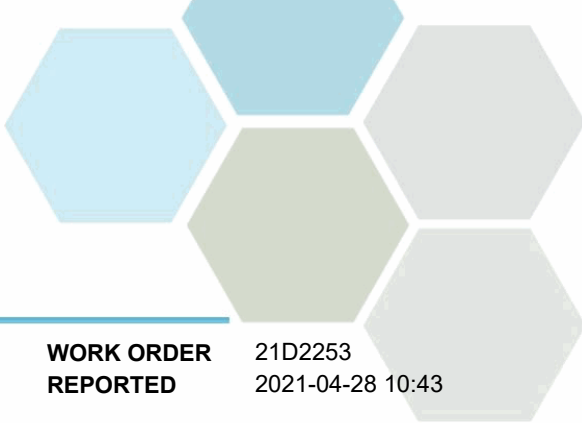
WELL ID	WELL DEPTH	WATER LEVEL	WATER DEPTH	DATE	OPT	TIME
MW-1-01	16.27 m					
MW-2-01	10.39 m					
MW-5-10	14.82 m					
MW-6-10	8.93 m					
MW-7-10	16.1 m					
MW-8-10	10.5 m					
MW-9-10	25.3 m					

For the Month of NOVEMBER

WELL ID	WELL DEPTH	WATER LEVEL	WATER DEPTH	DATE	OPT	TIME
MW-1-01	16.27 m	9.27	7.0	9	KF	1350
MW-2-01	10.39 m	9.04	1.35	9	KF	1330
MW-5-10	14.82 m	8.67	6.15	10	KF	805
MW-6-10	8.93 m	None	None	9	KF	1357
MW-7-10	16.1 m	12.45	3.65	9	KF	1352
MW-8-10	10.5 m	6.57	3.93	9	KF	1335
MW-9-10	25.3 m	14.31	10.99	9	KF	1345

For the Month of DECEMBER

WELL ID	WELL DEPTH	WATER LEVEL	WATER DEPTH	DATE	OPT	TIME
MW-1-01	16.27 m	9.05	7.22	8	KF	935
MW-2-01	10.39 m 10.3	9.13	1.26	8	KF	915
MW-5-10	14.82 m	8.7	6.12	8	KF	1030
MW-6-10	8.93 m	None	None	8	KF	945
MW-7-10	16.1 m	12.46	3.64	8	KF	925
MW-8-10	10.5 m	6.42	4.08	8	KF	905
MW-9-10	25.3 m	14.3	11	9	KF	955



TEST RESULTS

REPORTED TO PROJECT Osoyoos, Town of
WB Groundwater (Comp)

WORK ORDER REPORTED 21D2253
2021-04-28 10:43

Analyte	Result	Guideline	RL	Units	Analyzed	Qualifier
MW-8-'10 (21D2253-01) Matrix: Water Sampled: 2021-04-20 08:30						FILT, PRES

Anions

Chloride	31.7	AO ≤ 250	0.10	mg/L	2021-04-22	
Nitrate (as N)	2.76	MAC = 10	0.010	mg/L	2021-04-22	
Nitrite (as N)	< 0.010	MAC = 1	0.010	mg/L	2021-04-22	

Calculated Parameters

Hardness, Total (as CaCO3)	1640	None Required	0.500	mg/L	N/A	
Nitrate+Nitrite (as N)	2.76	N/A	0.0200	mg/L	N/A	

General Parameters

Ammonia, Total (as N)	< 0.050	None Required	0.050	mg/L	2021-04-23	
Phosphorus, Total Dissolved	0.0087	N/A	0.0050	mg/L	2021-04-26	
Solids, Total Suspended	2480	N/A	2.0	mg/L	2021-04-25	

Total Metals

Calcium, total	546	None Required	0.20	mg/L	2021-04-25	
Magnesium, total	66.4	None Required	0.010	mg/L	2021-04-25	
Sodium, total	51.3	AO ≤ 200	0.10	mg/L	2021-04-25	

MW-9-'10 (21D2253-02) | Matrix: Water | Sampled: 2021-04-20 08:45

FILT, PRES

Anions

Chloride	1.78	AO ≤ 250	0.10	mg/L	2021-04-22	
Nitrate (as N)	0.121	MAC = 10	0.010	mg/L	2021-04-22	
Nitrite (as N)	< 0.010	MAC = 1	0.010	mg/L	2021-04-22	

Calculated Parameters

Hardness, Total (as CaCO3)	144	None Required	0.500	mg/L	N/A	
Nitrate+Nitrite (as N)	0.121	N/A	0.0200	mg/L	N/A	

General Parameters

Ammonia, Total (as N)	0.115	None Required	0.050	mg/L	2021-04-23	
Phosphorus, Total Dissolved	0.0695	N/A	0.0050	mg/L	2021-04-26	
Solids, Total Suspended	48.0	N/A	2.0	mg/L	2021-04-25	

Total Metals

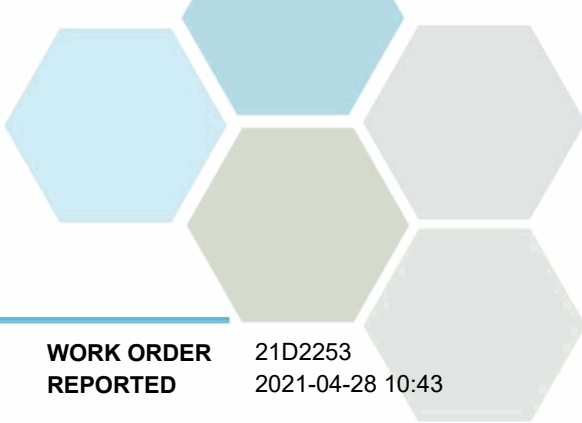
Calcium, total	40.3	None Required	0.20	mg/L	2021-04-25	
Magnesium, total	10.5	None Required	0.010	mg/L	2021-04-25	
Sodium, total	16.6	AO ≤ 200	0.10	mg/L	2021-04-25	

MW-1-'01 (21D2253-03) | Matrix: Water | Sampled: 2021-04-20 08:55

FILT, PRES

Anions

Chloride	13.9	AO ≤ 250	0.10	mg/L	2021-04-22	
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TEST RESULTS

REPORTED TO PROJECT Osoyoos, Town of
WB Groundwater (Comp)

WORK ORDER REPORTED 21D2253
2021-04-28 10:43

Analyte	Result	Guideline	RL	Units	Analyzed	Qualifier
MW-1-'01 (21D2253-03) Matrix: Water Sampled: 2021-04-20 08:55, Continued						FILT, PRES

Anions, Continued

Nitrate (as N)	< 0.010	MAC = 10	0.010	mg/L	2021-04-22	
Nitrite (as N)	< 0.010	MAC = 1	0.010	mg/L	2021-04-22	

Calculated Parameters

Hardness, Total (as CaCO3)	607	None Required	0.500	mg/L	N/A	
Nitrate+Nitrite (as N)	< 0.0200	N/A	0.0200	mg/L	N/A	

General Parameters

Ammonia, Total (as N)	< 0.050	None Required	0.050	mg/L	2021-04-23	
Phosphorus, Total Dissolved	0.0117	N/A	0.0050	mg/L	2021-04-26	
Solids, Total Suspended	434	N/A	2.0	mg/L	2021-04-25	

Total Metals

Calcium, total	139	None Required	0.20	mg/L	2021-04-25	
Magnesium, total	63.1	None Required	0.010	mg/L	2021-04-25	
Sodium, total	40.8	AO ≤ 200	0.10	mg/L	2021-04-25	

MW-7-'10 (21D2253-04) | Matrix: Water | Sampled: 2021-04-20 09:05

FILT, PRES

Anions

Chloride	4.77	AO ≤ 250	0.10	mg/L	2021-04-22	
Nitrate (as N)	0.112	MAC = 10	0.010	mg/L	2021-04-22	
Nitrite (as N)	< 0.010	MAC = 1	0.010	mg/L	2021-04-22	

Calculated Parameters

Hardness, Total (as CaCO3)	573	None Required	0.500	mg/L	N/A	
Nitrate+Nitrite (as N)	0.112	N/A	0.0200	mg/L	N/A	

General Parameters

Ammonia, Total (as N)	< 0.050	None Required	0.050	mg/L	2021-04-23	
Phosphorus, Total Dissolved	0.0167	N/A	0.0050	mg/L	2021-04-26	
Solids, Total Suspended	3210	N/A	2.0	mg/L	2021-04-25	

Total Metals

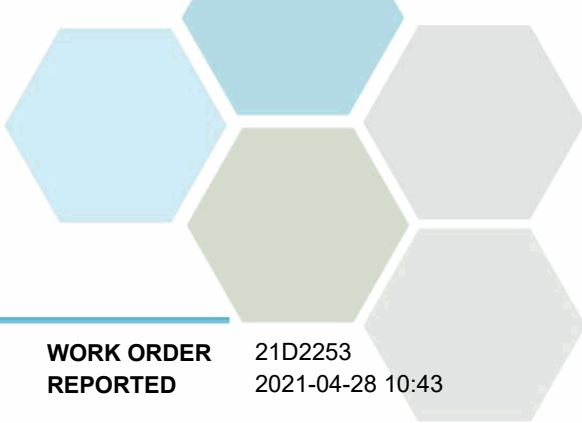
Calcium, total	141	None Required	0.20	mg/L	2021-04-25	
Magnesium, total	53.7	None Required	0.010	mg/L	2021-04-25	
Sodium, total	14.8	AO ≤ 200	0.10	mg/L	2021-04-25	

MW-5-'10 (21D2253-05) | Matrix: Water | Sampled: 2021-04-20 09:25

FILT, PRES

Anions

Chloride	195	AO ≤ 250	0.10	mg/L	2021-04-22	
Nitrate (as N)	7.40	MAC = 10	0.010	mg/L	2021-04-22	



TEST RESULTS

REPORTED TO PROJECT Osoyoos, Town of
WB Groundwater (Comp)

WORK ORDER REPORTED 21D2253
2021-04-28 10:43

Analyte	Result	Guideline	RL Units	Analyzed	Qualifier
MW-5-'10 (21D2253-05) Matrix: Water Sampled: 2021-04-20 09:25, Continued					FILT, PRES
Anions, Continued					
Nitrite (as N)	< 0.010	MAC = 1	0.010 mg/L	2021-04-22	
Calculated Parameters					
Hardness, Total (as CaCO3)	525	None Required	0.500 mg/L	N/A	
Nitrate+Nitrite (as N)	7.40	N/A	0.0200 mg/L	N/A	
General Parameters					
Ammonia, Total (as N)	< 0.050	None Required	0.050 mg/L	2021-04-23	
Phosphorus, Total Dissolved	0.0163	N/A	0.0050 mg/L	2021-04-26	
Solids, Total Suspended	280	N/A	2.0 mg/L	2021-04-25	
Total Metals					
Calcium, total	137	None Required	0.20 mg/L	2021-04-25	
Magnesium, total	44.2	None Required	0.010 mg/L	2021-04-25	
Sodium, total	101	AO ≤ 200	0.10 mg/L	2021-04-25	

Sample Qualifiers:

- FILT The sample has been filtered for TDP in the laboratory. Results may not reflect conditions at the time of sampling.
- PRES Sample has been preserved for TDP in the laboratory and the holding time has been extended.

APPENDIX H

Hydrogeological Review of the Town of Osoyoos
Reclaimed Wastewater Irrigation and Disposal System
Environmental Monitoring Program (OC 5.7.3)

-

May 21, 2019

WWAL Project: 19-013-01VR

Town of Osoyoos
c/o TRUE Consulting Ltd.
201-2079 Falcon Road,
Kamloops, B.C.
V2C 4J2

Attn: Natalie Alteen, EIT

Re: Hydrogeological Review of the Town of Osoyoos Reclaimed Wastewater Irrigation and Disposal System Environmental Monitoring Program

Western Water Associates Ltd. (WWAL) is pleased to provide this hydrogeological review of the Town of Osoyoos' (the Town) reclaimed wastewater irrigation and disposal system environmental monitoring program. The Town municipal wastewater system operates under the Ministry of Environment (MoE) Operational Certificate ME-12214. The Operational Certificate outlines the facility operating parameters and requirements for annual reporting as approved by the MoE. TRUE Consulting has prepared the annual reports on behalf of the Town since 2010. Condition 5.7 of the Operational Certificate and its subsections outline the requirements for a groundwater and surface water monitoring plan and annual reporting, to be completed annually by a hydrogeologist licensed to practice with Engineers and Geoscientists B.C. We understand that these annual reviews by a hydrogeologist have not been completed in recent years and have been requested by the MoE.

WWAL was retained by TRUE and the Town to assess the adequacy of the current monitoring program, evaluate the effects of discharge on the receiving environment, and provide recommendations to modify or update the annual monitoring program as needed. The following work plan was completed by WWAL:

- Obtain and review pertinent background information on Osoyoos' wastewater system including the Operational Certificate, annual monitoring reports, previous hydrogeology reports, engineering drawings, and the results of the biannual water level and water quality monitoring.
- Complete a brief site visit and review sampling procedures employed by the Town.
- Review available information on area geology and hydrogeology, including aquifer mapping, data from provincial groundwater observation wells and well logs for the monitoring wells and reported water wells in the area.
- Create time-series plots for water levels and key indicators of wastewater influence in groundwater.
- Prepare a hydrogeological report with the results of our assessment and provide recommendations as needed to modify or update the annual monitoring program. The report is organized as follows: a summary of findings and recommendations, followed by background, hydrogeology review, monitoring data assessment, data presentation and conclusions.

