2018 Wastewater Collection and Treatment Report

CITY OF
SALMON ARM

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1.0 Community General

The City of Salmon Arm is located in the southern interior of British Columbia on the southwest shoreline of the extensive Shuswap Lake system. With over 17,000 residents, Salmon Arm is the largest urban centre in the Columbia Shuswap Regional District. It serves as the commercial, cultural and administrative hub for an additional 35,000 residents of the Shuswap Lake region. Located at the junction of the Trans Canada Highway (TCH) and Highway 97B, Salmon Arm is a one-half day drive to Vancouver or Calgary and a 70 minute drive to Kelowna or Kamloops.

With a land base of 175 km², Salmon Arm is a relatively large municipality by area with most of the population concentrated within a few kilometers of the Trans Canada Highway and the downtown core. The surrounding terrain varies from the low lying marsh flats of Salmon Arm Bay to the extinct volcanic peak of Mt. Ida and the ridge lines of Fly Hills to the west and Larch Hills to the east. These highlands form the Canoe Creek and Salmon River watersheds which empty into Shuswap Lake. Sustainable land use planning over the years has resulted in the formation of an attractive, bustling, compact community surrounded by thousands of hectares of arable farmland, green space and natural shorelines.

Salmon Arm's commercial and industrial base is continuing to diversify. The housing market continues to remain tight. Retail, construction, professional services and healthcare, along with a wide array of entrepreneurial activities, are major sources of employment. Small businesses flourish in Salmon Arm's business friendly environment. Key economic drivers are value-added wood processing, high tech and traditional manufacturing, tourism and agri-business. The continuing surge in construction activity points to a healthy market demand for new housing and floor space for commercial, industrial and institutional uses. The 2016 Census indicates a percentage growth in population of 1.2% from the previous 2011 Census. This compares to the provincial average growth of 5.6%.

1.1 Staffing

The City of Salmon Arm Engineering and Public Works Department is responsible for this municipal function. The Utilities Division is responsible for the operation and maintenance of the sanitary collection system and the Water Pollution Control Centre (WPCC) staff is responsible for the operation and maintenance of the Wastewater Treatment facility and the main lift Station located at Wharf Street. The WPCC is manned seven days of the week with 24-hour standby provisions for after hour alarm response.

Table 1 - Staff Overview

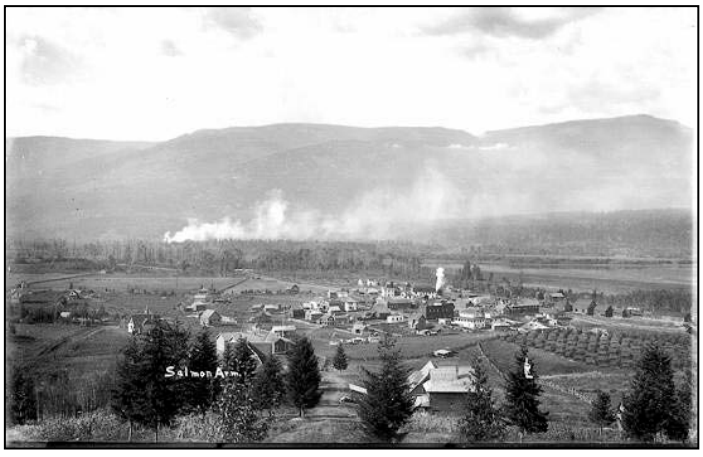
Engineering and Public Works	
Robert Niewenhuizen, A.Sc.T., Director of Engineering and Public Works	
Jenn Wilson, P.Eng., LEED® AP, City Engineer	
Utilities Division	
Gerry Rasmuson, B.Sc. ***Utilities Manager*** ◆ Level IV - Water Distribution ◆ Level IV - Wastewater Treatment ◆ Level I - Wastewater Collection	***Larry Kipp*** ***Utilities Supervisor*** ◆ Level I - Wastewater Collection
Mervin Arvay ◆ Level II - Wastewater Collection	**Devon Tulak** ◆ Level I - Wastewater Collection
Ray Muller ◆ Level I - Wastewater Collection	◆
Jason Baker ◆ Level I - Wastewater Collection	**Jason Philps** ◆ Level I - Wastewater Collection
Water Pollution Control Centre	
Hart Frese ***Chief Operator*** ◆ Level IV - Wastewater Treatment	**Doug Stalker**, Dip. Water Quality ***Operator III*** ◆ Level IV - Wastewater Treatment ◆ Level I - Wastewater Collection
Daryl Warnock, RSE, Dip. Water Engineering Technology ***Operator III*** ◆ Level III - Wastewater Treatment	**Damon Kipp,** B.Sc., Dip. Water Engineering Technology ***Operator III*** ◆ Level II – Wastewater Treatment

2.0 Wastewater Treatment & Collection System History

2.1 Wastewater Collection System - History

The District of Salmon Arm and the Village or Salmon Arm amalgamated in 1971 to form the District Municipality of Salmon Arm on January 1, 1971, and then became the City of Salmon Arm in 2005. The Village was the original urban core area and sewer lines were installed during the 1930's to collect septic tank effluent and some crude wastes which were then discharged into an open ditch leading into Shuswap Lake. The surrounding District Municipality relied on septic systems as sewer collection was not an issue until the urban development of the Village overflowed into the surrounding Municipality. By 1964, the Village had initiated plans for sewage treatment which included the construction of a lagoon along the waterfront for treatment. The lagoons would also service the Adams lake Indian Band lands. Concerned about the level of treatment that a lagoon offered, the Village decided to review their plans and objectives. By 1966, the review board recommended that the Village and District combine in their efforts to collect and treat wastewater. However, unable to agree upon implementation of various plans the Village applied to the Pollution Control Board for a permit to discharge highly treated effluent into Shuswap Lake. By the time this permit was granted in 1972, the Village and District had amalgamated.

Ultimately the Engineering firm of Dayton and Knight Ltd were hired to undertake a Wastewater survey in 1972 to study various different treatment and effluent disposal methods. The Survey resulted in the construction and official opening of the existing Water Pollution Control Centre on May 14, 1977. Furthermore, the survey identified collection system priorities and set in motion the construction of the infrastructure that currently exists. The City's sewage collection and treatment systems have evolved into a well maintained collection system and a state of the art Wastewater Treatment Centre.



2.2 Wastewater Treatment Plant History

The original plant was constructed on the current site, 121 Narcisse Street NW, in 1977 after the proposed site at Minion Field, 2191 30th Street SW was rejected by the B.C. Agricultural Land Commission and Provincial Pollution Control Board. It was constructed at a cost of $0.9 M and consisted of primary sedimentation, activated sludge, secondary clarification with chlorine disinfection. Solids were aerobically digested and stored in two 1 acre lagoons. Capacity of the plant was 3,000 m^3 per day for a design service population of 6,250.

In 1982, phosphorus removal was added at a cost of $0.1 M and consisted of precipitating phosphorus out of the effluent by the addition of ferrous chloride. Phosphorus was determined to be the limiting nutrient which contributes to the eutrophication and degradation of water quality in Shuswap Lake, particularly, Salmon Arm Bay. Currently the Salmon Arm WPCC contributes less than 4% of the phosphorus loading in the bay.

Aerial Photo Stage IIIB prior to Landscaping

In 1986 the $1.8 M Stage II Upgrade was the first major upgrade to the facility. The liquid process was altered from a common activated sludge process to an experimental trickling filter biological nutrient removal (BNR) system (Fixed Growth Reactor – Suspended Growth Reaction or FGR-SGR. As well, the aerobic digester was upgraded to an Autothermal Thermophilic Aerobic Digester (ATAD). Plant Capacity was increased to 3,500 m^3 per day for a design service population of 8,750.

Improvements were made in 1991 to the solids process at a cost of $0.5 M. The improvements consisted of changing aeration and solids pumping equipment. Rebuilding the ATAD tanks and added waste biological sludge thickening.

The Stage III Upgrade was split into two upgrades with the first part, Stage IIIA completed in 1998 at a cost of $5.2 M. It consisted of improvements to the FGR- SGR process, new secondary clarifier, Supervisory Control and Data Acquisition system, increased ATAD capacity and biosolids dewatering. These improvements led to better control and monitoring, the ability to beneficially recycle biosolids and the decommissioning of the solids storage lagoons. Capacity was increased to 5,000 m^3 per day for a design service population of 12,900.

