DISTRICT OF SOOKE WASTEWATER TREATMENT AND COLLECTION SYSTEM

OPERATED BY EPCOR WATER SERVICES INC.

2014 ANNUAL REPORT REGISTRATION 17300

Table of Contents

INTRODUCTION

The Sooke wastewater collection and treatment system is owned by the District of Sooke and operated by EPCOR Water Services Inc. (EPCOR). The system services the core area of Sooke.

The system consists of:

- 51 km of collection system piping
- 515 manholes
- 7 pump lift stations (Sooke Road, West Coast Road, Helgesen Road, Sunriver, Prestige Hotel, Mariner's Village and Treatment Plant)
- A wastewater secondary treatment plant with disinfection
- A marine discharge through a 1.7 km long, 30m deep outfall

The treatment plant uses a Sequencing Batch Reactor (SBR) treatment process with UV disinfection to provide secondary wastewater treatment. Plant treatment removes over 95% of the total suspended solids and high levels of other contaminants, providing significant environmental benefits to the District of Sooke and the receiving waters.

The treatment plant has a design capacity of 3,000 m^3/day (annual average daily flow), and a peak wet weather flow capacity of 6,900 m^3/day. The plant is expandable by an additional 3,000 m^3/day (average daily flow).

Construction of the Sooke collection system and wastewater treatment plant began in 2004 and the system was commissioned in November 2005. Individual domestic and commercial connections began in January 2006 and continued throughout 2006 and 2007, with the majority completed by December 2006. Additional connections have continued since that time for new construction in the specified sewer area.

Table 1: Acronyms

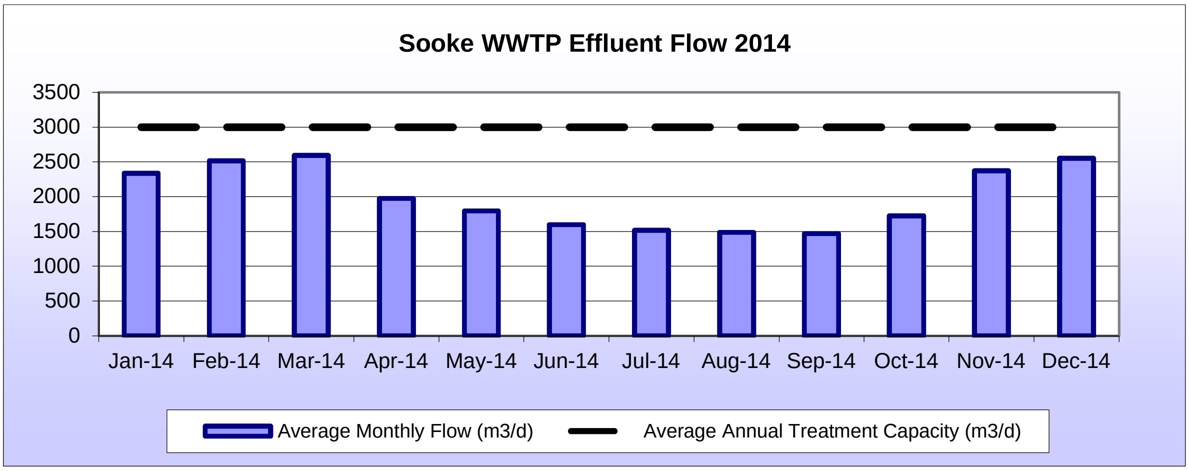
Acronyms /Abbreviations	Description
ATS	Automatic Transfer Switch
AVE or AVG	Average
BC EOCP	British Columbia Environmental Operators Certification Program
BOD	Biochemical Oxygen Demand
CBOD	Carbonaceous Biochemical Oxygen Demand
CFU/100mL	Colony Forming Units Per 100 milliliters
COD	Chemical Oxygen Demand
FC	Fecal Coliforms
F/M ratio	Food-to-microorganism ratio
HMI	Human Machine Interface
IC	Inspection Chamber
I/I	Inflow & Infiltration
LIT	Level Indicator Transmitter
m^3/day	Cubic meters per day (flow)
mg/L	Milligram per liter
MDL	Method detection limit
MSR	Municipal Sewage Regulation
MWR	Municipal Wastewater Regulation
NH_3	Ammonia
OC	Operational Certificate
PLC	Programmable Logic Controller
Q	Yearly Quarter
SBR	Sequencing Batch Reactor
SCADA	Supervisory Control And Data Acquisition (system)
SSA	Specified Sewer Area
TSS	Total Suspended Solids
VFD	Variable Frequency Drive
WWC	Wastewater Collection System
WSER	Wastewater Systems Effluent Regulations
WWTP	Wastewater Treatment Plant
YTD	Year to Date