SUMMARY OF MAIN FINDINGS AND RECOMMENDATIONS

Our review of approximately seven years of monitoring data show that the Town's application of reclaimed wastewater has not impacted groundwater quality. Two of the 7 monitoring wells sampled in this program appear to exhibit water quality impacts attributable to sources other than the reclaimed wastewater irrigation system. To optimize the ongoing monitoring program, we recommend adding two monitoring wells to the program in the near-term, one to provide a suitable background well and the other to assess conditions near the subsurface disposal fields. More detailed Conclusions and Recommendations are provided at the end of this report.

1.0 Osoyoos WWTP Background

The Town of Osoyoos has been collecting municipal wastewater, treating it to reclaimed water reuse standards and using the reclaimed wastewater for irrigation on the Osoyoos West Bench since 1978. The Town operated the wastewater treatment facility under Waste Management Permit PE 86; which was replaced by Operational Certificate No. ME 12214 issued December 18, 1998. The treatment and storage facility is located on the west side of Town near the Osoyoos Golf and Country Club (OGCC) (Figure 1).

Permit ME12214 requires that effluent be treated to a BOD₅ of 45 mg/L and TSS of 60 mg/L, and allows disinfected reclaimed water to be spray irrigated between March 15 and November 15. According to the 2017 annual monitoring report several system upgrades have been completed since 1990 (TRUE 2017). The current treatment facility uses secondary treatment processes comprised of a chlorine contact basin, with three aeration cells and two storage ponds to treat the municipal wastewater. In 2013, the Town of Osoyoos constructed a rapid infiltration basin (RIB) facility with a design capacity of 500 m³/day, which is used to dispose of excess reclaimed water and to facilitate draining of the storage lagoons for routine maintenance. In 2017, a hydrant was installed to facilitate system flushing.

During winter months, the treated municipal wastewater is stored in the two ponds with a total capacity of 565,000 m³. In the summer months, the stored reclaimed wastewater is used to spray irrigate the nearby 36 hole golf course, infield area at the Desert Park Equine Facility and Racetrack, ball diamonds, dog park and the playing fields at the nearby secondary school (TRUE Drawing No. 302-1104 01 attached). The total irrigation area is approximately 76 Hectares. Similar to previous years, in 2017, a total measured volume of 790,075 m³ was spray irrigated in these areas. In addition, the subsurface disposal field was operated for 123 days in 2017 with a total discharge volume of 61,500 m³ during operations conducted in spring (March through May) and fall (select days in September and November). 2017 saw higher than typical discharge to the subsurface disposal fields to facilitate draining of Cell #3 for relining, but recent annual reports indicate that subsurface disposal fields are still used frequently. Annual monitoring reports prepared by TRUE on behalf of the Town are detailed and contain more information on wastewater storage and annual balancing, irrigation volumes and effluent quality.

According to the requirements of the Operational Certificate, the groundwater monitoring program consists of bi-annual (May and September) monitoring of groundwater quality and monthly monitoring of water levels in seven monitoring wells surrounding the facility. Monitoring wells MW-1-01, MW-5-10, MW-7-10, MW-8-10, and MW-9-10 have consistently been sampled as of 2011 (based on records available

to WWAL). Monitoring well MW-6-10 has been dry since well completion in 2010, and MW-2-01 was sampled once in May 2017. Monitoring well MW-2-01 was dry prior 2013 and has had too little water to collect a water sample in subsequent sampling events until May 2017. The water quality parameters assessed in each well include the following:

- Total hardness (total, as CaCO₃) and total suspended solids (TSS),
- Nutrients (nitrate (as N), nitrite (as N), ammonia (as N), and total dissolved phosphorus),
- Chloride anion; and
- calcium, magnesium, and sodium.

Figure 1 and TRUE Drawing No. 302-1104-01 depict the location of all groundwater monitoring wells included in the groundwater sampling program and well logs for each monitoring well are attached to this report.

Town of Osoyoos staff complete water level monitoring and biannual sampling. Sampling involves purging each well of at least three well volumes with a submersible pump on day one, and collecting water samples the next day from the submersible pump discharge.

1.1 Previous Investigations

Golder Associates conducted a geotechnical and hydrogeological assessment for the Town in 1977, prior to construction of the wastewater treatment plant. The results of their assessment is detailed in their report entitled *Geotechnical and Hydrogeological Assessment Proposed Sewage Effluent Irrigation Scheme* (Golder 1977) and is summarized below. This report was aimed at characterizing site surficial deposits and suitability for effluent disposal to ground, but admittedly did not evaluate the effects that the reclaimed water spray irrigation would have on groundwater.

Golder conducted a drilling program in early November 1977 to characterize and assess the local site conditions. Ten boreholes were drilled, logged, and completed with 1.5 inch diameter piezometers and an additional nine test pits were excavated within the study area and on the lower bench (east) below the current site. Golder produced a cross section characterizing the subsurface conditions in the area and on the bench below the site (Cross-section Line shown on Figure 1 as 3 to 3', original cross-section included as an attachment).

Surficial geology was determined to be consistent across the site, comprising an upper terraced sand and gravel deposit approximately 7 m to 13 m (23-43 ft) thick overlying silt. The hydrogeological assessment concluded the groundwater table along the eastern extent of the study area was located at or near the silt / sand and gravel interface and that groundwater flows eastward on top of the silt layer toward Osoyoos Lake. Groundwater flow is controlled by the elevation and slope of the basal silt layer. Golder estimated that the rise in the water table due to irrigation with treated effluent, along the eastern edge of the study area and in the lower bench would be on the order of 0.5 m (1.5 ft), and that irrigation water was likely to infiltrate easily into the subsurface based on the highly permeable surficial sediments.

2.0 SITE AND HYDROGEOLOGIC SETTING

The following sections describes geographic location, topography, bedrock and surficial geology and hydrogeological setting of the study area.

2.1 Site Description

The Town of Osoyoos wastewater treatment facility and spray irrigation area (the site) is located on the west side of the Town of Osoyoos, west of Highway 97 and Osoyoos Lake (Figure 1). The site is situated on a bench near the base of Mount Kruger, approximately 50 metres higher in elevation than Town Centre and Osoyoos Lake. Topography typically slopes eastward at the site, with elevations ranging from approximately 375 m asl at its western extent to approximately 315 m asl along the eastern edge of the bench.

The site is largely surrounded by residential development, and agricultural land, which borders the north, east, and southern site boundaries and undeveloped hillslope occurs to the west of the site. A previously operated mine and processing facility exists on the slope to the southwest of the site (Figure 1). This former mine is referred to as the Dividend-Lakeview, and with polymetallic skarn mineralization (Minfile No. 082ESW001). The mine was periodically operated between 1907 and 1940, and since then exploration work has been completed on the property up until 2001.

Osoyoos Lake is the largest surface water body in the area, located approximately 1 km east and downgradient. There are also two small ponds, or kettle lakes (un-named and Peanut Lake) located downgradient of the Desert Golf Course (northern site section). There are several draws located on the hillslope upgradient of the site that lead onto the golf courses. There is also a draw centrally located near monitoring well MW-1-01 that reportedly seasonally contains water. These draws are ephemeral drainages, only conveying water during or after periods of rainfall or during seasonally wet months (spring). Town of Osoyoos Operations staff indicate that flowing water is very rarely if ever observed in the draws draining the hillside to the west.

2.2 Geologic Setting

Bedrock geology underlying the site and extending north and west is comprised of strongly foliated metamorphic rocks of the Kobau Group including undivided amphibolite, greenschist, quartzite, mica schist, greenstone, with minor marble (Tempelman-Kluit 1989). Within the Kobau Group, Anarchist Schist stratigraphy also exists in the area, consisting of greenstone and greenschist metamorphic rocks formed during the Carboniferous to Permian periods, approximately 362 to 245 million years ago (MFLNRORD 2019). Bedrock outcrops and near surface bedrock exists on the mountain slopes at the north end and to the west of the site.

Surficial geology in the Okanagan Valley was extensively mapped and described by Hugh Nasmith in Bulletin No. 46 *Late Glacial History and Surficial Deposits of the Okanagan Valley British Columbia* (1962), and is summarized as follows. Surficial geology at the site is characterized as outwash terrace deposits consisting of stratified glacial drift material deposited from meltwater streams and lakes during glacial

retreat. These sediments are fine sand to coarse gravel in texture and are typically deposited on the upper bench and valley walls at the site, and to the north and south. Kettled outwash deposits occur on the lower bench, just east of the site, and extend north along the lake shoreline. Sediments in these lower-lying areas are typically stream deposited sands and gravels, with some silt and clay deposited in local kettle ponds, which are visible northeast of the site.

Lithology in the monitoring wells completed at the site is consistent with the surficial outwash terrace deposits described above. All of the wells are terminated in a clay or silty clay unit that underlies the surficial sand and gravel deposits. These surficial deposits are thickest [approximately 11 to 15 m (36-50 ft)] at the eastern extent of the site (MW-5-10, MW-6-10, MW-7-10, MW-1-01, and MW-9-10) and are thinnest at the western site extent (MW-8-10) near the base of the mountain slope. Surficial unconsolidated sediments at monitoring well MW-2-01, near the southeast section of the study site, are moderately thick (7 m; 23 ft) and are slightly finer in texture (silty sand to fine sand with gravel seams). Monitoring well MW-8-10 is completed to bedrock, which was intercepted at 11 m (36 ft) bgs. Well logs for the monitoring wells are provided as an attachment to this report.

2.3 Hydrogeological Setting

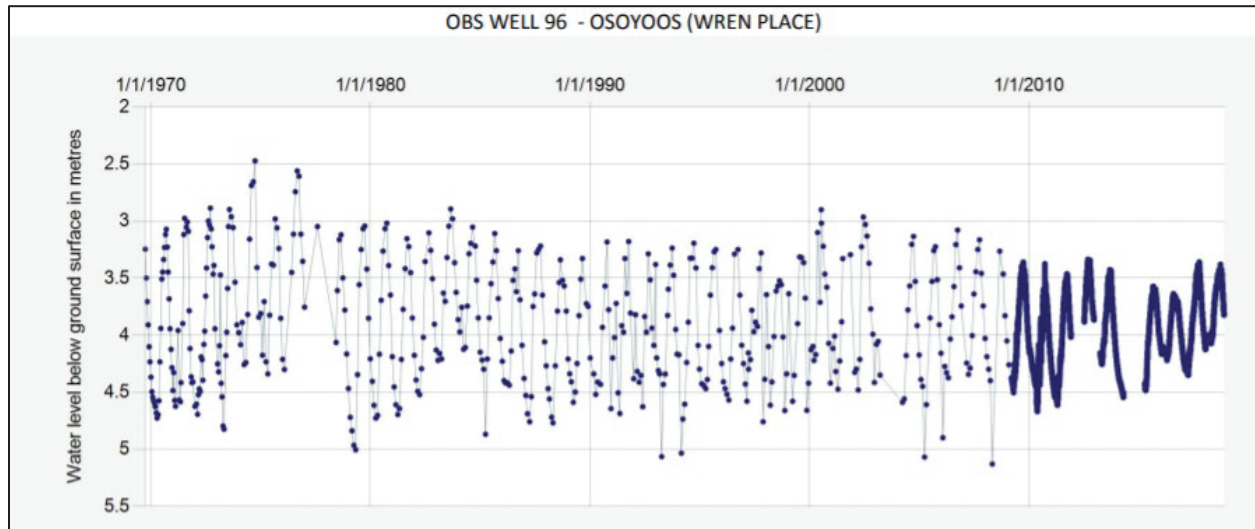
There is one provincially mapped unconsolidated aquifer underlying the site, according to information from the B.C. Water Resources Atlas (WRA 2019). Aquifer 193IIA, is characterized as an unconfined glaciofluvial outwash sand and gravel aquifer, referred to as the West Osoyoos Aquifer. Aquifer 193 is 14 km² in area, extending the length of Osoyoos Lake along its western shore to the base of the mountain slope, at the western site boundary (Figure 1). Aquifer 193IIA is classified as highly productive, with high demand, and high vulnerability to surface contamination. As described in WWAL's 2017 report entitled *Town of Osoyoos Well 7 Hydrogeological Assessment Report to Support Activation and Permitting*, recharge to the aquifer is dominated by irrigation return flow from agricultural land. Recharge to the aquifer also occurs from direct infiltration of precipitation, nearby surface waters (Osoyoos Lake) where the sands and gravels are present adjacent to the lake, and in small part from mountain block recharge from bedrock aquifers (WWAL 2017).

The Town of Osoyoos operates a municipal water system, which services the majority of residential, commercial, and industrial properties within the municipal boundary of Osoyoos. The municipal water system is supplied by six moderate to high capacity groundwater wells, three of which are located west of and within 100 m of Osoyoos Lake, and all are completed in Aquifer 193. Near the lake shore, aquifer water levels are likely to be influenced by seasonal changes in lake stage. Typically, lowest lake stage occurs November through March with elevated levels April through October (WWAL 2017). Surface water recharge from Osoyoos Lake does not influence groundwater conditions at the site as the elevation of the spray irrigation area is significantly higher.

Provincial observation well # 96 (OW 96) is located approximately 340 m east of the site, is completed within Aquifer 193, and has recorded water level data since 1969 (50-year record). Based on water level data for OW 96 (Figure 2.1), annual water level fluctuations are on the order of 1 m to 1.5 m, with highest aquifer levels occurring in July through October and lowest levels occurring in January through May. The

elevated aquifer levels are consistent with typical irrigation season in the area (May to September), which further suggests that irrigation return flow is the dominant source of aquifer 193 recharge.