Stage IIIB was completed in 2005 without the Laboratory/Administration expansion. Of the $7.4 M upgrade, $2.3 M was funded by the Federal and Provincial Governments.

The upgrade consisted of a complete rebuild of the main lift station at Marine Drive with odour control, added redundancy to critical equipment, stand-by power, effluent filtration, replacement of the chlorination/de-chlorination system with Ultra Violet disinfection, an elaborate odour control system and architectural improvements to the original exterior of the original building.

Capacity was increased to 6,700 m^3 per day average flow for a design service population of 15,000. Stage IIIB was completed in 2008 with the $0.4 M expansion of the Laboratory/Administration area. The Water Reclamation project was completed in 2010. This project utilizes the highly treated effluent for process water at the facility resulting in a 110 ML annual reduction in potable water use. In 2011, the Trickling Filter Media Upgrade was completed. The total cost of the project was $0.55 M and entailed removing approximately 1,560 m^3 of crossflow media and replacing with vertical flow media. This project was the result of the September 2007 pilot study (Dayton & Knight Ltd.) designed to reduce the impact of sloughing conditions problematic at the facility.

In 2017 an Engineering Audit was carried out ion the WPCC. The Audit concluded that the biological process is currently working well, with the plant showing very efficient removal of BOD,TSS and phosphorus. The plant is currently at about 90% of its 15,000 person equivalent projected design capacity, based on service population, which is projected to reach 15,000 people by between 2020 and 2025 based on current rates of growth. The design capacity of the plant is primarily based on biological and phosphorous loading to the plant, not flows. The primary trigger for plant upgrades will be the performance of the phosphorus removal process.

Based on the capacity assessment of the major plant unit processes, most have capacity well in excess of the 15,000 person equivalent design capacity. The unit processes with limited capacity and no redundancy include the anaerobic and anoxic reactors, which form part of the phosphate removal process. They currently have no redundancy, and are approaching their capacity limits.

The best estimate of when these capacity upgrades will be required is between 2020 and 2025 as the service population approaches 15,000 people; however, precise timing of upgrades is dependent on how the phosphorus removal process continues to perform. These upgrades are likely to be required in the next 5-10 years, with this in mind, the City will undertake the Stage IV Plant Upgrades Pre-Design during 2019.

Table 2 - Cost Summary Table

Project	Cost	Year
Stage I - 6,250 connected population	$0.9 M	1977
Chemical Phosphorus Removal	$0.1 M	1982
Stage II - 8,250 connected population	$1.8 M	1986
Solids Improvements	$0.5 M	1991
Stage IIIA - 12,500 connected population	$5.3 M	1998
Stage IIIB – 15,000 connected population	$7.4 M	2004
Laboratory/Administration Expansion	$0.4 M	2008
Reclaimed Water	$0.1 M	2009
Trickling Filter Media Upgrade	$0.55 M	2011
UV System Upgrade	$0.82 M	2018
Total	**$17.87 M**	
Estimated Insurable/Replacement Value (2018)	$52 M	

3.0 Wastewater Collection System

3.1 Overview of Collection System

The Utilities Division, through a schedule of systematic new improvements, upgrades and replacements strives to maintain and improve the sanitary sewer collection system. This Division plays an integral role in maintaining the health, safety and well being of the community. The sewer utility is a self-liquidating funded system which must provide for their own revenues through fees, taxes and other charges to support the expenditures required to operate and maintain infrastructure on a daily basis and long into the future.

3.2 Collection System

The City of Salmon Arm's sanitary sewer collection system consists of 14 sewerage sub areas and 127 km of gravity and force main sanitary sewer pipes covering approximately 1800 hectares. There are approximately 6,085 residential, commercial, industrial and institutional lots fronting onto the sanitary sewer system (2018 Court of Revision Report). There are seven (7) sewer lift stations that collect and pump sewerage to the Lakeshore Sewer Interceptor located on the foreshore where the main lift station, Wharf Street Pump Station, pumps the sewerage directly to the WPCC (see Map 3.2). The Interceptor provides storage and flow equalization capabilities.

3.3 Lift Stations

All seven of the tributary Lift stations are inspected once a week by the City of Salmon Arm's Utilities Division. All lift stations are thoroughly inspected and cleaned on a monthly basis. The stations are monitored using the City's SCADA system which enables staff to troubleshoot and trend data on the Cities SCADA system.

Table 3 - Wastewater Facilities

No.	Wastewater Lift Stations & Facilities	Address
1	Water Pollution Control Centre	121 Narcisse Street NW
2	Mosquito Park Lift Station	4290 Canoe Beach Drive NE
3	Clare's Cove Lift Station	5391-75 Avenue NE
4	Captain's Cove Lift Station	2251-73 Avenue NE
5	Canoe Beach Lift Station	7720-36 Street NE
6	Wharf Street Pump Station	1000 Marine Park Drive NE
7	Rotten Row Lift Station	681-10 Avenue SW
8	10 Avenue SW Lift Station	2270-10 Avenue SW [TCH]

3.4 Wharf Street Lift Station

The Wharf Street Lift station is gravity fed by the Lakeshore Interceptor. Three 30 Hp pumps with variable speed drives are used to feed the wastewater facility at rates determined by WPCC operators. The station was upgraded in 2002 with each pump rated at 80 liters/sec flow. The foul air is treated by utilizing ultraviolet light which catalyses the breaking of ambient oxygen and water vapor molecules into O^+ and OH^- ions. These free radicals oxidize the odourous contaminants in the air. This reaction results in a sequential and instantaneous gas breakdown of the contaminants with minimal by-products, such as elemental sulfur, CO_2, water vapor, molecular oxygen and trace ozone. In the event of an extended power outage, there is the capability to connect the City's portable generator to the station to run the pumps. A second portable generator was purchased in 2011 primarily to service this critical lift station. This generator was utilized in July of 2012 when a primary Hydro feed to the electrical sub station failed resulting in a localized 33 hour power outage.

3.5 Lift Station Repairs and Modifications

There were no significant repairs or upgrades in 2018 besides the rebuilding of a pump at Wharf Street.

3.6 Sanitary Flushing

Approximately 17.1 km of sanitary mains were flushed in 2018 as part of the maintenance program. Certain main lines and services of concern are flushed quarterly.

3.7 Main and Service Interruptions

There was one mainline blockage within the sanitary collection system in 2018 and only a handful of service interruptions which are typically attributed to grease build up within the service pipe from homeowners or roots from nearby trees and shrubbery.

3.8 Inflow and Infiltration Monitoring Program

The program identifies locations where storm water or ground water enters the sanitary system. We continue to provide system improvements in an effort to reduce the amount of rainwater and groundwater entering the sanitary sewer system when it is cost-effective to do so. Reduction of Inflow & Infiltration (I&I) in the system lowers the risk of sanitary sewer overflows and can decrease the costs of conveying and treating wastewater.

3.9 Wastewater Collection Capital Projects

Table 4 - Capital Project Information

Capital projects completed in 2018
◆ Complete forcemain redirection Claires Cove
◆ Renew the sanitary main 3rd St SE (2 – 3 Ave SE)
◆ Renew the sanitary main Okanagan (6 – 8 St NE)
◆ Radio Network Redundancy
◆ Purchase Large Diameter Root Cutter
◆ Purchase new Hydro-Vac Truck
◆ Rebuild Pump #2 Wharf St with Upgraded Impeller
Capital Projects scheduled for 2019
◆ Rebuild Pump #3 Wharf St with Upgraded Impeller
◆ Sanitary Main relining (49 – 50 St NE)
◆ Design of TCH Sanitary replacement 5th St SW
◆ Biosolids Storage area fencing at Landfill
◆ Mosquito Park pump replacement
◆ Raven sanitary sewer renewal
◆ Purchase battery packed sanitary camera
◆ Design of TCH Sanitary replacement 4th St NE

4.0 Wastewater Treatment - Water Pollution Control Centre (WPCC)

The City of Salmon Arm WPCC is located at 121 Narcisse Street N.W. which is located west of the City's Town Centre adjacent to the Shuswap Lake. This section of the report will detail the performance and operational strategies of the plant during the past year.