OVERVIEW

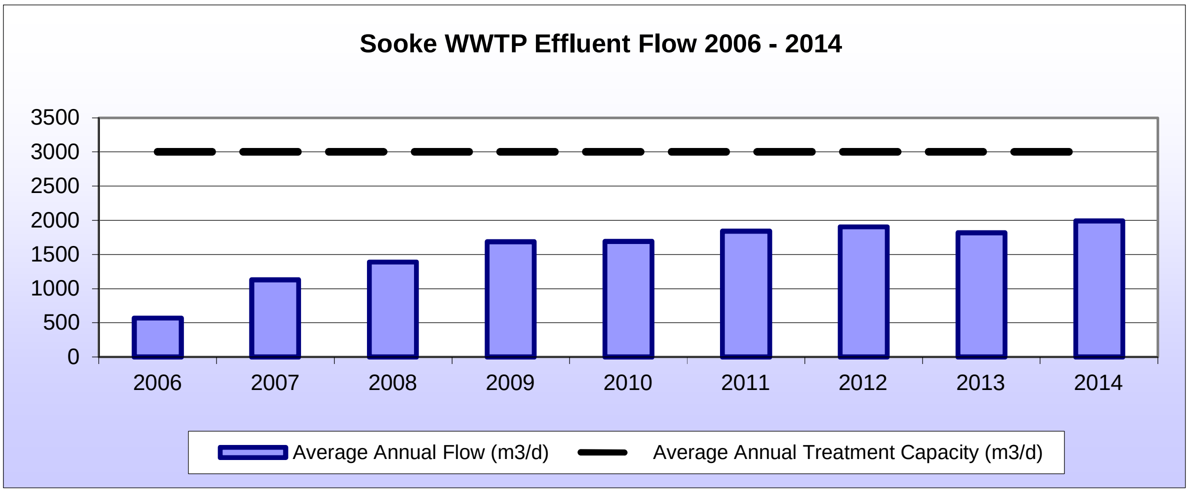
Plant Flow

The annual average daily effluent flow treated in the plant during 2014 was 1,993 m^3. Graph 1 summarizes the monthly average flows during the year compared to the plant design capacity (annual average flow). Graph 2 summarizes the average annual flow through the plant each year since 2006.