Figure 2.1 Water Level Hydrograph for Observation Well 96



Monitoring well logs indicate sediments consistent with those described for Aquifer 193 occur at the site, and are underlain by clay or silty clay deposits. Groundwater at the site is believed to be controlled by the slope and depth of this low permeable silty clay layer. Through basic triangulation, using groundwater levels obtained from the monitored wells (MW-5-10, MW-7-10, MW-8-10, and MW-9-10) and accurate top of casing elevations surveyed by TRUE, groundwater flow direction across the site was estimated to be eastward at a gradient of ~ 0.05 . We note that the majority of Osoyoos monitoring wells are in a roughly north south line making groundwater contour triangulation difficult. MW-8-10 is the only well that deviates from this line, but MW-8-10 is located at significantly higher elevation and skews the groundwater contouring in a more easterly direction. There is an apparent 15 m elevation difference between water levels at MW-5-10 and MW-9-10, which would likely result in groundwater flow having more of a southerly component than indicated on Figure 3.

The conceptual model for groundwater flow at the site is as follows. Irrigation water (the proportion that is not lost to evapotranspiration and is likely a small percentage of irrigation water applied) infiltrates into the permeable surficial sand and gravel and percolates vertically into the subsurface until contacting the low permeable silty clay layer. The water then preferentially flows in the downgradient direction (east) along the interface between the sand and gravel, and silty clay layer. This flow is generally eastwards towards the lake, but variations in flow direction would exist based on the local slope of the silt-clay surface.

3.0 HISTORICAL GROUNDWATER LEVEL DATA

The groundwater monitoring program includes seven monitoring wells, six downgradient (MW-1-01, MW-2-01, MW-5-10, MW-6-10, MW-7-10, and MW-9-10) and one upgradient (MW-8-10; background well) to the treatment facility and the irrigation area. Water level elevation data has been collected by Town staff

at all of the monitored well locations since January 2011. Monitoring well MW-6-10 has been dry since installation and monitoring well MW-2-01 remained dry until June 2013.

Wells in the monitoring well network were installed in 2001 and 2010 (the last number on the monitoring well ID indicates the year of installation), and all of the wells were intended to monitor the effects of applied reclaimed irrigation wastewater. In 2013, the subsurface disposal fields were added to WWTP operations, and no wells are present that specifically monitor discharge from this discharge.

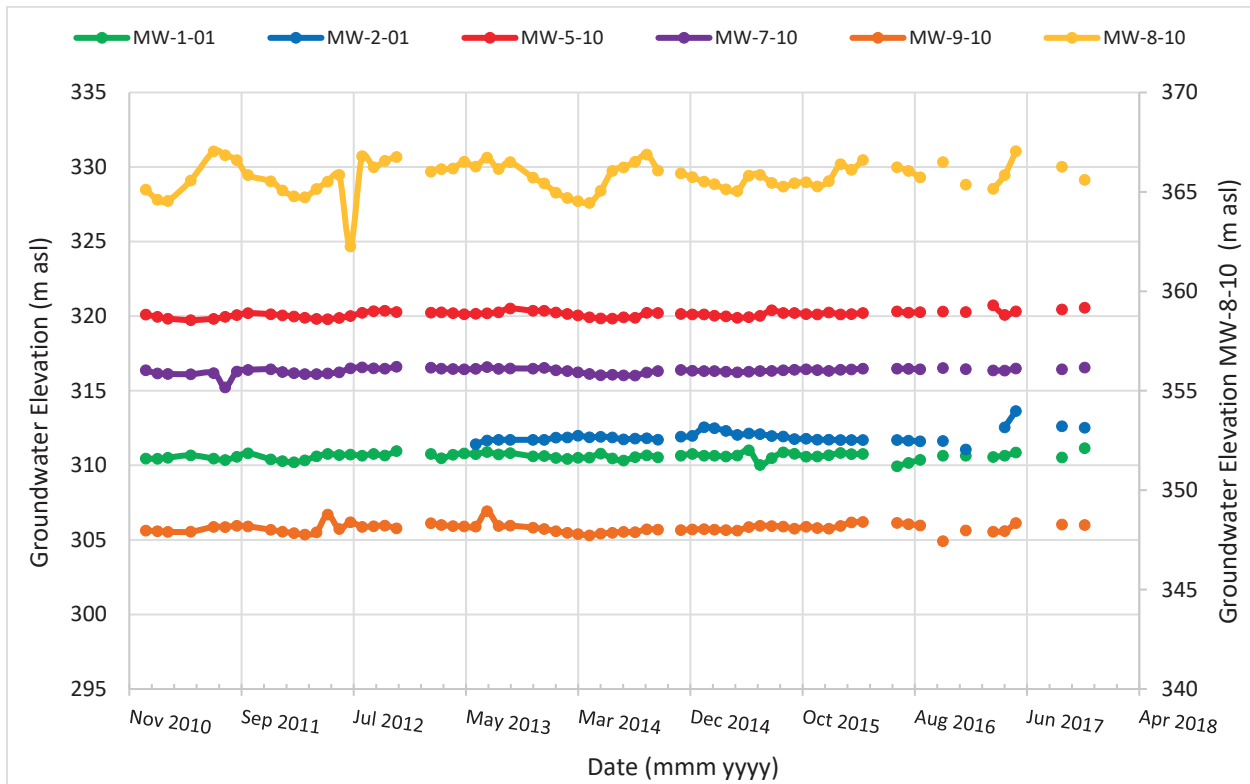
Table 3.1 summarizes the well construction details for the current monitoring wells included in the program and well logs are attached. Figure 3.1 below illustrates 2010-2017 water level hydrographs.

Table 3.1 Summary of Monitoring Well Construction Details

Well ID	Completion Date	Well Depth m (ft) bgs	Screened Interval m (ft)	Diameter mm (in)	Top of Casing Elevation m asl	Ground Surface Elevation m asl	Location Relative to Wastewater Storage Ponds
MW-1-01	March 2001	18.3 (60)	None	50 (2)	319.4	318.4	East
MW-2-01	March 2001	9.5 (31.2)	None	50 (2)	Unknown	320.3	Southeast
MW-5-10	October 2010	14.3 (47)	9.25-14.3 (30.3-47)	100 (4)	328.9	328.2	Northeast
MW-6-10	October 2010	8.3 (27.1)	3.25-8.3 (10.7-27.1)	100 (4)	320.5	319.9	Northeast
MW-7-10	October 2010	15.9 (52)	10.9-15.9 (35.8-52)	100 (4)	328.8	328.3	North
MW-8-10	October 2010	11.3 (37.1)	6.25-11.3 (20.5-37.1)	100 (4)	372.1	371.5	Southwest (Background)
MW-9-10	October 2010	25 (82)	20-25 (65.6-82)	100 (4)	320.2	319.4	Southeast

At all the monitoring wells, water table elevation has been quite stable throughout the 7 year (2011-2017) period of record (Figure 3.1). The annual fluctuations at the majority of the wells is on the order of 0.5 m (1.5 ft). MW-8-10 displays more variation in water levels than any of the other wells with an annual fluctuation of approximate 1.5 m to 2 m (5 - 6.5 ft). Monitoring well MW-8-10 is located upgradient of the irrigation area, at the base of a slope with natural draws to the north and south. These draws are likely to convey water, at least seasonally at or near surface, which would contribute to the variability in groundwater levels in MW-8-10.

Figure 3.1 Groundwater Elevation Hydrograph For Osoyoos WWTP Monitoring Wells



4.0 HISTORICAL GROUNDWATER QUALITY DATA

Assessing potential impact on the receiving environment from reclaimed water spray irrigation is the main objective of the current groundwater monitoring program. The receptors of concern are aquifers (potentially used for drinking water) at and downgradient of the site and the downgradient surface waterbodies, in particular, Osoyoos Lake.

Based on the above receptors of concern, the water quality results were compared to the following applicable guidelines and standards:

- Guidelines for Canadian Drinking Water Quality Maximum Acceptable Concentration (health-based guideline) (GCDWQ MAC) and Aesthetic Objectives (GCDWQ AO) (Health Canada 2014); and
- B.C. Contaminated Sites Regulation, Schedule 6, Generic Numerical Water Standards for Drinking Water (CSR DW) and Aquatic Life (CSR AW) (MoE 2018).

Water quality results for selected parameters sampled at the monitored wells are discussed in the sections below. Time series plots, illustrating concentrations of each parameter over the sampling period (7 years), are provided for the following parameters: chloride, sodium, nitrate, nitrite, ammonia, total dissolved phosphorus, and total hardness.

4.1 Chloride

The presence of chloride is not of direct concern to human health; however, concentrations above background can indicate the magnitude of impact on groundwater from the reclaimed water spray irrigation. Chloride is an indicator of anthropogenic impact and it is a conservative ion, meaning it does not sorb to soil or degrade in the environment. While chloride is usually naturally present in small concentrations in groundwater, elevated chloride can be due to anthropogenic activities such as road salting, industrial processes, wastewater effluent disposal to ground, and agricultural activity. Chloride concentrations in monitoring well samples is displayed in time-series on Figure 4.1.

Chloride at sample locations MW-1-01, MW-7-10, and MW-9-10 is relatively stable and low with concentrations below 15 mg/L, and no obvious seasonal or temporal variability.

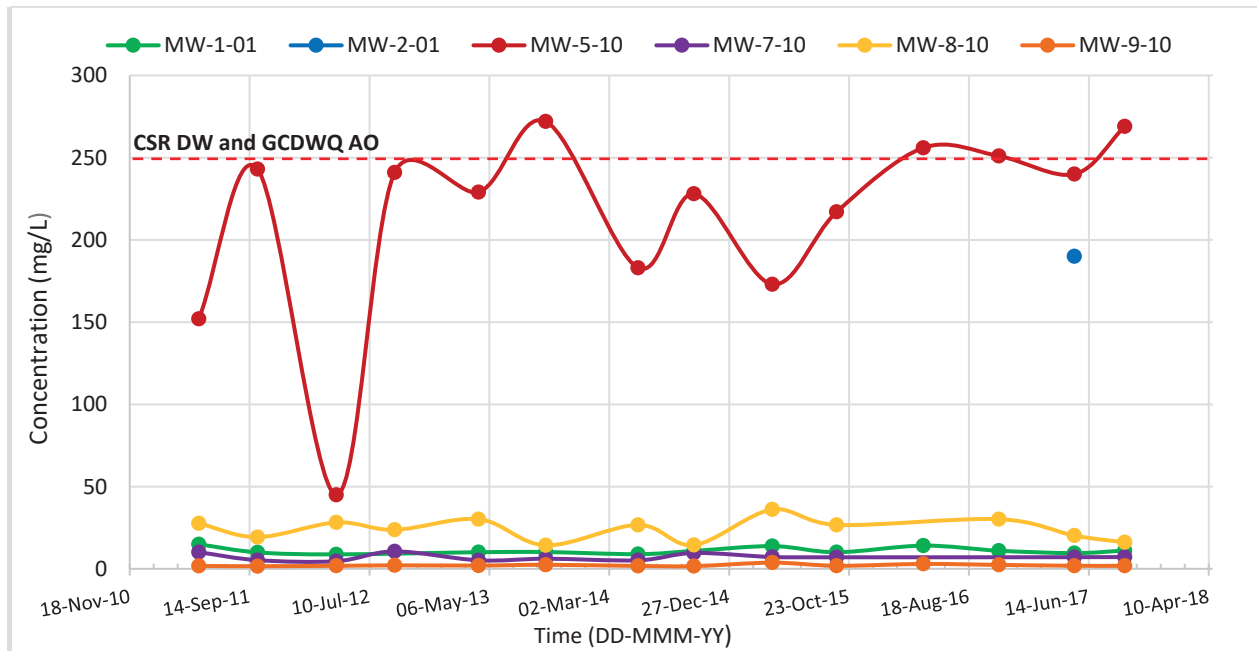
There is a seasonal trend in chloride concentrations and more variability at MW-8-10, with slightly elevated concentrations in spring compared to fall, but concentrations remain well below guidelines at this location.

Although below guidelines, chloride at MW-2-01 was elevated in May 2017 (only sampling event on record) at 190 mg/L. We suspect there may have been an issue with this one and only sample collected from MW-2-01, as concentrations of most parameters sampled for were quite high.

Chloride was below aesthetic guidelines (≤ 250 mg/L) at all locations with the exception of MW-5-10 in September 2013, April and November 2016, and September 2017. Chloride concentrations are highly variable (range of 227 mg/L) and have consistently been elevated at MW-5-10 since 2011 (Figure 4.1). Seasonally, chloride concentrations at MW-5-10 are slightly higher in fall relative to spring sampling events.

The elevated chloride at MW-5-10 and MW-2-01 could be in part due to the spray irrigation; however, we do not see elevated levels at any other sample location. The concentration and variability of chloride at MW-5-10 is puzzling. There is less irrigated area upslope of MW-5-10 than at other locations, and no obvious alternative sources of chloride in the area. The area upslope of MW-5 consists only of golf course, undeveloped lands, and a Town municipal water reservoir. Town of Osoyoos staff were also not aware of any land use activities, present or historical, that could be a source of chloride. The area upslope (west) of MW-5-10 is interpreted to be comprised of shallow soils over bedrock, whereas other portions of the golf course overlie thicker sediments. It is possible that the application of chemical fertilizers to the golf course, if that occurs, may contain nitrogen and chloride and that this application is effecting water quality at MW-5-10 more than at other monitoring locations.