WPCC – After renovations

Wharf Street Lift Station

4.1 Process Overview

The process of wastewater treatment can be separated into two flow streams – liquid and solids also referred to as the liquid train and solids train.

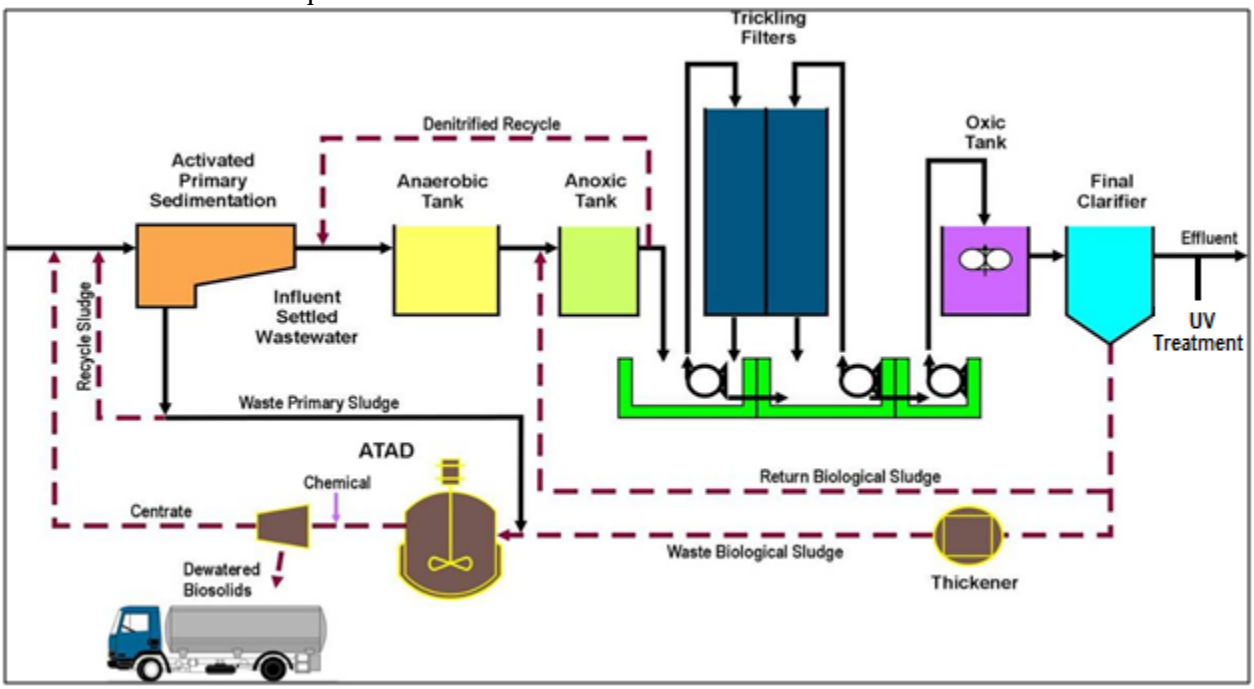


Figure 1: Wastewater Treatment Overview

Initially the wastewater flows into the plant from a sewage lift station located at Marine Park Drive. The influent then passes through several mechanical devices to remove large particles including rocks, rags, plastics and grit. This is done in the headworks of the facility and prevents damage to downstream equipment.

Headworks

Primary Sedimentation Tanks

The flow then enters the Primary Sedimentation Tanks where heavier organic and inorganic solids are settled out of the liquid stream. These particles are then pumped to the ATAD for stabilization. The liquid, on the other hand, then enters the tertiary BNR and SGR-FGR part of the facility for further treatment.

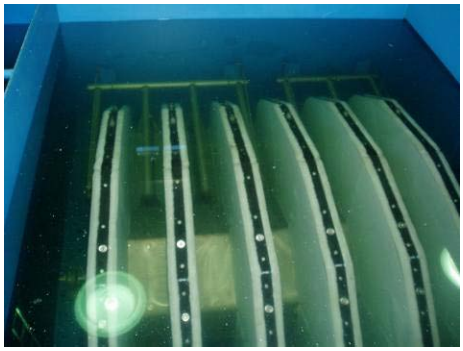
SGR's

FGR

The tertiary treatment involves the use of bacteria to convert degradable organic matter into bacterial cells. These cells are then separated from the liquid in the secondary clarifiers.

The growth portion of the bacteria is removed from the process by thickening and pumped to the ATAD while the remainder is recycled back to the incoming wastewater. This maintains a balance of food (wastewater organics) to micro organisms.

The secondary effluent then passes through the Aqua Aerobics disk filtration system which provides 10 micron filtration, the effluent is then disinfected using a TrojanUV3000Plus™ Ultra Violet Light (UV) disinfection system prior to it being discharged into the Salmon Arm Bay in the Shuswap Lake.



Cloth Disk Filters

Secondary Clarifiers

UV Treatment System

UV HMI

Solids are digested to form biosolids in the high temperature ATAD. This process uses high temperature bacteria (60 to 70 degrees Celsius) to stabilize and pasteurize the biosolids. Following processing, the biosolids are thickened with the use of high speed centrifuges and the biosolids are then incorporated with soil to produce a high quality top soil.

Centrifuge

Train B Odour Scrubber

Odour control is another major component of the plant operation. The odour control has been separated into two trains based on the concentration of odour generating compounds. One train deals with a large air volume of low odour concentration while the second train deals with a low air volume with a high concentration of odour compounds. The latter system uses a multi

treatment system – biofilter, ozone contact, four (4) stage chemical scrubber and dilution while the other system uses a single stage chemical scrubber.

Single Stage Chemical Scrubber

ATAD & Piping

Generator Set, Train B - Odour Control and Filtration Building

4.2 Flows

Plant flows increased by 1.7% in 2018. The average daily flow was 4,605 m^3/d while in 2017 it was 4,528 m^3/d. The highest flow of 6,826 m^3/d was recorded on March 23 when a rain event combined with snow melt increasing the inflow and infiltration in the collection system.

Outfall with marker buoy

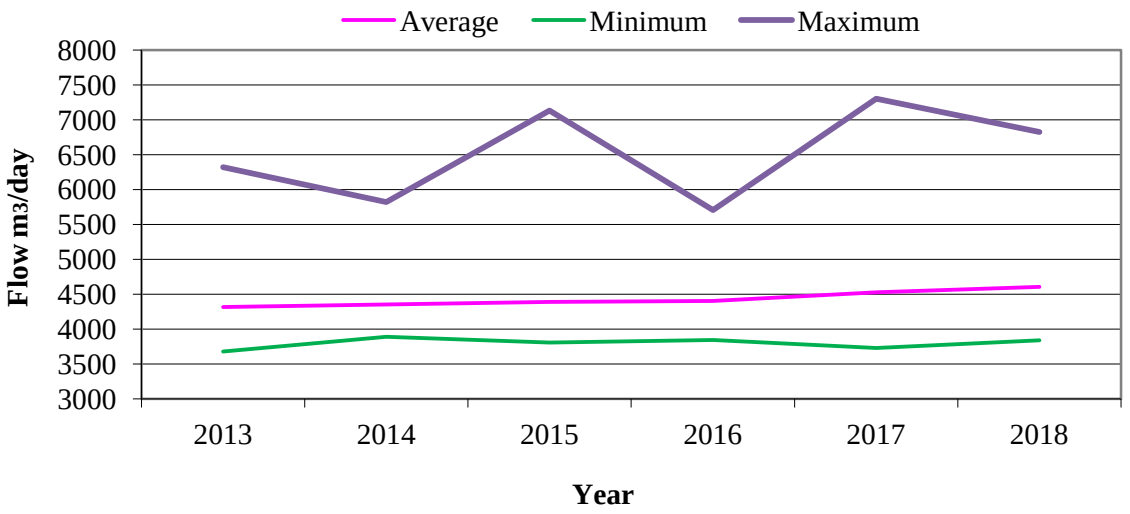


Figure 2: Minimum, Maximum and Average Daily Flows

4.3 Nutrient Removal

Phosphorus concentration is the key nutrient contributing to poor water quality in the Salmon Arm Bay as it is in most lakes in British Columbia. The WPCC contributed approximately 2.7% of the phosphorus loading to the Salmon Arm Bay in 2018. Addition information on the health of the entire Shuswap Lake is available from the **Summary: 2011–2013 Water Quality Monitoring Results for Shuswap and Mara Lakes** and can be view at http://www.slippbc.ca/images/pdf/2011-13_WQ_Summary.pdf .