Graph 1: WWTP Effluent Flow 2014



Graph 2: WWTP Effluent Flow 2006 – 2014

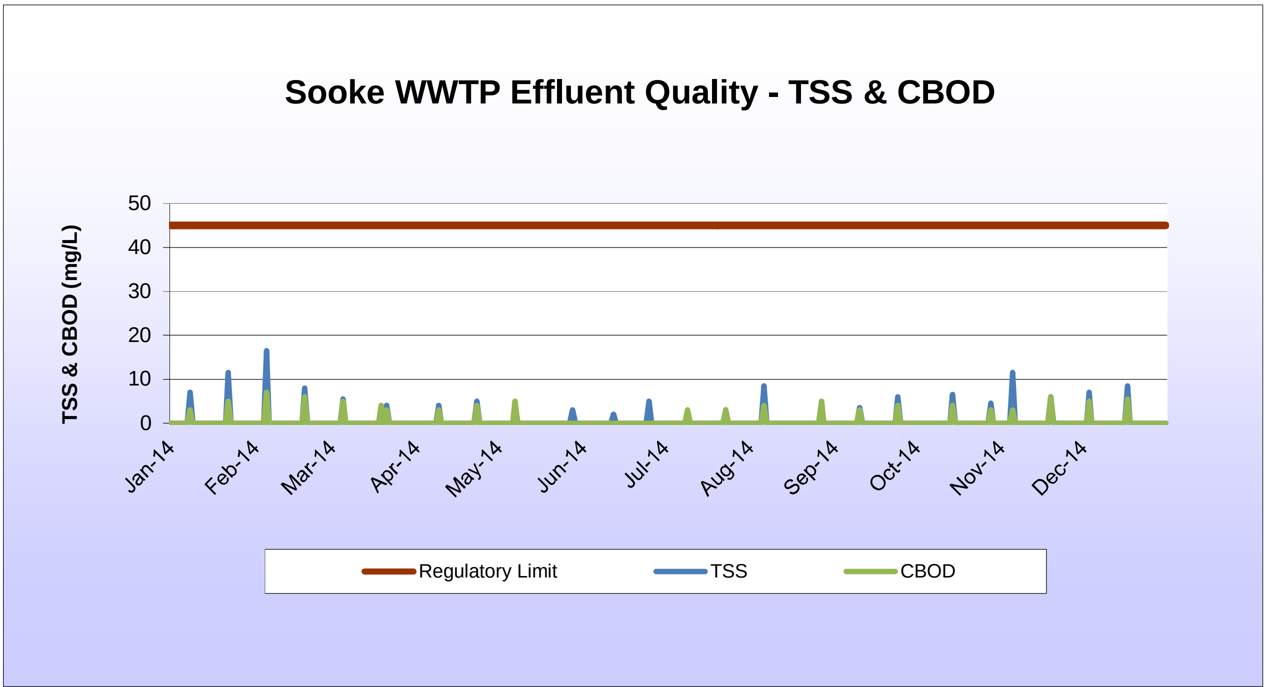


Plant Performance

The wastewater treatment plant is performing very well. Three of the important parameters monitored at the plant are total suspended solids (TSS), carbonaceous biochemical oxygen demand (CBOD) and fecal coliforms (FC).

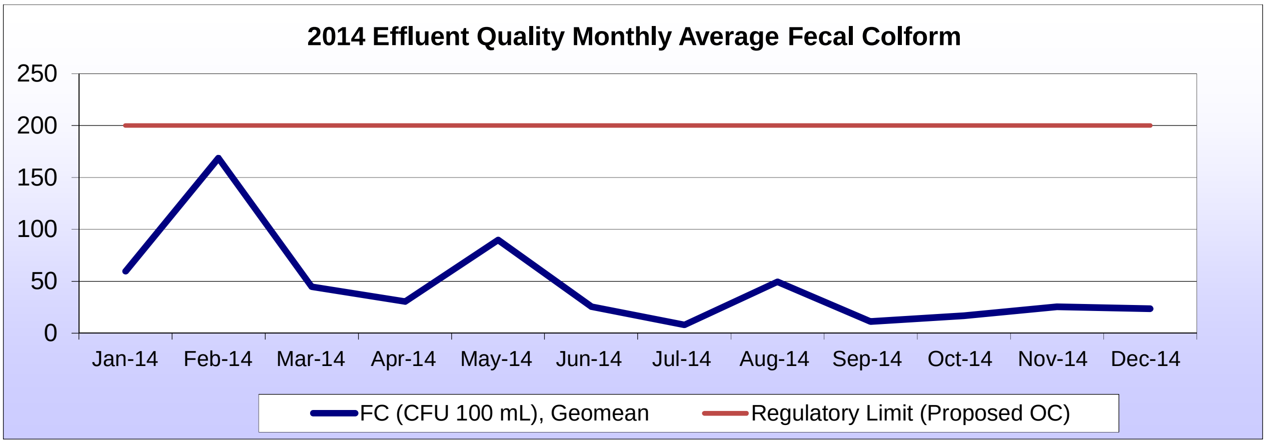
Graphs 3 and 4 summarize the external lab test results for TSS, CBOD and FC in the plant effluent in relationship to the regulatory discharge limits (≤45mg/L as per MWR and Proposed OC). The TSS, CBOD and FC in the plant effluent were consistently lower than the regulatory limits throughout the year. Further information on the performance of the plant throughout the year is contained in the Operations section of this report.

Graph 3: WWTP Effluent Quality -TSS & BOD



Graph 4: WWTP Effluent Quality – FC

(Regulatory limit is a geomean monthly average not to exceed 200 CFU/100mL at the edge of the dilution zone in recreational waters)



OPERATIONS

Certification

The wastewater treatment plant is a Class III Wastewater Treatment Plant, Certification # 1358, in accordance with the Environmental Operators Certification Program (EOCP). The collection system is a Class III Wastewater Collection System, classified under EOCP #1827, and is operated in compliance with the MWR and under MOE guidelines.

Table 2 summarizes the operators working at the Sooke WWTP in 2014 and their certifications.