Figure 4.1 Chloride Time Series Plot



4.2 Sodium

The presence of sodium above background concentrations can indicate wastewater impacts on groundwater. Sodium can also be present naturally due to weathering of bedrock containing natural sources of sodium or due to anthropogenic activities such as road salting, sewage and industrial effluents, home water softener use, and agricultural activity.

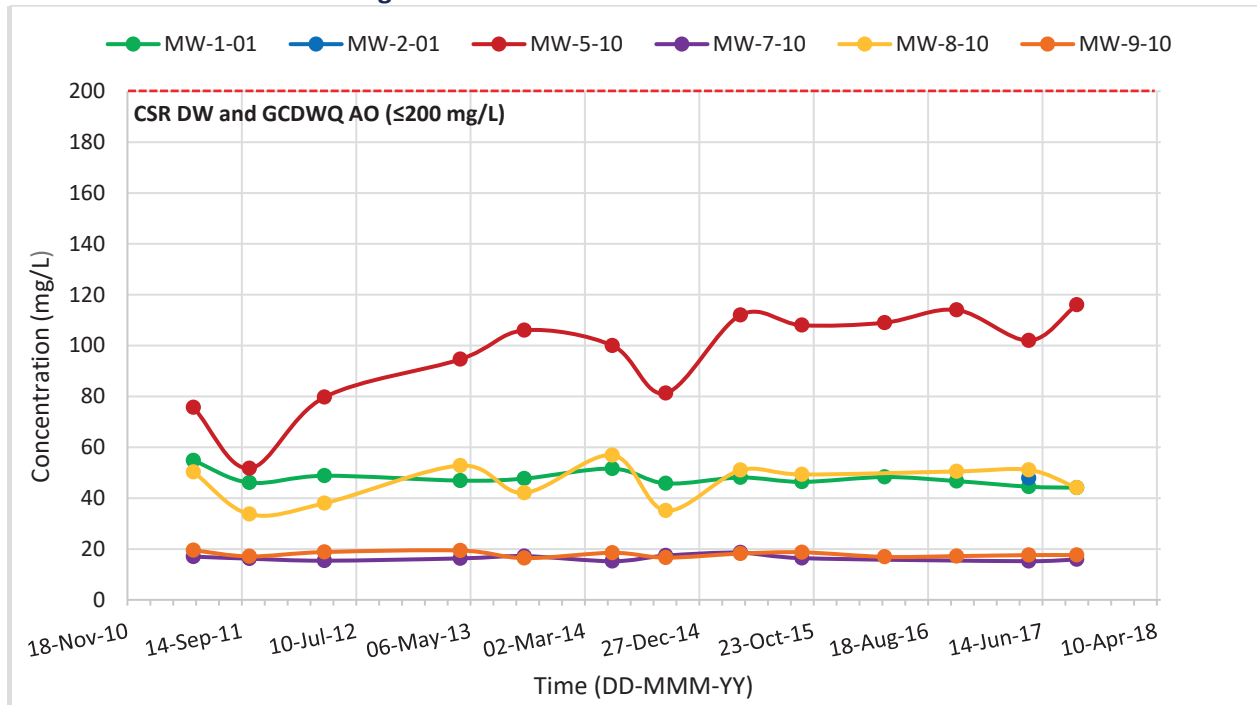
Similar to chloride, concentrations of sodium are low and stable at MW-1-01 and MW-9-10, in the 15-20 mg/L range.

Sodium concentrations are higher but also stable at MW-1-01, in the 50 mg/L range. MW-1-01 is located near a draw containing seasonal water, and this draw appears to drain or collect runoff from a sizeable portion of the golf course, which may explain the elevated sodium.

At MW-8-10 (the program background well), sodium concentrations are also in the 50 mg/L but show more temporal variability. This well is at the base of an ephemeral draw draining the hillside above the golf course which could influence water quality, but the source of the sodium is unclear as the well is at the upgradient part of the golf course. As previously mentioned there is a former mine on the hillside to the south of this location, and drainage from the old workings could possibly contain parameters not normally present in area groundwater (see also Section 4.3).

Again, as with chloride, MW-5-10 has anomalously high and variable sodium concentrations that cannot be explained. Sodium concentrations at MW-5-10 have been increasing since 2011.

Figure 4.2 Total Sodium Time Series Plot



4.3 Nitrate

Nitrate is of direct concern for its potential effects on human health and the environment. Nitrate concentrations greater than 3 mg/L are considered by the Province to reflect human impacts (MoE 2007), but typically nitrate is not present or only present at low concentrations (<0.3 mg/L) in pristine environments. The most common anthropogenic sources of nitrates include agricultural activities, wastewater disposal to ground, and discharge from industrial processes and mining (blast residuals from ammonium-nitrate or other explosives).

Nitrate concentrations at all sample locations remain below drinking water and aquatic life guidelines (10 mg/L and 400 mg/L, respectively) throughout recorded results, with exception of the single sampling event (May 2017) at MW-2-01, with nitrate well above health-based MAC and CSR DW standards at 15.6 mg/L.

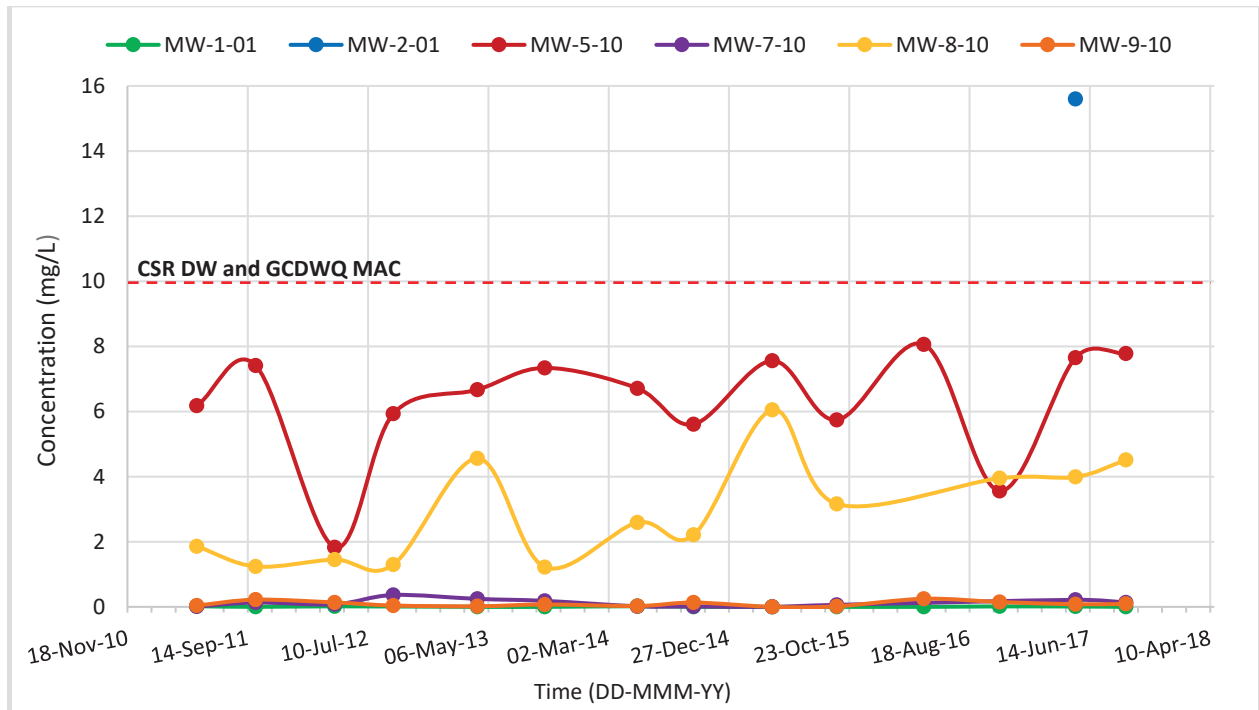
Nitrate concentrations at MW-1-01, MW-7-10, and MW-9-10 are low (<0.5 mg/L) and stable for the period of record.

Concentrations of nitrate are elevated and display more variability at monitoring locations MW-8-10 (background well) and MW-5-10. Concentrations have increased at MW-8-10 since monitoring began in 2011 from 1.24 mg/L (October 2011) to 4.51 mg/L (September 2017) and are typically elevated during spring relative to fall sampling events. As speculated upon previously with sodium and chloride, the location of MW-8-10 at the upper end of the golf course would suggest that the elevated concentrations

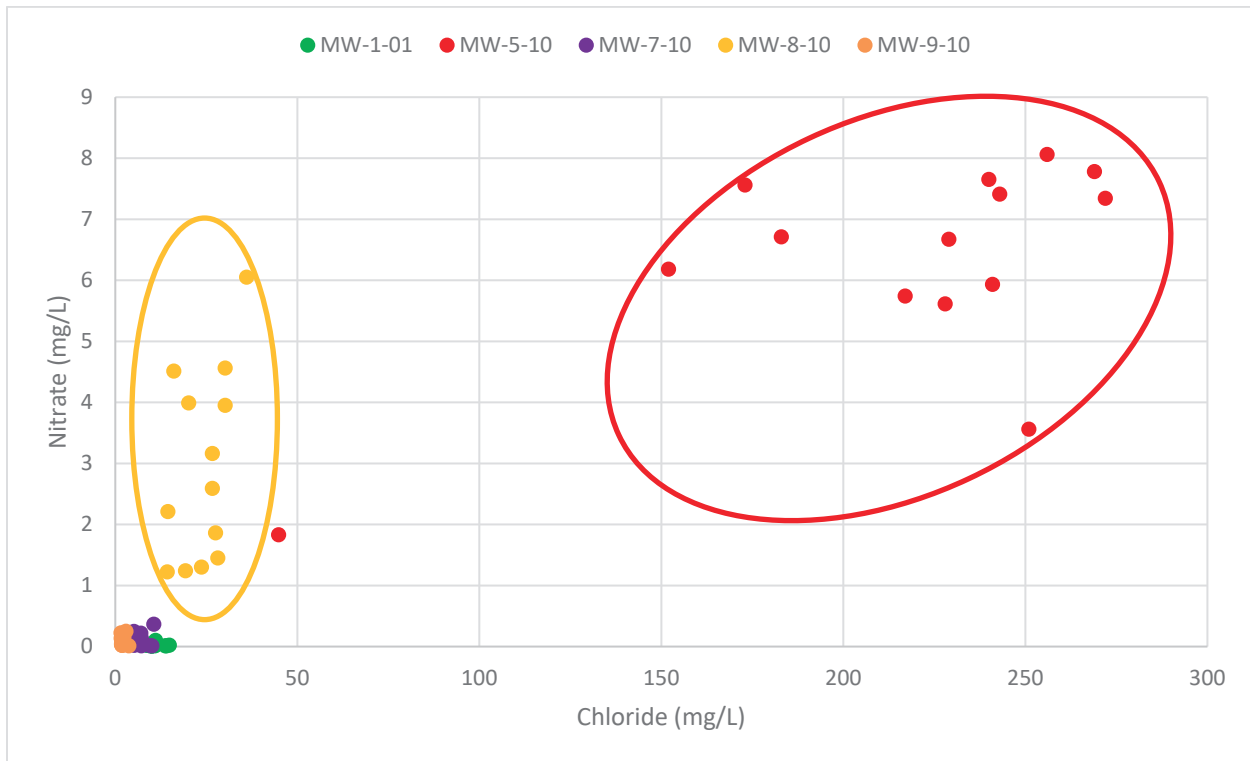
of these parameters are not a result of reclaimed water irrigation, but rather some offsite source. Again, it is possible that historical activities at the nearby former gold mine (blasting using nitrogen-based explosives) or in the watershed above this location are the source of elevated nitrate at this well.

Nitrates are variable at MW-5-10, ranging between 3.56 mg/L and 8.06 mg/L and the time-series plot indicates that concentrations have been stable, or increasing very slightly, since 2011. Seasonally, concentrations at this location were elevated in spring and lower in fall; however, this was only observed since 2014 (Figure 4.3). The source of the elevated nitrate at MW-5-10 remains unclear.

Figure 4.3 Nitrate (as N) Time Series Plot



The ratio of chloride to nitrate in groundwaters can provide insight into the sources of these parameters, and can be an indicator of whether observed impacts are from the same source or from different sources. Figure 4.4 presents a graph of chloride versus nitrate in the five wells that have been frequently monitored. MW-1-01, MW-7-10 and MW-9-10 all plot together and have relatively low concentrations of both parameters. Results for MW-8-10 show variations in nitrate concentration while chloride is stable. At MW-5-10, both chloride and nitrate are at much higher concentrations and both vary significantly. This suggests the impacts observed at MW-5-10 and MW-8-10 are from different sources.

Figure 4.4 Chloride versus Nitrate Concentrations

4.4 Nitrite and Ammonia

Ammonia and Nitrite are early forms of nitrogen in the nitrification process. Ammonia is the primary form of nitrogen in raw wastewater, but is quickly converted to nitrite and eventually nitrate during wastewater treatment. Nitrite is an unstable form of nitrogen which rapidly oxidizes to nitrate or reduces to nitrogen gas, as such concentrations within the environment are typically present in small quantities, especially in surface waters (MoE 1998). When monitoring groundwater for impacts from wastewater disposal to ground, nitrate is the predominant nitrogen species present. When ammonia or nitrite are present in groundwater, it indicates that the source of nitrogen is close by, and that the nitrification process was not completed prior to nitrogen reaching the groundwater table. Similar to nitrate, anthropogenic sources of nitrite and ammonia include wastewater effluent, agriculture and urban development, industrial effluents, and mining (blast residuals).