Key points contained in the Summary are:

- The most significant source of phosphorus and other nutrients to the Shuswap and Mara Lakes is the Shuswap River. The Salmon and Eagle Rivers contribute the second and third largest loadings of phosphorus to the lakes.
- The largest non-point source of nutrients (over 95%) comes from seepage and run-off from agricultural lands in the Shuswap, Salmon and Eagle River watersheds. This source affects water quality in the lakes much more significantly than other sources do, and should be a management focus.
- If all wastewater treatment plants in the Shuswap increased their capability to tertiary treatment (some are now operating a secondary treatment level), this would likely achieve the largest reduction in nutrients from a permitted point-source.
- Within Shuswap and Mara Lakes, the largest direct nutrient inputs occur naturally from decaying salmon following spawning.

*Shuswap Lake Integrated Planning Process,"***Summary: 2011–2013 Water Quality Monitoring Results for Shuswap and Mara Lakes"** *Pages 9, 10*

Table 5 – Phosphorus Mass Loading to Salmon Arm Bay from Salmon River, White Creek, Tappen Creek and Salmon Arm WPCC at 2017 Concentration and Flow – Daily Annual Averages

Total Mass Load (kg/d)	Salmon River* 1985 - 1999		White Creek* 1987 - 1990		Tappen Creek* 1988 - 1990		WPCC Year 2018	
	(kg/d)	% of Total	(kg/d)	% of Total	(kg/d)	% of Total	(kg/d)	% of Total
75.6	65.7	87.0%	6.9	9.1%	0.9	1.2%	2.1	2.7%

- *Data supplied from WPCC Outfall Impact Study, August 2002 (Dayton & Knight Ltd.)

Table 6 - Effluent Quality Summary - Yearly

Parameter (*mg/l*)	2010	2011	2012	2013	2014	2015	2016	2017	2018	Permit
Flow (m^3)	4603	4406	4382	4318	4355	4388	4406	4528	4528	8200
Total Phosphorus (mg/l)	0.49	0.35	0.58	1.13	0.77	0.25	022	0.32	0.45	1.0
Kg P per Day	2.26	1.54	2.55	4.88	3.35	1.09	0.95	1.47	2.05	8.2
Kg P per Year	823	563	931	1781	1224	397	347	536	749	2993
Suspended Solids (mg/l)	9.6	7.9	7.4	7.2	5.4	4.4	4.8	5.6	7.0	40
BOD_5 (mg/l)	4.9	4.8	7.5	6.5	8.3	5.8	6.7	8.7	9.1	30
Ortho Phosphorus (mg/l)	0.10	0.04	0.11	0.51	0.32	0.04	0.03	0.10	0.14	N/A
Ammonia (mg/l)	13.5	10.4	4.5	6.6	9.4	5.5	7.0	9.4	11.2	N/A
Nitrate & Nitrite (mg/l)	4.9	6.7	8.7	8.8	8.3	10.8	11.6	10.9	9.1	N/A
NH_4 NO_3 NO_2 (mg/l)	18.4	16.7	13.1	15.4	17.0	16.3	18.4	20.1	20.6	N/A

Table 7 - Effluent Quality Summary - Weekly

Test Data	S.S. mg/l	BOD mg/l	Ortho P mg/l	Total P mg/l	NH_4 mg/l	NOx mg/l	Oxic MLSS mg/l
January 4, 2018	7.4	13.5	0.09	0.346	19.5	6.5	4677
January 11, 2018	5.0	11.5	0.04	0.248	25.0	7.9	4431
January 18, 2018	4.6	6.2	0.03	0.243	N/A	8.5	3946
January 25, 2018	3.5	7.8	0.10	0.261	N/A	4.5	2789
February 1, 2018	6.1	9.3	0.04	0.339	N/A	3.8	3012
February 8, 2018	7.9	14.6	0.12	0.455	N/A	5.1	3557
February 15, 2018	14.4	N/A	0.11	0.484	N/A	N/A	4500
February 22, 2018	20.0	22.3	1.05	1.59	N/A	6.5	4618
March 1, 2018	13.6	16.4	0.28	0.709	N/A	N/A	4051
March 8, 2018	9.6	14.1	0.40	0.690	18.5	N/A	2862
March 15, 2018	9.3	13.9	0.66	1.03	11.7	3.6	2458
March 22, 2018	9.7	14.0	0.24	0.560	22.6	2.1	2638
March 29, 2018	6.6	15.5	N/A	0.575	22.1	5.4	2810
April 5, 2018	10.9	19.9	0.27	0.564	24.4	5.9	3411
April 12, 2018	13.0	21.9	0.47	1.31	30.0	2.4	3891
April 19, 2018	20.0	24.3	0.21	1.42	15.9	9.6	3616
April 26, 2018	17.5	23.9	0.17	0.906	9.7	5.8	3849
May 3, 2018	11.0	12.9	0.14	0.513	16.6	7.0	3513

Test Data	S.S.	BOD	Ortho P	Total P	NH_4	NOx	Oxic MLSS
	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
May 10, 2018	11.1	10.0	0.17	0.526	12.1	12.6	3412
May 17, 2018	6.4	9.1	0.14	0.414	6.0	6.5	3624
May 23, 2018	4.9	10.3	0.10	0.331	7.0	9.6	3528
May 31, 2018	7.4	9.6	0.05	0.355	9.1	N/A	3296
June 7, 2018	10.3	11.5	0.04	0.455	7.9	9.4	3249
June 14, 2018	7.5	11.2	0.13	0.395	12.3	11.7	3350
June 21, 2018	6.7	10.0	0.07	0.307	6.5	11.1	3199
June 28, 2018	4.6	4.1	0.05	0.285	N/A	7.0	3600
July 5, 2018	5.3	5.7	0.10	0.272	N/A	10.6	3937
July 12, 2018	3.7	2.4	0.09	0.324	6.0	12.6	3663
July 19, 2018	7.4	4.2	0.10	0.465	5.0	20.1	4092
July 26, 2018	5.4	3.6	0.64	0.937	3.7	11.8	3900
August 2, 2018	3.7	7.3	0.12	0.255	12.6	4.3	3762
August 9, 2018	5.6	7.0	0.03	0.262	6.6	7.0	4229
August 16, 2018	4.9	4.4	0.04	0.217	3.3	6.0	4166
August 23, 2018	3.2	5.3	0.11	0.239	3.1	12.8	3935
August 30, 2018	3.4	5.7	0.04	0.267	3.8	13.1	3693
September 6, 2018	4.7	5.4	0.05	0.280	9.1	13.3	3826
September 13, 2018	5.2	4.7	0.02	0.269	7.1	13.5	3800
September 20, 2018	5.1	4.8	0.04	0.277	5.8	14.4	4134
September 27, 2018	4.4	4.7	0.03	0.297	9.4	12.3	4436
October 4, 2018	3.8	4.9	0.06	0.294	6.1	11.7	4512
October 11, 2018	3.8	5.2	0.07	0.282	11.2	8.6	4470
October 18, 2018	4.8	4.6	0.07	0.308	7.9	7.8	4808
October 26, 2018	3.8	5.2	0.04	0.294	7.2	12.8	4870
November 1, 2018	4.7	4.8	0.04	0.262	7.6	13.0	4735
November 8, 2018	3.9	4.8	0.06	0.256	9.2	10.9	4476
November 15, 2018	5.3	3.7	0.07	0.313	8.6	8.7	4430
November 22, 2018	4.2	4.4	0.06	0.277	11.7	9.7	4463
November 29, 2018	3.7	5.0	0.06	0.234	9.0	10.6	4488
December 6, 2018	3.9	5.6	0.05	0.243	7.8	10.5	4473
December 13, 2018	3.1	4.7	0.07	0.258	14.3	8.3	4394
December 20, 2018	3.4	4.5	0.08	0.214	11.2	11.4	4397
December 27, 2018	4.1	4.0	0.06	0.277	17.0	7.3	4475
Average	**7.0**	**9.1**	**0.14**	**0.446**	**11.2**	**9.1**	**3893**
Maximum	**20.0**	**24.3**	**1.05**	**1.590**	**30.0**	**20.1**	**4870**
Minimum	**3.1**	**2.4**	**0.02**	**0.214**	**3.1**	**2.1**	**2458**

Table 8** - **Tests performed by Caro Environmental Services on split sample.