Table 2– Operator Certification

Name	Position	Qualifications
Dan Skidmore	Operations Manager	BC EOCP Certified: Level II Wastewater Treatment & Level IV Wastewater Collection System Operator
Shawn Pearson	Lead Operator	BC EOCP Certified: Level III Wastewater Treatment & Level I Wastewater Collection System Operator
Chris Miller	Operator (Jan. to Sept.)	BC ECOP Certified Level III Wastewater Treatment & Level I Wastewater Collection System Operator
Jesse Forcier	Operator (Sept.-Dec.)	BC EOCP OIT (Operator in Training)

Water Quality Standards & Results

The District of Sooke Liquid Waste Management Plan was approved by the Ministry of Environment in May 2011. Contained in the approved plan is a proposed Operational Certificate (OC). The OC provides more extensive standards and guidelines for the operation of the wastewater treatment plant than is contained in the plant registration, the Municipal Waste Regulations (MWR) and the federal Wastewater Systems Effluent Regulations (WSER) (in effect January 2013).

Table 3 summarizes the regulatory requirements defined in the Federal Wastewater Systems Effluent Regulations, the Provincial Municipal Wastewater Regulations and the Proposed Operational Certificate from the approved Liquid Waste Management Plan.

Table 4 summarizes the water quality results and other key operational data from the treatment plant in 2014. More detailed water quality information is contained in the following appendix 1.

Appendix 2 contains the Receiving Environment Monitoring report from 2014. The water quality at the edge of the dilution zone (near the discharge point of the outfall) continues to exceed regulatory limits.

Table 3 – Summary of Regulatory Requirements

Parameters or Description	WSER		MWR		Proposed OC	
	Limits	Frequency	Limits	Frequency	Limits	Frequency
Ammonia-Nitrogen			NA	Quarterly (Grab)	NA	Quarterly (grab)
Ammonia (un-ionized) as N at 15^{0}C (Federal WSER)	<1.25 mg/L	Monthly	NA	NA	NA	NA
Effluent CBOD	≤25 mg/L (Quarterly Average)	Monthly (Grab)	≤45 mg/L	Monthly (Grab)	≤45 mg/L	Monthly (Grab)
Fecal Coliforms	NA		<200 CFU/100 ml * Geometric Mean	5 samples GM/ 30 days	NA	6 x / year
Enterococci	NA		NA	NA	NA	6 x / year
Effluent pH			6.0 - 9.0		6.0 - 9.0	Monthly (Grab)
Receiving Environment Testing			Required	Yearly	As per Receiving Environment Monitoring Plan	Annually, between August1 and August31
Operator Certification			Required notification to regulator when there is a change in operator with the highest certification level in the plant	NA	Required notification to regulator when there is a change in operator with the highest certification level in the plant	NA
Reports, Annual			As requested by Director	As requested by Director	1/year	Within 120 days of calendar Year
Reports, General	Quarterly	Within 45 days after the end of the quarter	Data submission 2 times per year		Quarterly	Within 31 days of quarter ends
Flow Measurement		Daily Total			NA	Daily Total
Flow, Average			To be determined	2/week	3,000 m^3/day	2/week
Flow, Maximum			To be determined	2/week	6,900 m^3/day	2/week
Total Phosphorus			NA	Quarterly (Grab)	Not Required	NA
Effluent TSS	≤25 mg/L (Quarterly Average)	Monthly (Grab)	≤ 45 mg/L (Monthly Average)	Monthly (Grab)	≤ 45 mg/L (Monthly Average)	Monthly (Grab)
Post of Outfall Sign			Required		Erect sign above High water Mark.	NA
Out fall Inspection			Required	Every 5 years	Required	Every 5 years. Next Due 2018
Biosolids Management			NA		Shall be transported to an approved receiving facility	NA

*<200 CFU/100 mL on a geometric mean on the last 5 samples in 30 days at the edge of the dilution zone for recreational water use and <14 CFU/100 mL for shellfish bearing waters. ** All regulated tests are conducted by an ISO 17025 accredited laboratory. ***Un-ionized testing only required from January1, 2013 to July 1, 2014. ****Acute Lethality is not required based on average daily volume deposited (<2500m^3), WSER Section 11(1)