Nitrite concentrations were above detectable limits at MW-9-10 during six of the 14 recorded sampling events ranging between 0.059 mg/L and 0.012 mg/L (but at concentrations well below the CSR AL guideline of 1.0 mg/L). In comparison, nitrite concentrations are non-detect (<0.01 mg/L) at all other sample locations with exception of one anomalously high sample result (September 2017) at MW-5-10 (Figure 4.5).

Figure 4.5 Nitrite (as N) Time Series Plot

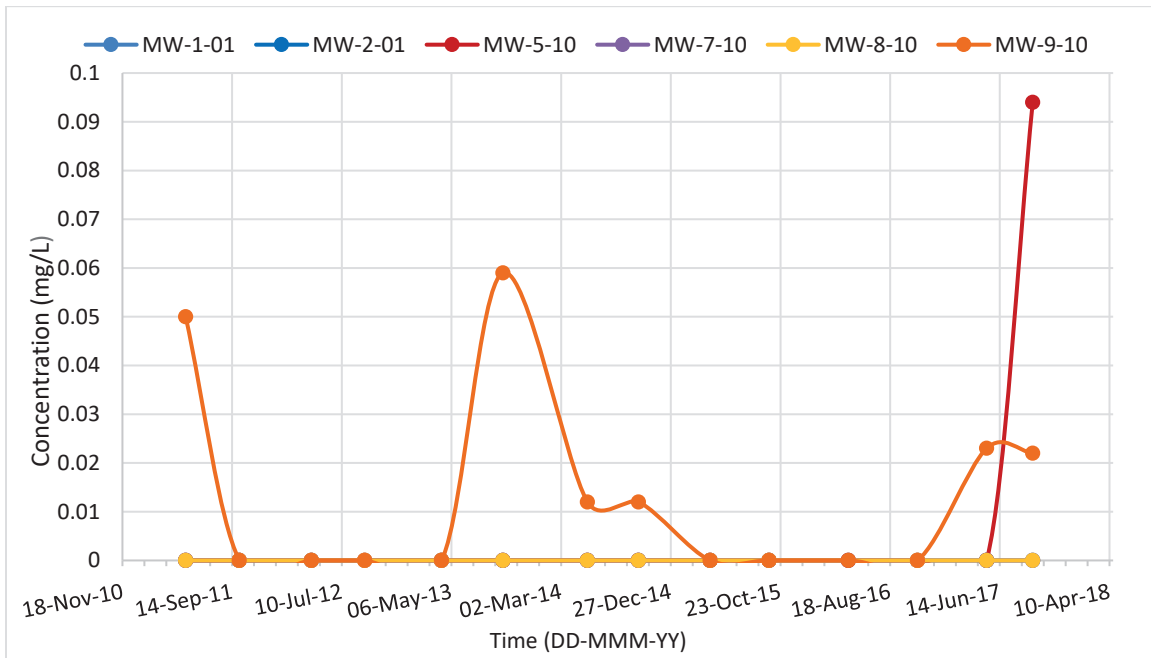
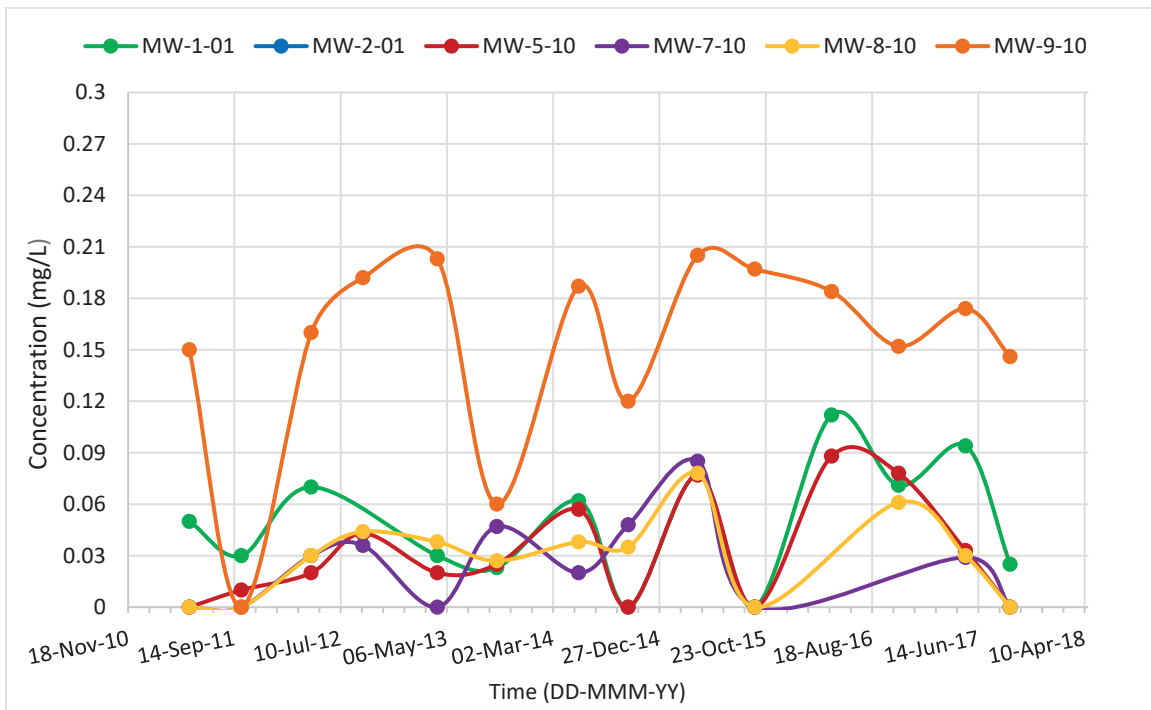


Figure 4.6 Ammonia (as N) Time Series Plot



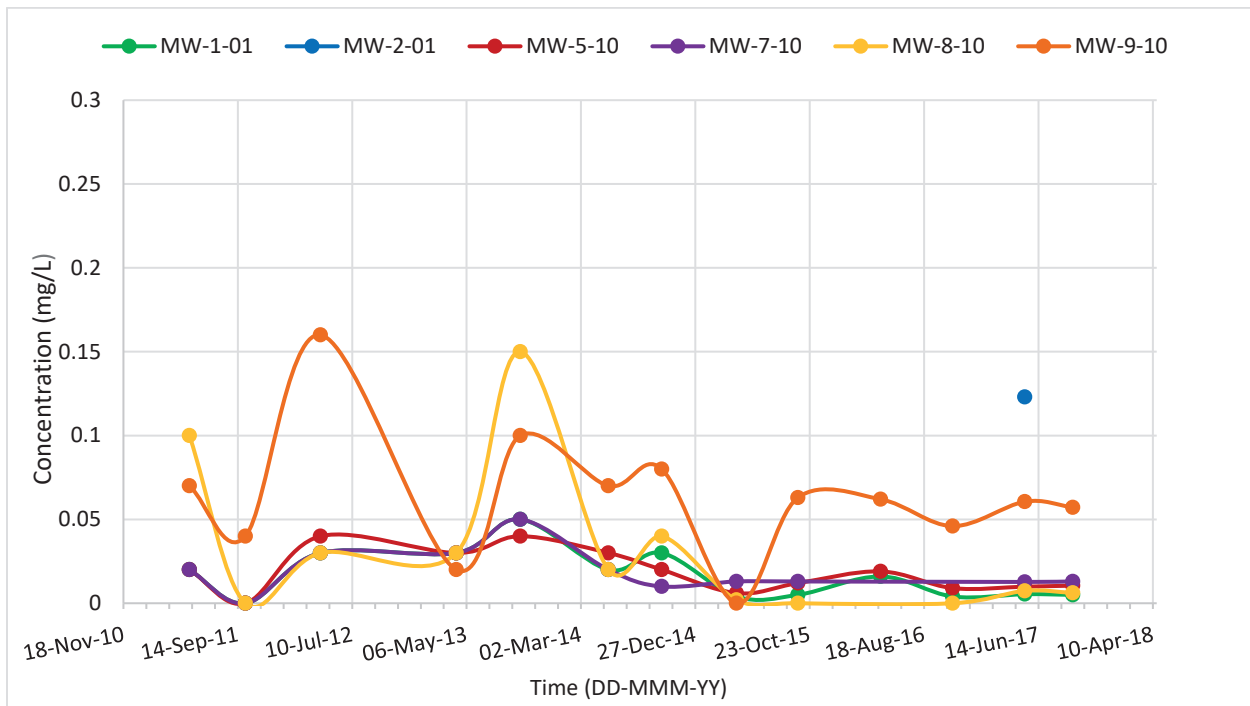
Ammonia is also elevated above all other sample locations at MW-9-10. Ammonia is slightly more variable than nitrite at all sample locations. Ammonia is typically elevated in spring relative to fall sampling events at monitoring wells MW-1-01, MW-5-10, MW8-10, and MW9-10 (Figure 4.6).

4.5 Total Dissolved Phosphorus

Potential impact to aquatic life and surface water quality can occur from increased loading of phosphorus present in wastewater effluent, even at low concentration. Inputs of phosphorus to fresh water systems can cause proliferations of algal growth, and are one of the prime contributing factors to eutrophication in fresh water systems (MoE 1998). There are no drinking water or aquatic life guidelines in either CSR water standards or Canadian Drinking Water Quality Guidelines for phosphorus.

Dissolved phosphorus concentrations are low (below 0.16 mg/L) at all sample locations throughout the sample record. In comparison, total dissolved phosphorous concentrations in effluent grab samples in 2017 were 4.8 and 5.4 mg/L. This suggests that phosphorous in reclaimed irrigation water is being utilized by plant growth or adsorbed to soils in the irrigated areas, and not reaching the groundwater table in meaningful amounts.

Figure 4.7 Total Dissolved Phosphorus Time Series Plot



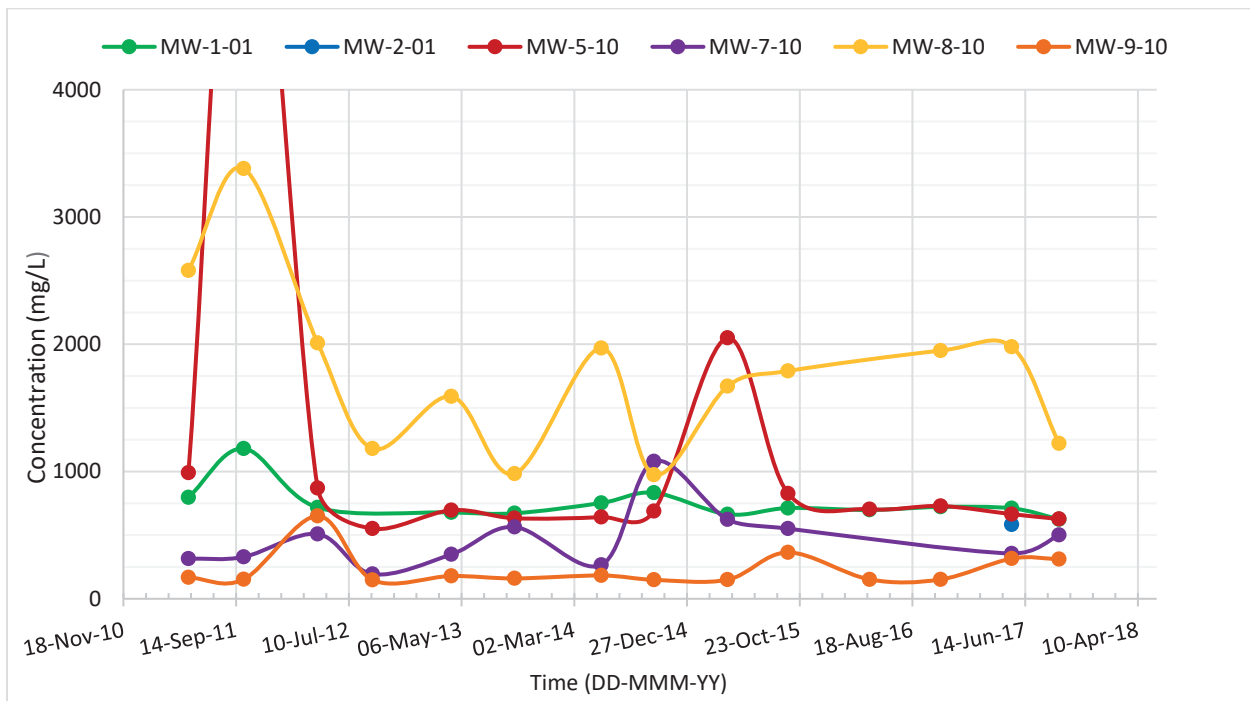
4.6 Hardness

Water hardness is typically due to the presence of calcium and magnesium in the water, although other metal species can contribute to water hardness (MoE 1998). Sources of water hardness include weathering of bedrock, seepage from soils, and industrial process such as mining. Hardness in and of itself is not indicative of wastewater impacts on groundwater, but hardness can shed light on differing hydrologic processes and recharge mechanisms affecting a site. Groundwater is typically harder than surface waters due to contact with soils and rocks containing appreciable amounts of minerals such as calcite, gypsum, and dolomite (Health Canada 1979).