Test Data	S.S. mg/l	BOD mg/l	Ortho P mg/l	NH_4 mg/	NO_3 mg/l	NOx mg/l	E.Col	Fec. Col.
04-Jan	5.3	<8.2	0.03	13.7	6.22	7.52	3.6	3.6
18-Jan	3.2	6.4	N/A	N/A	N/A	N/A	N/A	N/A
01-Feb	4.0	<6.2	0.05	16.9	3.03	4.05	9.1	9.1
15-Feb	13.3	18.2	N/A	N/A	N/A	N/A	93	93
01-Mar	11.5	20.1	0.193	10.0	N/A	N/A	150	150
08-Mar	N/A	N/A	N/A	12.8	N/A	N/A	N/A	N/A
15-Mar	8.7	11.5	N/A	16.7	N/A	N/A	N/A	N/A
05-Apr	6.4	15.8	0.261	18.1	0.54	0.99	93	93

Test Data	S.S. mg/l	BOD mg/l	Ortho P mg/l	NH_4 mg/	NO_3 mg/l	NOx mg/l	E.Col	Fec. Col.
19-Apr	24.0	19.5	N/A	N/A	N/A	N/A	N/A	N/A
03-May	9.7	11.3	0.108	8.52	6.48	7.03	43	43
17-May	6.3	7.0	N/A	N/A	N/A	N/A	N/A	N/A
31-May	6.8	<6.1	0.041	5.66	9.80	10.8	9.1	9.1
07-Jun	7.8	8.5	N/A	4.17	10.1	11.4	N/A	N/A
14-Jun	7.0	10.5	0.040	N/A	N/A	N/A	N/A	N/A
21-Jun	4.6	8.7	N/A	N/A	N/A	N/A	N/A	N/A
28-Jun	5.0	6.4	N/A	N/A	N/A	N/A	3.0	3.7
05-Jul	3.6	6.5	N/A	2.53	11.9	13.1	N/A	N/A
12-Jul	5.0	5.8	0.090	N/A	N/A	N/A	N/A	N/A
19-Jul	5.0	<6.1	N/A	N/A	N/A	N/A	N/A	N/A
26-Jul	4.0	8.6	N/A	N/A	N/A	N/A	10	10
02-Aug	<2.0	<15.0	N/A	4.28	8.91	10.7	23	23
09-Aug	3.0	8.7	0.0347	N/A	N/A	N/A	15	43
16-Aug	4.6	8.5	N/A	N/A	N/A	N/A	N/A	N/A
23-Aug	3.8	7.1	N/A	N/A	N/A	N/A	15	21
30-Aug	3.4	<5.8	N/A	3.37	18.7	18.8	<3.0	<3.0
06-Sep	4.4	14.6	0.0121	N/A	N/A	N/A	N/A	N/A
13-Sep	4.4	6.9	N/A	N/A	N/A	N/A	3.6	3.6
20-Sep	4.2	17.4	N/A	N/A	N/A	N/A	<3.0	<3.0
27-Sep	3.8	13.0	N/A	4.98	10.5	12.6	<3.0	<3.0
04-Oct	4.4	13.1	<0.005	4.54	7.51	8.93	N/A	N/A
11-Oct	3.0	8.8	N/A	N/A	N/A	N/A	N/A	N/A
18-Oct	6.2	7.3	N/A	N/A	N/A	N/A	3.6	3.6
26-Oct	3.6	<4.9	N/A	6.00	8.96	10.9	N/A	N/A
01-Nov	3.2	<8.7	0.024	N/A	N/A	N/A	3.6	3.6
08-Nov	4.7	<8.7	N/A	N/A	N/A	N/A	3.6	3.6
15-Nov	6.0	N/A	N/A	N/A	N/A	N/A	3.6	3.6
22-Nov	4.2	<6.4	N/A	8.64	11.6	13.7	N/A	N/A
29-Nov	<2.0	4.8	N/A	N/A	N/A	N/A	3.6	3.6
06-Dec	4.6	<7.5	N/A	N/A	N/A	N/A	N/A	N/A
13-Dec	2.6	<6.9	0.0168	N/A	N/A	N/A	3.6	3.6
20-Dec	N/A	N/A	N/A	8.45	N/A	N/A	N/A	N/A
27-Dec	4.2	<6.8	0.0154	12.6	5.44	7.25	N/A	N/A
Avg.	**5.6**	**9.2**	**0.070**	**9.00**	**8.55**	**9.84**	**N/A**	**N/A**

4.4 Fecal Coliform

The ultraviolet disinfection system was upgraded in fall of 2018. The new Trojan 3000Plus system was commissioned in October with additional testing completed in November.

4.5 Toxicity

As part of the Environment Canada's Wastewater Systems Effluent Regulations which came into effect January 1, 2013, the City was initially required to test the effluent for toxicity quarterly. Having never failed a toxicity analysis, the frequency was reduced to annually and was

completed on effluent collected on November 27th, 2018. Analysis concluded, once again, the effluent discharged from the facility is non toxic.

4.6 Biosolids

The City of Salmon Arm produced approximately 350 dry tonnes of Class B biosolids during 2018. The biosolids are used by the Columbia Shuswap Regional District for local landfill reclamation. Testing of the biosolids by CARO Environmental Services for nutrients, metals and fecal coliform occurred on December 6th. Test results, once again, verified the biosolids produced by the Auto Thermophilic Aerobic Digester (ATAD) were of high quality managed under the Organic Matter Recycling Regulation.

4.7 Operating Certificate

The City operates the WPCC under Operating Certificate issued by the BC Ministry of Environment on June 1st, 2018. The certificate is attached as **Appendix B**.

In addition, The City's system must also comply with Environment Canada's Wastewater Systems Effluent Regulations. The goal of the Regulation is to standardize wastewater treatment across Canada. The Regulation specifies conditions to be met in order for the discharge of wastewater including setting limits on the concentration of deleterious substances that are authorized to be deposited, as well as requirements concerning effluent monitoring, toxicity, record keeping and reporting. Since the City's Operation Certificate is generally more stringent, only additional monitoring by an accredited laboratory and reporting is required to meet the Regulation.