Table 4 - Sooke WWTP 2014 Water Quality Summary

	Influent				Effluent																											Biosolids Shipped	
	BOD mg/L	TSS mg/L	NH3-N mg/L	TP	Flow m^3/day			CBOD mg/L			TSS mg/L			NH3-N mg/L			Un-Ionized NH3-N mg/L			TP			FC CFU/100mL			Kg	# of Loads
	Ave	Ave	Ave	Ave	Min	Max	Ave	Min	Max	Ave	Min	Max	Ave	Min	Max	Ave	Min	Max	Ave	Min	Max	Ave	Min	Max	Geo Mean		
Regulatory Limit						14400	3000		≤45**	≤25 *		≤45**	≤25 *					<1.25							<200		
January	155	275	33	7.6	1749	4385	2336	<4	7	5	6	14	9	3.32	6.84	5.10	<0.02	<0.02	<0.02	1.60	2.16	1.93	22	207	60	85120	8
February	140	222	29	7.4	1715	4036	2514	5	9	7	6	25	12	7.34	15.7	9.5	<0.05	<0.05	<0.05	2.02	2.78	2.40	8	1110	169	39580	4
March	121	146	19	5.1	1945	4284	2592	<4	5	4	<2	6	4	3.4	9.8	6.2	<0.05	<0.05	<0.05	1.54	1.79	1.67	12	286	45	59820	6
April	172	250	36	8.6	1701	2301	1971	<4	5	4	<3	5	4	0.09	1.05	0.53	<0.05	<0.05	<0.05	3.02	3.37	3.18	15	76	30	52540	5
May	249	300	44	9.4	1513	2309	1794	<4	5	<4	<3	3	<3	0.1	0.9	0.4	<0.05	<0.05	<0.05	3.08	4.62	3.76	16	300	90	41110	4
June	189	340	56	10.6	1439	1846	1597	<4	<4	<4	<3	8	4	0.11	1.26	0.48	0.0005	0.0042	0.0016	4.46	6.36	5.08	10	80	26	61780	6
July	205	263	54	10.8	1411	385	1514	<4	<4	<4	<3	4	<4	0.08	0.47	0.27	nr	nr	nr	3.79	4.74	4.27	<2	26	8	54020	5
August	257	312	47	8.4	1330	1656	1487	<4	6	5	<4	12	6	0.14	11.20	3.97	nr	nr	nr	5.14	5.18	5.16	8	1130	50	28550	3
September	237	284	55	10.2	1314	1720	1465	<4	<4	<4	3	9	5	0.12	0.50	0.31	nr	nr	nr	2.90	3.72	3.28	<2	106	11	29140	3
October	182	253	38	7.9	874	2758	1720	<4	4	4	4	9	6	0.41	18.50	5.13	<0.05	<0.05	<0.05	0.59	4.93	2.58	<2	640	17	38470	4
November	183	205	44	7.9	1589	3686	2370	<4	8	5	4	17	9	0.36	2.56	1.19	<0.05	<0.05	<0.05	2.99	4.24	3.62	<2	270	25	29100	3
December	156	292	23	9.2	1916	4515	2551	<4	6	5	5	9	8	0.25	2.38	1.32	<0.05	<0.05	<0.05	2.76	3.16	2.93	6	46	24	60290	6
Total																										579520	57
Annual	187	262	40	8.6	874	4515	1993	<4	9	5	<2	25	6	0.06	18.5	2.87	0.0005	<0.05	<.005	0.59	6.36	3.32	<2	1130	14	48293	5

* WSER-Quarterly Average, ** MWR, unionized ammonia not required (nr), previous tests provided by ISO 17025 certified lab

Operations, Maintenance & Improvements

Ongoing operations and maintenance activities and improvements occurred throughout the year. Highlights of those activities are included below.

TREATMENT PLANT

Biosolids

Biosolids extracted by the centrifuge dewatering/solids separation process were trucked to the Hartland Landfill for disposal under Control Waste Permit #2014-053. During 2014, on average, approximately 48,290 tonnes of bio-solids per month were taken to the landfill. 57 loads and a total of 579,490 kg were hauled for the year. Grit and screenings from the headworks building were hauled under CWP #2014-054. There were 12 bins hauled, totalling 11,898.22 kg.

Operations

The treatment plant performed very well throughout the year, even when being challenged by several different conditions. The TSS, CBOD and FC design standards were met throughout the year.

In January, increased flows, on top of poor sludge settling characteristics, created process upset in SBR#2 and resulted in additional loads of biosolids to be hauled. Dewatering efficiency was also adversely affected by process upset. Operations made adjustments and continued to monitor the situation closely throughout the month.