Overall, the groundwater is considered hard at all sample locations with the lowest levels (average 230 mg/L) occurring at MW-9-10 and highest levels (average 1790 mg/L) at MW-8-10 (background). Concentrations are relatively stable with no observable increasing or decreasing trend at the majority of the sample sites. Monitored locations MW-5-10 and MW-8-10 are slightly more variable throughout the data record. MW-5-10 shows two peaks one in October 2011 (6,670 mg/L) and the other in April 2015 (2050 mg/L); however, the remaining measured concentrations are stable at approximately 750 mg/L. Concentrations at MW8-10 are highly variable with a range in results of 2,406 mg/L.

The elevated hardness at MW-8-10 is likely due to this well being completed into bedrock, which typically has higher mineral content. Further, there are several draws located in the vicinity of MW-8-10, which may convey more highly mineralized bedrock aquifer water towards MW-8-10. Near surface bedrock occurs upgradient to MW-5-10, and it is possible bedrock aquifer groundwater is influencing geochemistry at that site as well.

Figure 4.8 Total Hardness Time Series Plot



5.0 CONCLUSIONS

Based on our assessment, we provide the following conclusions:

- C1 Surficial lithology at the site consists of two main units: an upper sand and gravel unit ranging in thickness from 2 m to 15 m, overlying a dense silty-clay. The upper sand and gravels host a shallow unconfined aquifer bounded by the silty clay below which would have low permeability (however the upper portion of the silty clay appears to be water-bearing as many of the monitoring wells

are screened in or partially in the clay layer). This shallow aquifer is what is being monitored in the annual sampling program.

- C2 The direction of groundwater flow beneath the site is eastwards towards Osoyoos Lake. Local variations in this predominant direction of groundwater flow may occur where the slope of the underlying silty clay surface changes.
- C3 The water table elevation has been relatively stable throughout the 7 year period of record at all monitoring wells. Annual fluctuations at the majority of the monitoring wells is on the order of 0.5 m (1.5 ft). Annual water level fluctuations are slightly more variable at monitoring well MW-8-10 at approximate 1.5 m to 2 m (5-6.5 ft), likely due to surrounding natural draws seasonally contributing to groundwater in this well.
- C4 As part of their Annual Monitoring Program, The Town of Osoyoos monitors seven wells. Whereas spray irrigation began in the 1970s, receiving environment monitoring in earnest only began in 2010/2011, and as such results cannot be compared to baseline conditions. We comment below on noteworthy trends and observations based on the period of record:
- **MW-1-01, MW-7-10 and MW-9-10** show little evidence of impacts from reclaimed water irrigation. Concentrations of wastewater indicator parameters in these wells (chloride, sodium and nitrate) are all low, and likely representative of receiving environment conditions. There is little variability in the concentrations of these parameters and no discernable trends in concentrations are apparent over the period of record.
 - **MW-2-01** is monitored, was dry up until 2013 and since 2013 has typically contained too little water to collect a sample. Only one water quality sample has been collected from this well in September 2017, and had somewhat unusual results with very high nitrate (15 mg/L) and elevated chloride. We suspect that there may have been issues with this sample (perhaps there was little water available to sample or the sample was turbid) so we are hesitant to draw any conclusions based on only one sample. The Town should continue to monitor this well and collect samples, possibly using a different sampling technique (See Recommendations).
 - **MW-6-10** is monitored for water levels but has never contained water since installation.
 - **MW-5-10** is the northern most monitoring well, located below the northern-most extent of the irrigated area. Geochemistry results from this well have been consistently different than other monitoring wells, characterized by elevated chloride concentrations that have exceeded drinking water quality guidelines on occasion, elevated and rising sodium concentrations, and elevated nitrate concentrations in the 6-8 mg/L range. The reason for the elevated concentrations of these parameters is not clear. While reclaimed water irrigation could be a contributing factor, concentrations of these parameters are much lower in other wells that are down gradient of more irrigated lands (e.g. MW-1-01, MW-7-10 and MW-9-10). Current and historic land uses around this well do not indicate other possible sources for these parameters.

- **MW-8-10** is intended to be the program's background well, and is located on the uppermost part of the golf course above the majority of the irrigated area. However MW-8-10 has chloride, sodium and nitrate at higher concentrations than downgradient wells. In addition there is more variability in the concentrations of these parameters and in the variability of groundwater levels. MW-8-10 is completed just into the upper bedrock surface, and is located where two draws draining the hillsides above intersect the golf course. It is believed that seasonal groundwater runoff through these draws influences groundwater quality and variability in this well, and that bedrock aquifer discharge at this site is affecting groundwater quality. In addition, historic land use on the hillside south of this well included mining and ore processing which could be a source of the elevated sodium, chloride and nitrate (if nitrogen-based explosives were used). All of the factors contribute to MW-8-10 not being an appropriate background well.

To summarize, our interpretation is that the monitoring program is not indicating significant impacts on groundwater in the area. The results from two wells, MW-5-10 and MW-8-10, are anomalous, indicate anthropogenic impacts, but it appears that these impacts are largely from a source(s) other than the reclaimed wastewater irrigation.

- C5 The current reclaimed wastewater irrigation and disposal system monitoring program should be expanded/modified to more adequately monitor the discharges that are occurring and to clear up uncertainty associated data being collected at two of the existing wells. This expansion would include:

Higher Priority:

- A new monitoring well specifically located to monitor the discharge from the subsurface disposal fields;
- A new background monitoring well not affected by offsite land uses the way MW-8-10 is interpreted to be.

Lower Priority:

- We understand that the Town's sludge management program sees sludge bagged and dried on lands directly south of the high school. There are no monitoring wells installed to specifically monitor the effects of this, and a well should be added immediately east of the sludge management area. We understand that desludging occurs infrequently (around every 15 years), so this well is considered a lower priority. In addition, we understand that the nearby school is not connected to the municipal wastewater system and uses its own septic system and ground disposal. Siting of a well for this purposes needs to consider the location of the school septic fields and those need to be considered in interpretation of monitoring results.

- Another monitoring well in the vicinity of MW-5-10, to try to confirm whether the geochemistry observed at that site is indeed a result of the reclaimed wastewater irrigation or a result of something else.

6.0 RECOMMENDATIONS

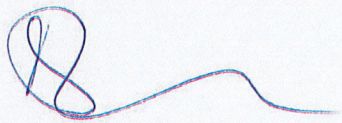
- R1 WWAL recommends continued monitoring of water levels and bi-annual sampling at all of the wells currently being monitored and at the same frequency and schedule. Only one water quality sample has been collected to date from MW-2-01 and was anomalous. We recommend consideration be given to sampling this well in 2019 with low flow sampling techniques, as a lack of water for sampling with a submersible pump has been reported in the past.
- R2 A new monitoring well should be installed downgradient of the subsurface disposal fields to specifically monitor that discharge. The approximate location for this new well is shown on Figure 1. Following installation and initial sampling, this well should be monitored at the same frequency and schedule as the current wells.
- R3 A new background well should be installed on the western edge of the golf course. A recommended location for this new background well is shown on Figure 1. The recommended location is also located below a draw leading onto the golf course, but should be outside of the zone of influence of the former mining operations potentially effecting MW-8-10. Following installation and initial sampling, this well should be monitored at the same frequency and schedule as the current wells. For the time being, MW-8-10 should continue to be monitored.
- R4 A monitoring well should be installed immediately east of the sludge drying area to monitor the effects on groundwater caused by current residual management practices. Following installation and initial sampling, this well should be monitored at the same frequency and schedule as the current wells. Note our comments in the conclusions section related to siting this well and interpreting the results of water sampling.
- R5 A more detailed review of historical land uses should be completed for the area around MW-5-10. This would include a review of historical aerial photos, collecting information on golf course fertilizer application and interviews with people knowledgeable about the history and development of the area. Assuming that review does not shed light on the observed water quality at MW-5-10, another monitoring well should be drilled in that area to see how extensive the area of impacted groundwater is and to help shed light on the possible source of the impact.
- R6 We recommend that grab samples of the reclaimed effluent be collected and analyzed for chloride, sodium and sulphate to help interpret the results of the groundwater monitoring program. These parameters should be added to the list of parameters already sampled for by the Town at sampling site 2074444.

- R7 Following the addition of the new monitoring wells and recommended effluent grab sampling, the results should be reviewed and interpreted by a hydrogeologist. We note that Section 5.7.4 of Permit ME-12214 requires the annual receiving environment monitoring program to incorporate existing groundwater and surface water data contained in the Province's EMS database. To date this has not been completed, but should be as part of the next annual monitoring report.

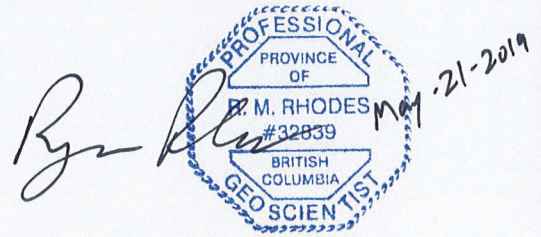
CLOSURE

We trust that the professional opinions and advice presented in this document are sufficient for your current requirements. Please note that there are restrictions and limitations that apply to the scope of our services and conclusions provided herein, as outlined on the attached Standard Report Limitations page. Should you have any questions, or if we can be of further assistance in this matter, please contact the undersigned.

WESTERN WATER ASSOCIATES LTD.



Morgan Jackson, B.Sc
Junior Scientist



Ryan Rhodes, P.Geo.
Hydrogeologist

Attachments:

- Figure 1: General Site Location, Location of Monitoring Wells and Mapped Aquifer
TRUE Consulting Drawing No. 302-1104-01
- Figure 2: WWAL Cross-Section
- Figure 3: Calculated Groundwater Flow Direction
Cross-Section 3-3' (From Golder 1977)
- Well Logs

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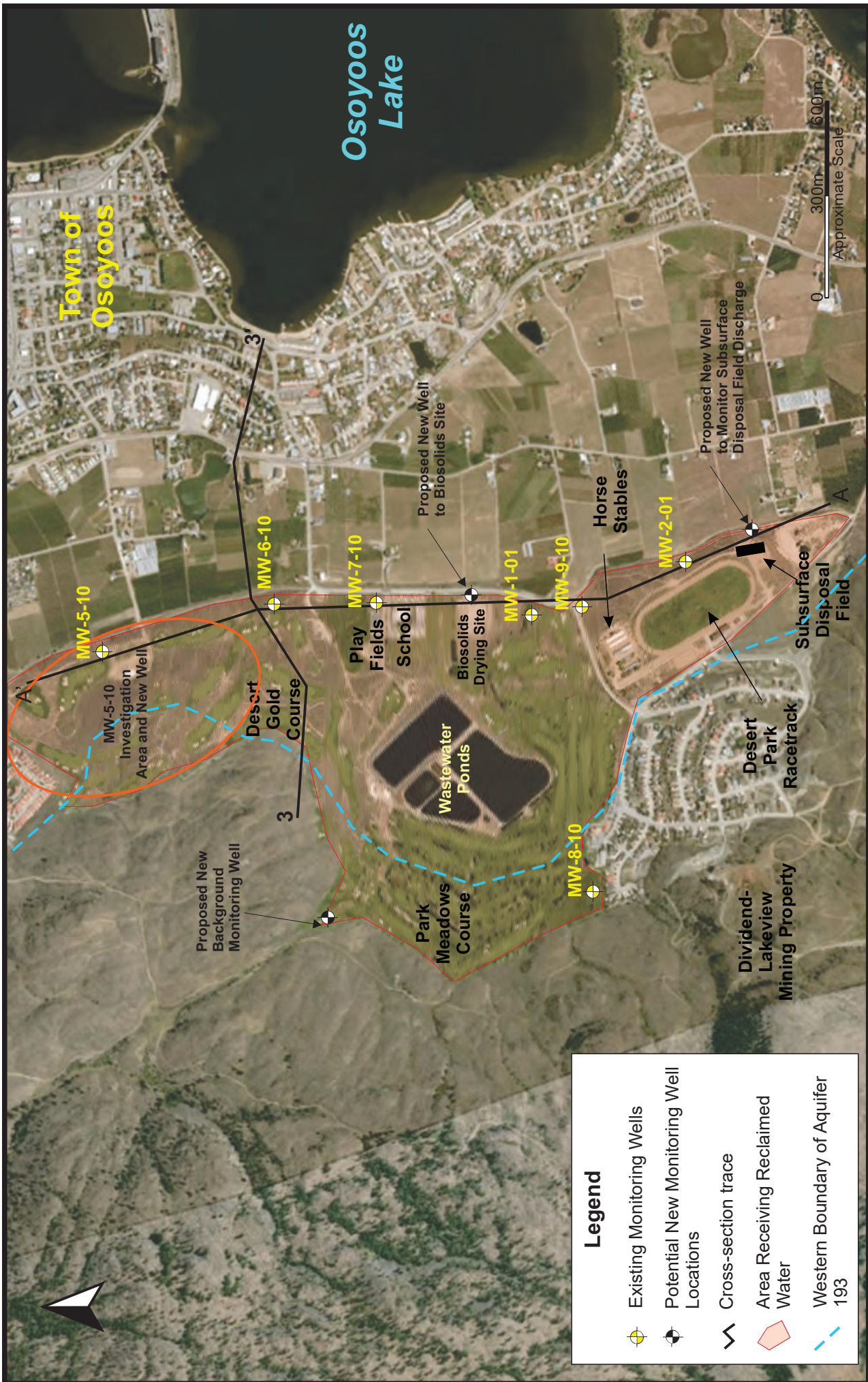


Figure 1: Location of Osoyoos WWTP and Monitoring Wells

Date: April 2019	Image Source: BC WRA (2019)	WWAL Project: 19-013-01VR
Drawn by: MJ	Checked by: RR	Client: Town of Osoyoos and TRUE