4.8 Liquid Waste Management Plan

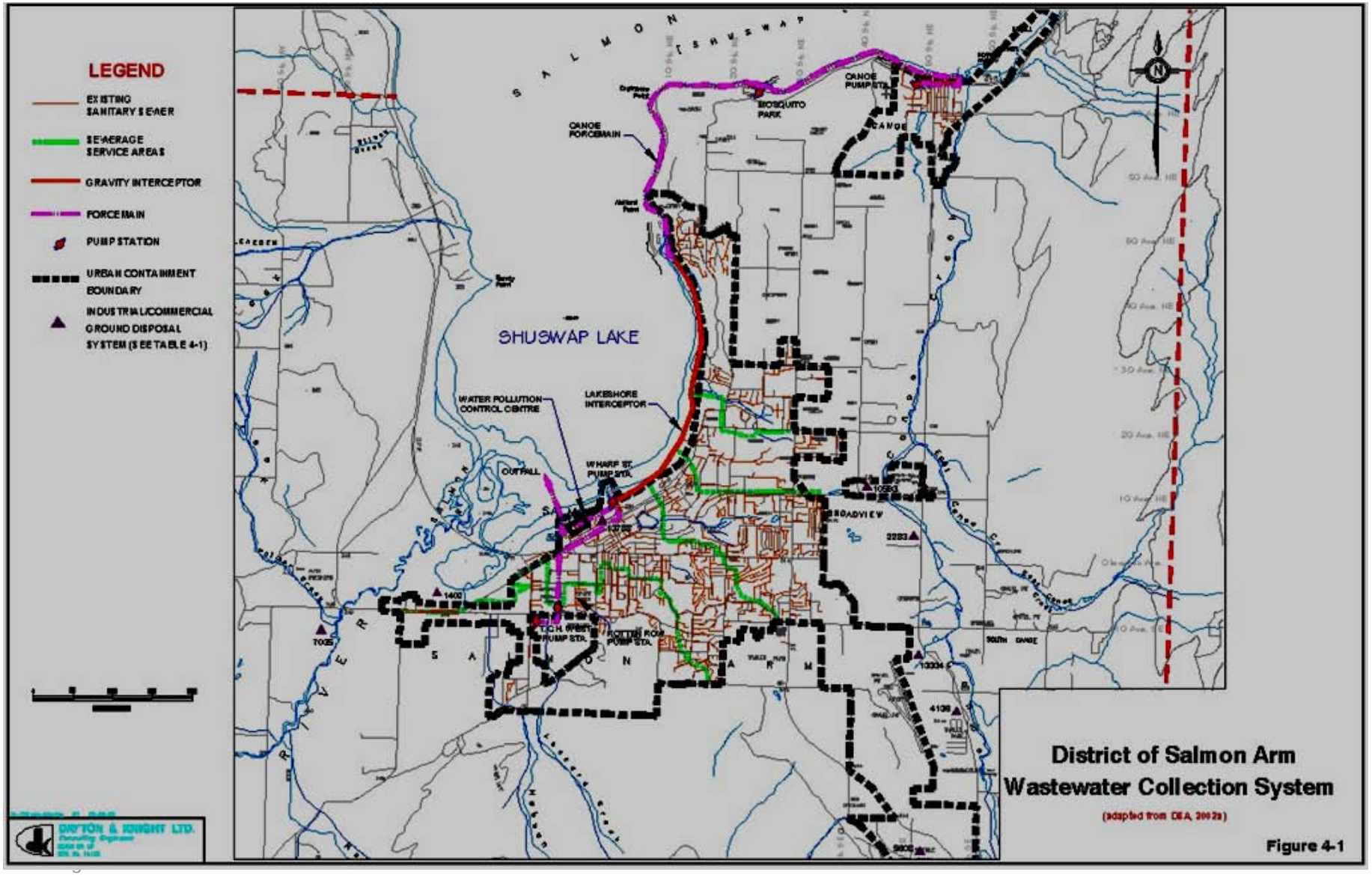
The City's Liquid Waste Management Plan (LWMP) was adopted by City Council on November 2, 2004 and was subsequently approved by the Ministry of Environment (MOE). One of the commitments contained in the approved LWMP was to carry out a LWMP update during 2009 to review progress, update the schedule, and make any required revisions in consultation with MOE. The City has been working with WSP Consulting Engineer to update LWMP. In the fall of 2010 meetings were held with MOE staff in an effort to review the proposed updates and amendments. Resulting from these discussions a draft LWMP update memorandum has been prepared and submitted for MOE review and comment.

4.9 WPCC Capital Projects

Table 9 – WPCC Capital Project Information

WPCC Capital Projects completed in 2018
◆ Stage IV Engineering Predesign Initiated
◆ UV Upgrade
Staff Initiated WPCC Projects Completed in 2018
◆ Purchase Turborator (2 of 2)
◆ Purchase New Aerator for Oxic Tank
◆ Instrumentation Improvements
WPCC Capital Projects scheduled for 2019
◆ Continue Stage IV Engineering Pre-design
◆ Activate Cell 6 Auto Thermophilic Aerobic Digester
◆ Upgrade lighting Filtration Building
◆ Rebuilt Centrifuge #1

APPENDIX A


LEGEND
EXISTING SANITARY SEWER
SEWERAGE SERVICE AREAS
GRAVITY INTERCEPTOR
FORCEMAIN
PUMP STATION
URBAN CONTAINMENT BOUNDARY
INDUSTRIAL/COMMERCIAL GROUND DISPOSAL SYSTEM (SEE TABLE 4-1)
SHUSWAP LAKE
CANOE FORCEMAIN
MOSQUITO PARK
CANOE PUMP STA.
WATER POLLUTION CONTROL CENTRE
LAKESHORE INTERCEPTOR
OUTFALL
WHARF ST. PUMP STA.
BROADVIEW
10TH AVE. S.W. PUMP STA.
POTTER ROAD PUMP STA.
SOUTH CANOE
SALMON RIVER
District of Salmon Arm
Wastewater Collection System
(adapted from DEA, 2002a)
Figure 4-1
DAYTON & KNIGHT LTD.

APPENDIX “B”

OPERATIONAL CERTIFICATE

June 1, 2018

Tracking Number: 6040
Authorization Number: 100218

REGISTERED MAIL

City of Salmon Arm
500 2nd AVE NE
Salmon Arm, BC V1E 4N2

Dear City:

Enclosed is Operational Certificate 100218 issued under the provisions of the *Environmental 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 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 rests with the City. It is also the responsibility of the City 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 decision may be appealed to the Environmental Appeal Board in accordance with Part 8 of the *Environmental Management Act*. An appeal must be delivered within 30 days from the date that notice of this decision is given. For further information, please contact the Environmental Appeal Board at (250) 387-3464.

Administration of this operational certificate will be carried out by staff from the Environmental Protection Division's Regional Operations Branch. Plans, data and reports pertinent to the operational certificate are to be submitted by email or electronic transfer to the Director, designated Officer, or as further instructed.

Yours truly,

Bryan Vroom
for Director, *Environmental Management Act*
Authorizations - South Region

Enclosure
cc: Environment Canada

Ministry of Environment and Climate Change Strategy
Environmental Protection Division
1259 Dalhousie Dr.
Kamloops BC V2C 5Z5
Authorizations - South Region
Telephone: (250) 371-6200
Facsimile: (250) 828-4000

MINISTRY OF ENVIRONMENT AND CLIMATE CHANGE STRATEGY

OPERATIONAL CERTIFICATE

100218

Under the Provisions of the Environmental Management Act

City of Salmon Arm

500 - 2nd AVE NE
Salmon Arm , BC V1E 4N2

is authorized to discharge effluent from a municipal wastewater collection and treatment system located at Salmon Arm, British Columbia to Salmon Arm Bay of Shuswap Lake, subject to the conditions listed below. Contravention of any of these conditions is a violation of the *Environmental Management Act* and may result in prosecution. This Operational Certificate supersedes Waste Management Permit PE-1251.

1. AUTHORIZED DISCHARGE

1.1 Authorized Source

The following applies to the discharge of effluent from a wastewater treatment plant serving the City of Salmon Arm (the City) in accordance with the approved Liquid Waste Management Plan. The site reference number for this discharge is E212492.

1.1.1 The maximum rate of discharge is 8,200 cubic metres per day.

1.1.2 The characteristics of the discharge must be equivalent to or better than:

5-day Carbonaceous Biochemical Oxygen Demand (BOD_5)
15 milligrams per litre (mg/L), maximum;

Total Suspended Solids (non-filterable residue) (TSS)
20 mg/L, maximum;

Fecal Coliforms
200 CFU (or MPN) per 100 millilitres (mL), maximum;

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Bryan Vroom
for Director, *Environmental Management Act*
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Total Phosphorous
12-month 90th percentile* not to exceed 1.0 mg/L;
12-month moving average not to exceed 0.5 mg/L; and

Fish bioassay (rainbow trout), 96 hour LC50, %
50% mortality, maximum.

* The 12-month 90th percentile means that 90 percent of all weekly values throughout the preceding 12 months (47 samples out of 52) must not exceed 1.0 mg/L total phosphorous as P.

1.1.3 The authorized works, located approximately as shown on Site Plan A are:

- Influent screens;
- Headworks grit removal;
- Primary treatment facilities;
- Fixed-growth/suspended-growth secondary treatment facilities;
- Biological and/or chemical phosphorus removal facilities;
- Effluent filtration facilities;
- Ultraviolet light disinfection facilities;
- Odour control and treatment system;
- Reclaimed water usage system;
- Autothermal thermophilic aerobic digester, solids dewatering, and sludge handling facilities; and
- Submerged outfall extending approximately 720 metres (m) from the shoreline at high water (approximately 570 m north-northwest from the end of the Salmon Arm wharf) and discharging at a depth of between approximately 0.6 m (low water period) and 5.6 m (high water period), and related appurtenances.

1.1.4 The authorized works must be complete and in operation while discharging to ensure effluent meets final effluent quality requirements.

1.1.5 The location of the facilities from which the discharge originates is Lot 1 of the NW ¼ of Section 14, Township 20, Range 10, West of the Sixth Meridian, Kamloops Division Yale District, Plan KAP58178, located approximately as shown on the attached Location Map.

1.1.6 The point of discharge (outfall) is located within a 6 m right-of way described as Plan No. C14596 (in the bed of Shuswap Lake), located approximately at 50.709418 N, 119.294080 W, and as shown on the

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attached Location Map.

2. GENERAL REQUIREMENTS

2.1 Maintenance of Works

The City must inspect the authorized works regularly and maintain them in good working order. Notify the Director of any malfunction of these works.

2.2 Emergency Procedures

During and/or after an emergency event or condition, the City must conduct sampling and analysis of discharges which might be non-compliant with this permit and/or applicable statutory requirements and, as they become available, provide the results to the Regional Director, Environmental Protection, or designated Officer.

Within 30 days of the emergency event or condition, the City must provide a report including results of sampling and analysis, non-compliance with this operational certificate and/or applicable statutory requirements, corrections to the operational system, root cause(s) of the emergency event or condition, and decisions for corrective and preventative action.

2.3 Bypasses

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

2.4 Process Modifications

The Director must be notified prior to implementing changes to any process that may negatively affect the quality and/or quantity of the discharge. Despite notification under this section, permitted levels must not be exceeded.

2.5 Posting of Outfall

The City must maintain a marker buoy at the terminus of the outfall. The marker buoy must identify the nature of the works.

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2.6 Sludge Disposal or Utilization

Efforts should be taken to beneficially utilize the sludge from the treatment plant. Sludge must be disposed/utilized in a manner approved by the Director, or as authorized by regulation under the *Environmental Management Act.*

2.7 Backup Power

The City must provide auxiliary power facilities to ensure the continuous operation of the treatment works and operations building during power outages.

2.8 Odour Control

Should objectionable odours, attributable to the operation of the sewage treatment plant, occur beyond property boundary, measures or additional works will be required to reduce odour to acceptable levels.

2.9 Reclaimed Water

Water that has been reclaimed from the effluent authorized in Section 1.1 must be used in a manner approved by the Director, or as authorized by regulation under the *Environmental Management Act*.

2.10 Facility Classification and Operator Certification

The City must have the authorized works classified (and the classification must be maintained) by the Environmental Operators Certification Program Society (Society). The authorized works must be operated and maintained by persons certified within and according to the program provided by the Society. Certification must be completed to the satisfaction of the Director. In addition, the Director must be notified of the classification level of the facility and certification levels of the operators, and changes of operators and/or operator certification levels within 45 days of any change.

3. MONITORING, PROCEDURES AND REPORTING REQUIREMENTS

3.1 Discharge Monitoring

3.1.1 Flow Measurement

Provide and maintain a suitable flow measuring device and record once per day

the effluent volume discharged over a 24-hour period.

3.1.2 Sampling and Analyses

Suitable sampling facilities must be installed and maintained. Except where otherwise specified, the City must obtain composite samples of the effluent. The composite samples must be comprised of sub-samples taken over a 24-hour period. Proper care must be taken in sampling, storing and transporting the samples to adequately control temperature and avoid contamination, breakage, etc.

The following samples and analyses must be obtained:

PARAMETER	FREQUENCY
BOD_5	Weekly
TSS	Weekly
Total phosphorus	Weekly
Ammonia*	Monthly
Nitrates	Monthly
Fecal coliforms (CFU or MPN/100 mL)	Monthly grab
pH	Weekly grab
Fish bioassay (rainbow trout), 96 hour LC50, %	Annual grab

* Temperature and pH are required to determine the ammonia standard to apply and must be measured and recorded at the same time the ammonia sample is collected. Measurements of pH must be conducted on-site using a calibrated and properly maintained pH probe or analyzer.

3.2 Receiving Environment Monitoring

The receiving environment monitoring program consists of eight monthly water samples collected in April, May, June, July, August, September, October and November unless otherwise instructed by the Director.

The Director may vary the current or future monitoring program parameters, frequency, locations, and other conditions as warranted based on previous monitoring results or other relevant circumstances.

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for Director, *Environmental Management Act*
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The sample sites are as follows:

1. Outfall –within 2 m of end of outfall. (Surface and bottom samples when water depth is greater than 3 m);
2. North edge of Initial Dilution Zone (IDZ;
3. East of outfall (Christmas Island); and
4. Deep site off Sandy Point.

Depth profile is required at the deep station. Depth profile parameters must include: depth, temperature and dissolved oxygen.

The City will work in partnership with the Ministry of Environment and Climate Change Strategy and other stakeholders (e.g., Shuswap Watershed Council) concerned with Shuswap Lake water quality to conduct the receiving environment monitoring per the table below:

Parameter	**Outfall (EMS ID E263503)**	**North Edge of IDZ (EMS ID E263504)**	**Christmas Island (EMS ID E206770)**	**Deep Site (EMS ID E206771)**
Bromide	X[1,2]	X[1,2]	X[1,2]	X [2,3]
Chloride	X[1,2]	X[1,2]	X[1,2]	X [2,3]
Sulphate	X[1,2]	X[1,2]	X[1,2]	X [2,3]
Alkalinity Total 4.5	X[1,2]	X[1,2]	X[1,2]	X [2,3]
DOC	X[1,2]	X[1,2]	X[1,2]	X [2,3]
TOC	X[1,2]	X[1,2]	X[1,2]	X [2,3]
Turbidity	X[1,2]	X[1,2]	X[1,2]	X [2,3]
Conductivity	X[1,2]	X[1,2]	X[1,2]	X [2,3]
pH	X[1,2]	X[1,2]	X[1,2]	X [2,3]
Hardness (ICP)				X [2,3]
Ammonia	X[1,2]	X[1,2]	X[1,2]	X [2,3]

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Total Organic Nitrogen	X[1,2]	X[1,2]	X[1,2]	X [2,3]
Kjeldahl Nitrogen	X[1,2]	X[1,2]	X[1,2]	X [2,3]
Nitrite	X[1,2]	X[1,2]	X[1,2]	X [2,3]
Nitrate	X[1,2]	X[1,2]	X[1,2]	X [2,3]
Total Nitrogen	X[1,2]	X[1,2]	X[1,2]	X [2,3]
Total Phosphorus	X[1,2]	X[1,2]	X[1,2]	X [2,3]
Dissolved Phosphorus	X[1,2]	X[1,2]	X[1,2]	X [2,3]
Ortho Phosphorus	X[1,2]	X[1,2]	X[1,2]	X [2,3]
Chlorophyll "a"				X [2,3]
Zooplankton				X [2,3]
Phytoplankton				X [2,3]
Fecal coliforms*	X[1,2]	X[1,2]	X[1,2]	X [2,3]
E. coli	X[1,2]	X[1,2]	X[1,2]	X [2,3]

Notes:

[1] Samples should be taken at least two depths when water depth greater than 3 m.

[2] Profiles including depth, water temperature and dissolved oxygen shall be measured at one metre increments to the lake bed.

[3] One sample should be collected from the epilimnion and one from the hypolimnion layers of the lake. Each of these samples should consist of three subsamples taken at varying depths within the respective layers.

3.2.1 Sediment Monitoring

Sediment monitoring for benthic invertebrates, taxonomy, and TOC must be conducted when specified by the Director.

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3.2.2 Resource Support

The City must contribute funds to support the receiving environment monitoring program as specified by the Director.

3.3 Procedures

3.3.1 Sampling Procedures

Sampling is to be carried out in accordance with the procedures described in the "British Columbia Field Sampling Manual for Continuous Monitoring and the Collection of Air, Air-Emission, Water, Wastewater, Soil, Sediment, and Biological Samples, 2013 Edition (Permittee)", or most recent edition, or by suitable alternative procedures as authorized by the Director.