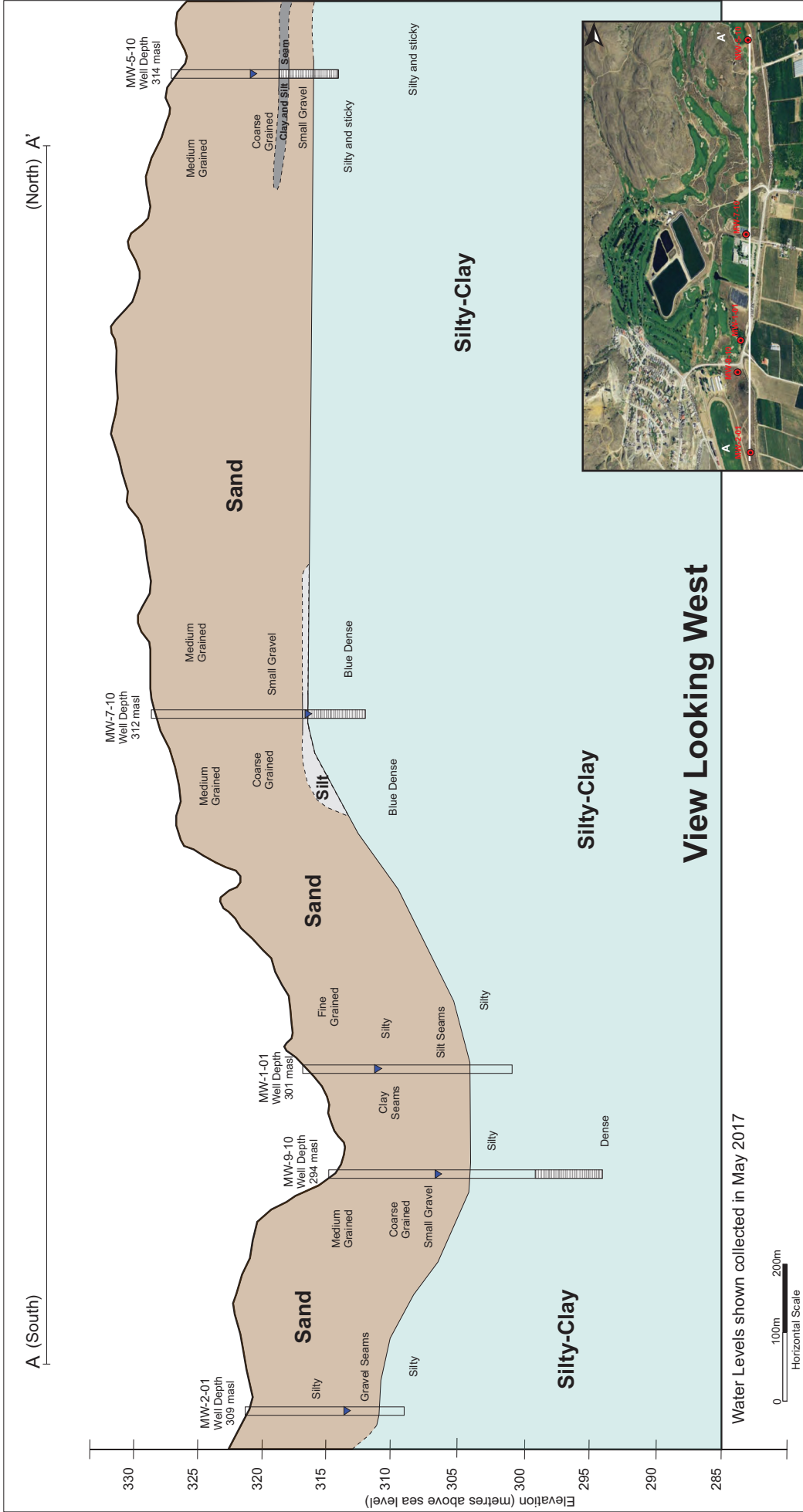


Figure 2: Cross Section A-A' through Osoyoos WWTP Monitoring Wells

Date: February 2019	Image Source: N/A	WWAL Project: 19-013-01VR
Drawn by: MJ	Checked by: RR	Client: Town of Osoyoos and TRUE Consulting



Figure 3: Estimated Groundwater Flow Direction May 2017

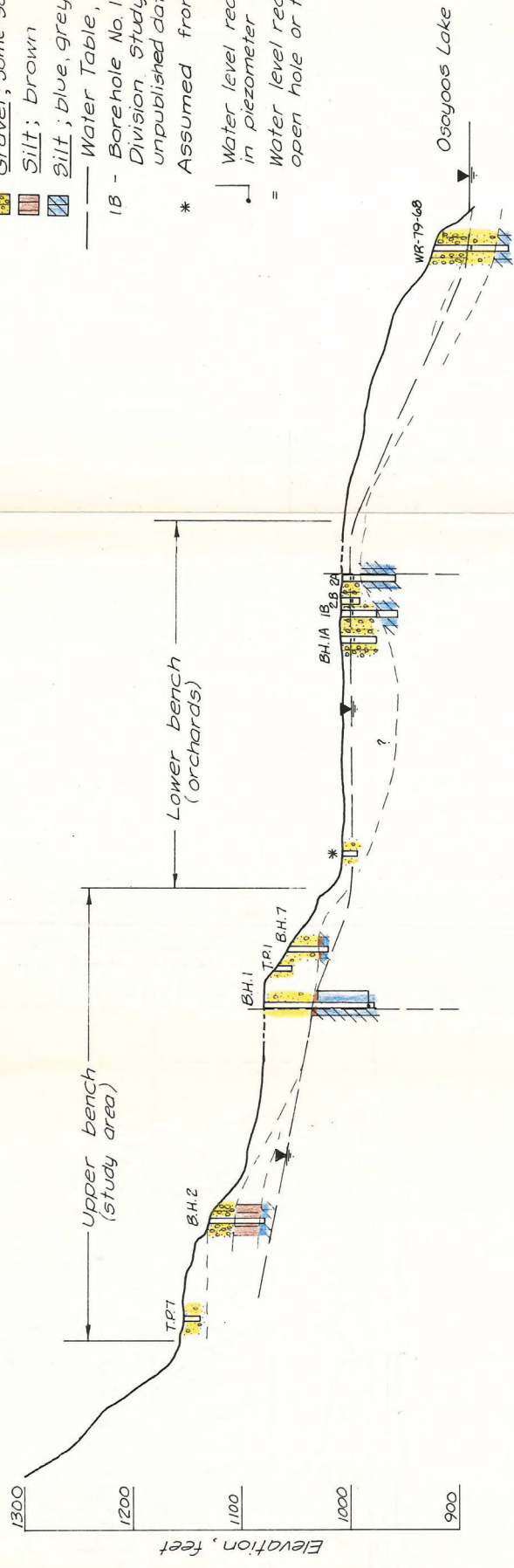
Date: April 2019	Image Source: Google Earth 2019	WWAL Project: 19-013-01VR
Drawn by: MJ	Checked by: RR	Client: Town of Osoyoos and TRUE

GEOLOGIC SECTION 3-3
OSOYOOS KETTLE AREA

Fig.

LEGEND

- Sand; some gravel
- Gravel; some sand
- Silt; brown
- Silt; blue, grey, t.f.
- Water Table, J
- IB - Borehole No. 18 Division Study, unpublished data
- * Assumed from
- └ Water level record in piezometer
- = Water level record open hole or test

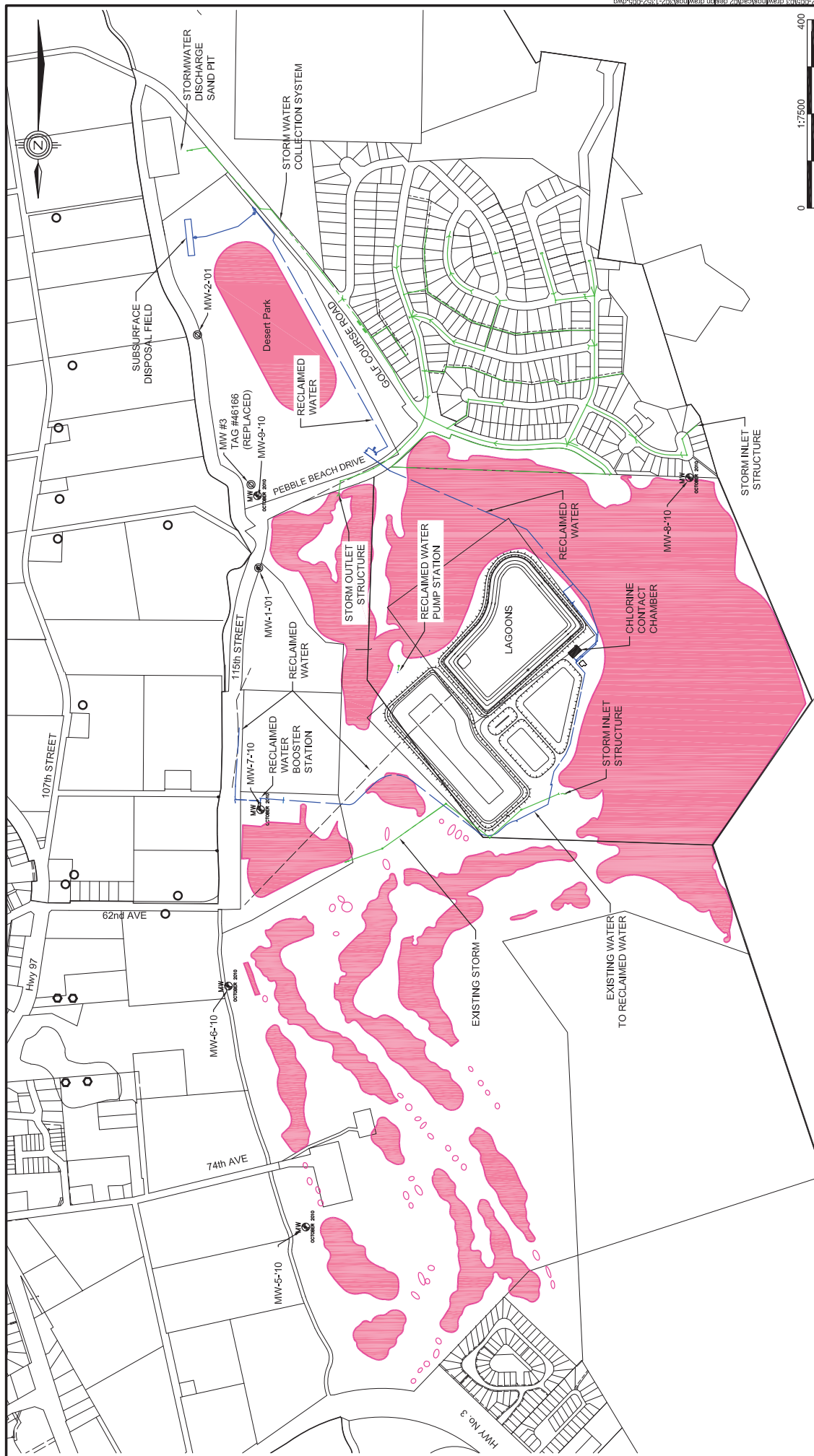


SECTION 3-3

Scales - Vert. 1 in. to 100 ft.
Horiz. 1 in. to 500 ft.

NOTES

1. Data from BH. 1A, 1B, 2A, based on unpublished information obtained from Groundwater Ministry of the Environment.
2. For location of section see
3. Section is drawn to an exact vertical scale.