A copy of the above manual is available on the Ministry web page at www.env.gov.bc.ca/epd/wamr/labsys/lab_meth_manual.html

3.3.2 Analytical Procedures

Analyses are to be carried out in accordance with procedures described in the "British Columbia Laboratory Manual (2013 Permitee Edition)", or the most recent edition, or by suitable alternative procedures as authorized by the Director.

A copy of the above manual is available on the Ministry web page at www.env.gov.bc.ca/epd/wamr/labsys/lab_meth_manual.html.

3.4 Quality Assurance

The City must obtain from the analytical laboratory(ies) their precision, accuracy and blank data for each sample set submitted as well as an evaluation of the data acceptability, based on the criteria set by the laboratory, and make it available to the Director if requested.

The analytical laboratory(ies) must be accredited in accordance with the Canadian Association for Laboratory Accreditation (CALA) unless otherwise instructed by the Director.

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3.5 Reporting

3.4.1 Outfall Inspection

The outfall must be inspected annually by a qualified professional to ensure it is in good working condition. An inspection must include examination of the entire length of the pipe and diffuser (if installed) for leaks, breaks, and blockages.

Qualified professional means an applied scientist or technologist specializing a particular applied science or technology, including agrology, biology, chemistry, engineering, geology or hydrogeology,

a) who is registered in British Columbia with the professional organization responsible for his or her area of expertise, acting under that professional association's code of ethics and subject to disciplinary action by that association, and
b) who, through suitable education, experience, accreditation and knowledge, may be reasonably relied on to provide advice within his or her area of expertise as it relates to outfall inspections.

An inspection report must be submitted to the Director within 60 days after the inspection date.

3.4.2 Monthly Reporting

The City must maintain data of analyses and flow measurements for inspection and submit the data monthly, suitably tabulated, to the Regional Environmental Protection office for the previous month. All reports must be received by the manager within 30 days of the end of the reporting period.

Each data submission must include:

- a statement outlining the reported values that were outside the permit limits; and
- Clearly identify the dates of these occurrences in the data submission, include an explanation as to the cause of each occurrence, and provide a description of the measures taken to rectify the situation.

Should all submitted values be within the permit limits, a statement to this effect must be included.

Reports must be submitted by email to the Ministry's Routine Environmental

Reporting Submission Mailbox (RERSM) at EnvAuthorizationsReporting@gov.bc.ca or as otherwise instructed by the Director. For guidelines on how to properly name the files and email subject lines or for more information visit the Ministry website: https://www2.gov.bc.ca/gov/content/environment/waste-management/waste-discharge-authorization/data-and-report-submissions/routine-environmental-reporting-submission-mailbox.

3.4.2 Annual Reporting

The City must submit an annual report for the preceding year on or before March 31 of each year.

The annual report must review and interpret monitoring data for the preceding calendar year and provide graphical analysis with suitable interpretations of any trends in the monitoring results. Results of the most recent outfall inspection should also be included in the annual report.

The annual report must review the performance of the sewage treatment system and identify any necessary changes to the treatment process and works. If necessary, the annual report should include an implementation schedule for any alterations to the treatment and disposal works.

Annual reports must be sent by email to EnvAuthorizationsReporting@gov.bc.ca or as otherwise instructed by the Director.

3.4.4 Non-Compliance Reporting

The City must immediately notify the Director or designate by e-mail at EnvironmentalCompliance@gov.bc.ca, or as otherwise instructed by the Director, of any non-compliance with the requirements of this authorization and action to remedy any effects of such non-compliance.

If the City fails to comply with the requirements of this operational certificate, the City must, within 30 days of the non-compliance, submit to the Director a written report that is satisfactory to the Director and includes, but is not necessarily limited to, the following:

- All relevant test results obtained by the City in relation to the non-compliance;
- An explanation of the most probably cause(s) of the non-compliance; and

- A description of the remedial action planned and/or taken by the City in the future.

3.4.5 Spill Reporting

All spills to the environment (as defined in the Spill Reporting Regulation) must be reported immediately in accordance with the Spill Reporting Regulation. Notification must be via the Provincial Emergency Program at 1-800-663-3456 or as otherwise specified in the Spill Reporting Regulation.

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N

Location Map

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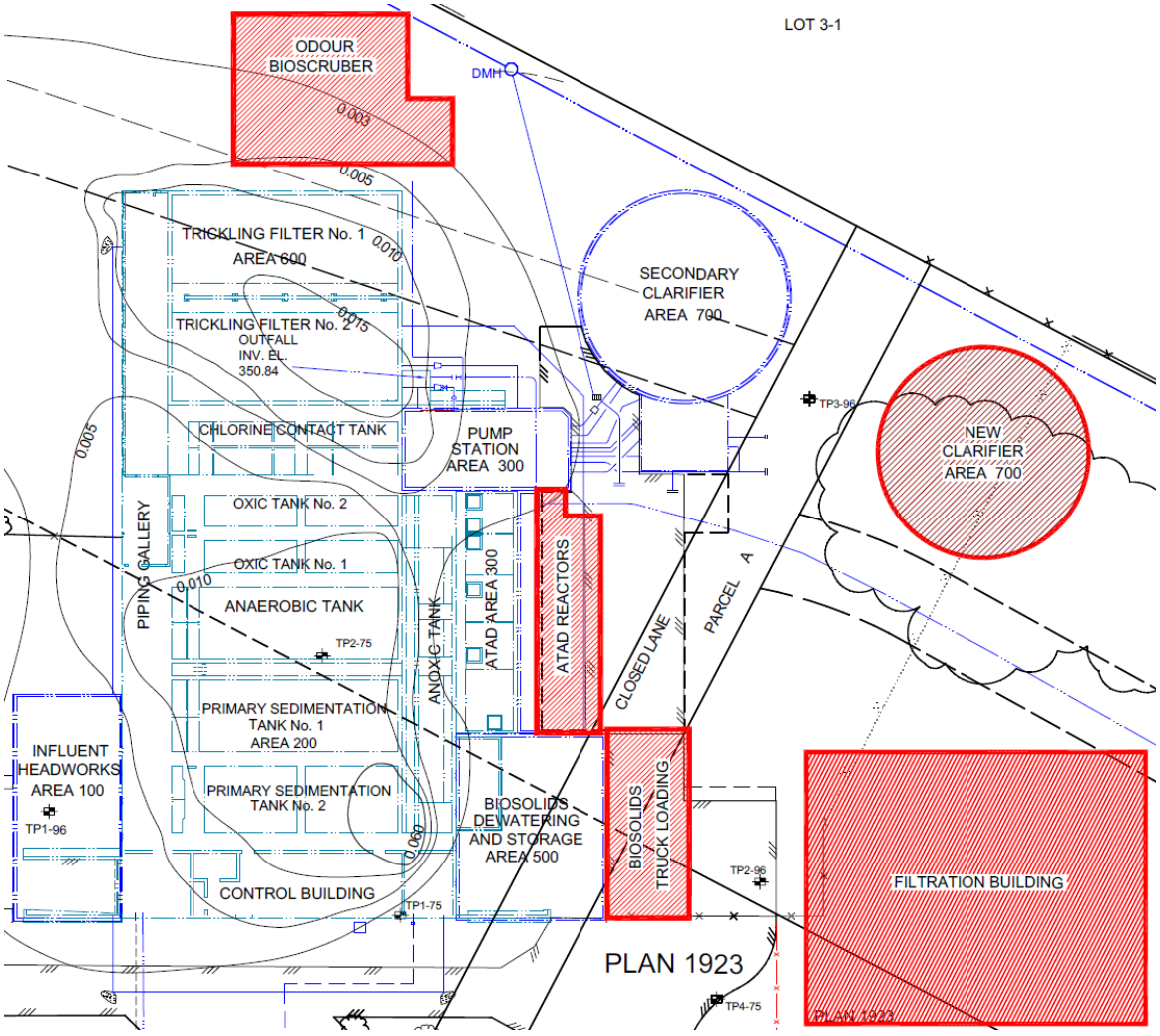
Site Plan A



Red outlined areas indicate Stage IIIB Expansion.
Source: Dayton & Knight Figure 4.1, DWG. No. 14.134, 03-05-29.

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