DESIGN BY: NA
 SCALE: 1:7500
 DWG NO: **Fig. 1**
 302-1352-005
 REV:
 DRAWN BY: DL
 DATE: 14 May 2019



Reclaimed Water Groundwater Monitoring Wells and Storm Water Infrastructure



UTM COORDINATES

MW-1-01: N 5432379.357 E 318621.833
MW-2-01: N 5432379.357 E 318621.833
MW-5-10: N 5433779.638 E 318521.980
MW-6-10: N 5433267.733 E 318686.135
MW-7-10: N 5432893.203 E 318617.742
MW-8-10: N 5432187.920 E 317707.195
MW-9-10: N 5432226.468 E 318624.341

MONITORING WELLS

MW-1-01: T.O.C.=319.424; Ground=318.394
MW-2-01: T.O.C.=32.1; Ground=20.254
MW-5-10: T.O.C.=328.867; Ground=328.217
MW-6-10: T.O.C.=320.506; Ground=319.906
MW-7-10: T.O.C.=325.810; Ground=328.280
MW-8-10: T.O.C.=372.078; Ground=371.498
MW-9-10: T.O.C.=320.190; Ground=319.420





WELL TAG NUMBER: MW-1-01
 OWNER: TOWN OF OSOYOOS
 DRILLER: FAASSE DEWATERING
 WELL LOCATION: GABLEMAN ORCHARD
 WELL USE: MONITORING

CONSTRUCTION HOD: DRILLED
 DEPTH: 18.29 m DIAMETER: 50 mm
 OSOYOOS COORDINATES:
 ELEVATION: T.O.C.= ; BASE=
 CONSTRUCTION DATE (yy/mm/dd): 2002/03/28

DEPTH (m)	SOIL SYMBOL	SOIL DESCRIPTION	SCREEN LOCATION	DEPTH (m)
0.0		SANDS AND LIGHT GRAVEL		0.0
1.0				1.0
2.0				2.0
3.0				3.0
4.0				4.0
5.0		FINE SANDS		5.0
6.0				6.0
7.0		BROWN SILTY SANDS WITH CLAY SEAMS W.L. Nov 2017 - 7.24 m bgs W.L. Jul 2016 - 8.45 m bgs		7.0
8.0				8.0
9.0				9.0
10.0		SANDS WITH SILT LAYERS (SOME WATER DURING DRILLING)		10.0
11.0				11.0
12.0				12.0
13.0				13.0
14.0				14.0
15.0		SILTY BLUE CLAY		15.0
16.0				16.0
17.0				17.0
18.0				18.0
19.0				19.0
20.0				20.0
21.0				21.0
22.0				22.0
23.0				23.0
24.0				24.0
25.0				25.0
26.0				26.0
27.0				27.0
28.0				28.0
29.0				29.0
30.0				30.0
31.0				31.0
32.0				32.0
33.0	33.0			

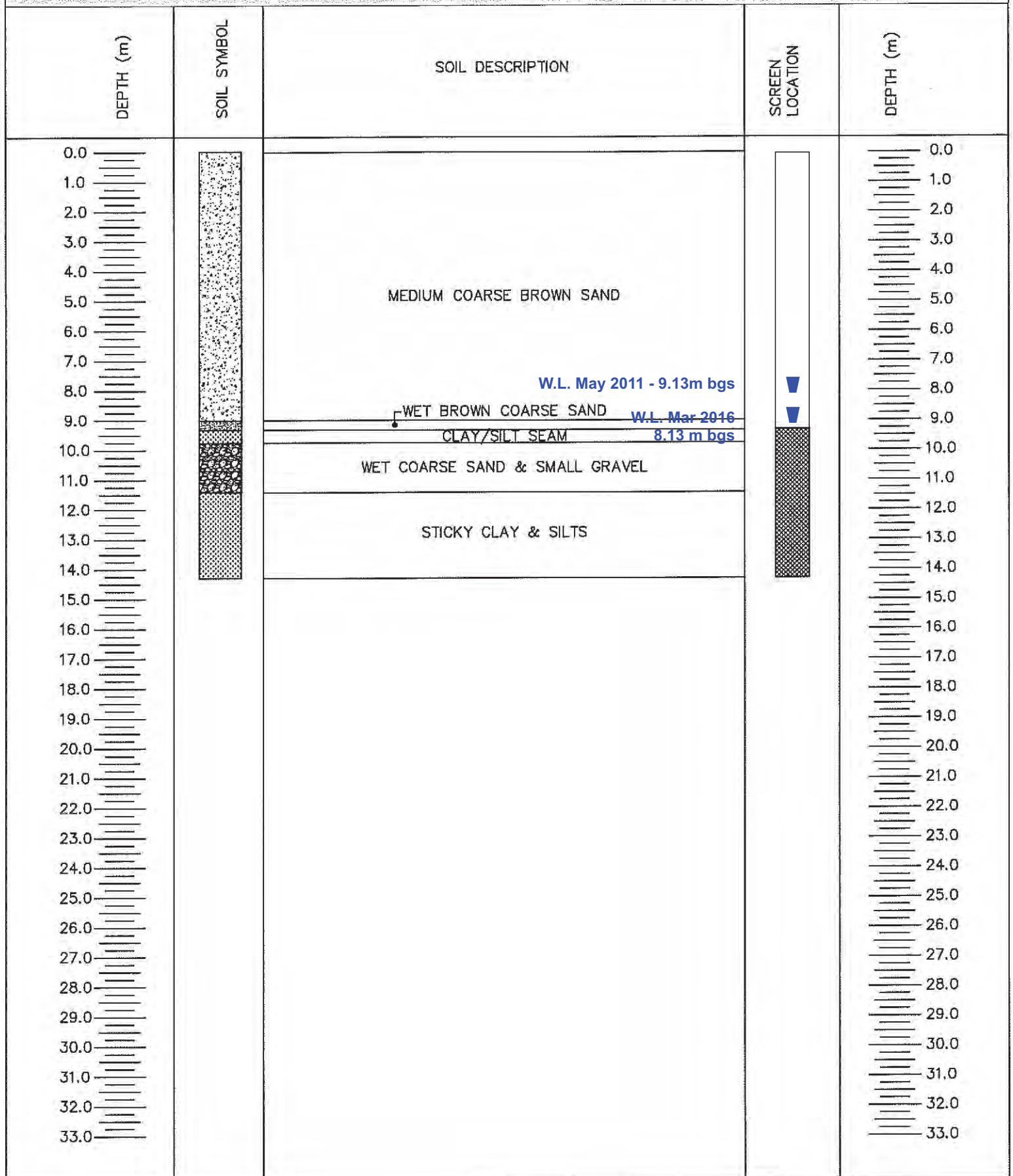
WELL TAG NUMBER: MW-2-01
 OWNER: TOWN OF OSOYOOS
 DRILLER: FAASSE DEWATERING
 WELL LOCATION: EAST OF DESERT PARK
 WELL USE: MONITORING

CONSTRUCTION METHOD: DRILLED
 DEPTH: 9.45 m DIAMETER: 50 mm
 OSOYOOS COORDINATES:
 ELEVATION: T.O.C.= ; BASE=
 CONSTRUCTION DATE (yy/mm/dd): 2002/03/28

DEPTH (m)	SOIL SYMBOL	SOIL DESCRIPTION	SCREEN LOCATION	DEPTH (m)
0.0		SILTY SAND, SOME FINE GRAVEL SEAMS		0.0
1.0				1.0
2.0				2.0
3.0				3.0
4.0				4.0
5.0				5.0
6.0		W.L. May 2017 - 6.61 m bgs		6.0
7.0				7.0
8.0		SILTY CLAY		8.0
9.0		Dry Well until June 2013		9.0
10.0				10.0
11.0				11.0
12.0				12.0
13.0				13.0
14.0				14.0
15.0				15.0
16.0				16.0
17.0				17.0
18.0				18.0
19.0				19.0
20.0				20.0
21.0				21.0
22.0				22.0
23.0				23.0
24.0				24.0
25.0				25.0
26.0				26.0
27.0				27.0
28.0				28.0
29.0				29.0
30.0				30.0
31.0				31.0
32.0				32.0
33.0				33.0

WELL TAG NUMBER: MW 5-10
 OWNER: TOWN OF OSOYOOS
 DRILLER: LEN FAASSE (GROUND SOURCE DRILLING)
 WELL LOCATION: OSOYOOS GOLF COURSE
 WELL USE: MONITORING

CONSTRUCTION METHOD: DTH HAMMER
 DEPTH: 14.3 m DIAMETER: 100 mm
 OSOYOOS COORDINATES:
 ELEVATION: T.O.C.=328.867; BASE=328.217
 CONSTRUCTION DATE (yy/mm/dd): 10/10/27







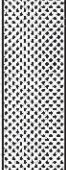
WELL TAG NUMBER: MW 6-10
 OWNER: TOWN OF OSOYOOS
 DRILLER: LEN FAASSE (GROUND SOURCE DRILLING)
 WELL LOCATION: OSOYOOS GOLF COURSE
 WELL USE: MONITORING

CONSTRUCTION METHOD: DTH HAMMER
 DEPTH: 18.25 m DIAMETER: 100 mm
 OSOYOOS COORDINATES:
 ELEVATION: T.O.C.=320.506; BASE=319.906
 CONSTRUCTION DATE (yy/mm/dd): 10/10/27

DEPTH (m)	SOIL SYMBOL	SOIL DESCRIPTION	SCREEN LOCATION	DEPTH (m)
0.0		MEDIUM COARSE BROWN SAND		0.0
1.0				1.0
2.0		MEDIUM FINE BROWN SAND		2.0
3.0		COARSE SHARP GRAVEL		3.0
4.0		Dry Well		4.0
5.0		BROWN CLAY & SILTS		5.0
6.0				6.0
7.0				7.0
8.0				8.0
9.0				9.0
10.0				10.0
11.0				11.0
12.0				12.0
13.0				13.0
14.0				14.0
15.0				15.0
16.0				16.0
17.0				17.0
18.0				18.0
19.0				19.0
20.0				20.0
21.0				21.0
22.0				22.0
23.0				23.0
24.0				24.0
25.0				25.0
26.0				26.0
27.0				27.0
28.0				28.0
29.0				29.0
30.0				30.0
31.0				31.0
32.0				32.0
33.0				33.0



WELL TAG NUMBER: MW 7-10
 OWNER: TOWN OF OSOYOOS
 DRILLER: LEN FAASSE (GROUND SOURCE DRILLING)
 WELL LOCATION: SECONDARY SCHOOL TENNIS COURT
 WELL USE: MONITORING

CONSTRUCTION METHOD: DTH HAMMER
 DEPTH: 15.85 m DIAMETER: 100 mm
 OSOYOOS COORDINATES:
 ELEVATION: T.O.C.=328.810; BASE=328.280
 CONSTRUCTION DATE (yy/mm/dd): 10/10/28

DEPTH (m)	SOIL SYMBOL	SOIL DESCRIPTION	SCREEN LOCATION	DEPTH (m)	
0.0		MEDIUM COARSE BROWN SAND		0.0	
1.0				1.0	
2.0				2.0	
3.0				3.0	
4.0				4.0	
5.0		5.0			
6.0				COARSE BROWN SAND & SMALL GRAVEL	6.0
7.0					7.0
8.0					8.0
9.0					9.0
10.0					10.0
11.0				DAMP GREY SILTS	11.0
12.0					12.0
13.0				W.L. Nov 2012 - 11.67 m bgs W.L. Aug 2014 - 12.26 m bgs DENSE BLUE CLAY	13.0
14.0					14.0
15.0	15.0				
16.0	16.0				
17.0	17.0				
18.0	18.0				
19.0	19.0				
20.0	20.0				
21.0	21.0				
22.0	22.0				
23.0	23.0				
24.0	24.0				
25.0	25.0				
26.0	26.0				
27.0	27.0				
28.0	28.0				
29.0	29.0				
30.0	30.0				
31.0	31.0				
32.0	32.0				
33.0	33.0				





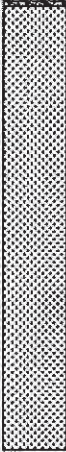
WELL TAG NUMBER: MW 8-10
 OWNER: TOWN OF OSOYOOS
 DRILLER: LEN FAASSE (GROUND SOURCE DRILLING)
 WELL LOCATION: GOLF COURSE DRIVING RANGE
 WELL USE: MONITORING

CONSTRUCTION METHOD: DTH HAMMER
 DEPTH: 11.3 m DIAMETER: 100 mm
 OSOYOOS COORDINATES:
 ELEVATION: T.O.C.=372.078; BASE=371.498
 CONSTRUCTION DATE (yy/mm/dd): 10/10/28

DEPTH (m)	SOIL SYMBOL	SOIL DESCRIPTION	SCREEN LOCATION	DEPTH (m)
0.0		TOP SOIL & FILL		0.0
1.0		DRY BROWN MEDIUM SAND		1.0
2.0		W.L. May 2017 - 4.45 m bgs DENSE BROWN CLAY		2.0
3.0				3.0
4.0		W.L. Apr 2014 - 7.05 m bgs TAN COLOURED DAMP TILL		4.0
5.0	5.0			
6.0	MOLTED BEDROCK	6.0		
7.0		7.0		
8.0		8.0		
9.0		9.0		
10.0		10.0		
11.0		11.0		
12.0		12.0		
13.0		13.0		
14.0		14.0		
15.0		15.0		
16.0		16.0		
17.0		17.0		
18.0		18.0		
19.0		19.0		
20.0		20.0		
21.0		21.0		
22.0		22.0		
23.0		23.0		
24.0		24.0		
25.0		25.0		
26.0		26.0		
27.0		27.0		
28.0		28.0		
29.0		29.0		
30.0		30.0		
31.0		31.0		
32.0		32.0		
33.0		33.0		

WELL TAG NUMBER: MW 9-10
 OWNER: TOWN OF OSOYOOS
 DRILLER: LEN FAASSE (GROUND SOURCE DRILLING)
 WELL LOCATION: OSOYOOS RACE TRACK
 WELL USE: MONITORING

CONSTRUCTION METHOD: DTH HAMMER
 DEPTH: 25.0 m DIAMETER: 100 mm
 OSOYOOS COORDINATES:
 ELEVATION: T.O.C.=320.190; BASE=319.420
 CONSTRUCTION DATE (yy/mm/dd): 10/10/28

DEPTH (m)	SOIL SYMBOL	SOIL DESCRIPTION	SCREEN LOCATION	DEPTH (m)
0.0		DRY FINE BROWN SAND		0.0
1.0				1.0
2.0				2.0
3.0		MEDIUM LIGHT BROWN SAND		3.0
4.0			4.0	
5.0			5.0	
6.0			6.0	
7.0			7.0	
8.0			8.0	
9.0		COARSE BROWN SAND & PEA SIZED GRAVEL		9.0
10.0			10.0	
11.0			11.0	
12.0			12.0	
13.0			13.0	
14.0			14.0	
15.0		DENSE CLAY		15.0
16.0			16.0	
17.0			17.0	
18.0			18.0	
19.0			19.0	
20.0			20.0	
21.0			21.0	
22.0			22.0	
23.0			23.0	
24.0			24.0	
25.0		25.0		
26.0		26.0		
27.0		27.0		
28.0		28.0		
29.0		29.0		
30.0		30.0		
31.0		31.0		
32.0		32.0		
33.0		33.0		

W.L. Apr 2016 - 13.21 m bgs

W.L. Nov 2016 - 14.5 m bgs