From January 7 to January 11, a water and wastewater student job-shadowed operations.

In February, operators closely managed SBR#2's poor settleability. The most significant changes were wasting good sludge from SBR#1 to SBR#2 and increasing MLSS concentrations. This continued for two weeks before good, settleable conditions were restored. Effluent TSS in SBR#2 began to trend back downward, ending up with an internal result of 4 mg/L by month end.

Sub-zero temperatures caused one of the wasting valves to a digester to freeze and storm mode was initiated twice due to heavy rains and high flows.

From March 3 to March 6, heavy rain caused high flows (from 2100 m^3/day to 4000 m^3/day), but the plant maintained good process. An aeration valve failed to close mechanically and an unsettled condition was observed. Operators ran the plant manually until the aeration valve was replaced to ensure proper treatment. On Mar.13, an electrical contractor installed pressure sensors in the aeration piping downstream of aeration valves. Wiring connections were made to SBR logic controller. EPCOR programmers made additions to the program to "park" decanters if any pressure was detected downstream which will prevent decanting of unsettled water.

Operations detected measurable H_2S (hydrogen sulfide) in the centrifuge room near centrate discharge port during centrifuge start-up. It was all clear after five minutes but monitoring will continue.

March 20 an SBR PLC failed. Automation was lost for all SBR functions including aeration, sludge pumps and decanters. Operators took manual control of plant and contacted EPCOR programmers who immediately began troubleshooting remotely. Operators maintained continuous manual control, working 12 hours shifts, awaiting EPCOR programmer to arrive on site with replacement central processing unit. March 21 the replacement CPU was installed, programmed and SBR PLC automation was restored..
During this time, a power outage occurred at the treatment plant, West Coast Road lift station and Prestige Hotel lift station. Standby power generators operated at all locations, plant process was uninterrupted and effluent quality remained excellent.

In April, a sign was installed on the utilities building to caution entrants to the possibility of H_2S gas being present.
In April, warmer weather increased treatment basins temperatures and, as such, had increased biological activity. Bacteria metabolized their food source at a much faster rate. This creates an "under loaded" condition "process-wise". Increased awareness to the situation has operations making changes that have maintained excellent effluent quality and efficient sludge management.

In May aeration valve #2 failed to close. Troubleshooting began to determine cause. A spare rebuilt valve was installed. On May 24, operators troubleshot with Edmonton SCADA and programming personnel to resolve PLC communication problem alarms at Mariner's Village Lift Station.

In June, several alarms were experienced after hours; including aeration valve #2 failed to close and digester blower #2 faults. On June 13, an operator noticed oil from digester blower #2 was dark and followed up with additional oil changes.
On June 18, an engineering firm's representatives were on site surveying elevations at plant for future tie-in of First Nations' Land to treatment plant.
Treatment operations were closely watched and small adjustments were being made daily to keep up with changing food-to-microorganisms ratios as temperatures steadily increase. On June 25 and 28, aeration valve #2 continuing to be problematic and was recalibrated again. A new actuator was ordered

On July 2, EPCOR lab technicians were on site for annual lab audit. Recommendations were received and completed in August.
Multiple call-outs were responded to in July including SBR#1 blower VFD faults, digester blowers #1 and #2 did not run for four hours and motion detector alarms in administration building. There were no signs of intrusion. Also, trouble with the fire alarm panel created several call-outs. A contractor was called in to troubleshoot and make necessary repairs, which were completed July 18.

On July 29, an insurance adjuster toured treatment plant facility to document plant operations, on behalf of the District of Sooke.
For security and safety purposes, operations adopted a policy to keep front gates closed in response to unscheduled visitors entering plant facility unannounced.

August 4 through 16, operators observed a downward trend in effluent quality and made adjustments to daily processes. More frequent sample testing and monitoring were completed. An EPCOR Operations Specialist was consulted to confirm that adjustments were the correct course of action. Effluent quality remained well within regulatory limits throughout.
A diving contractor performed annual receiving waters sampling at the outfall. The lab results were all positive and a copy of their report is attached. The divers also removed debris from the outfall piping, and ensured that everything was in good condition. A report and video are available upon request.
Environment Canada staff were onsite for general discussion about current operations.
On August 25th and 28th, an EPCOR HMI Engineer was on site to install redundant and upgraded SCADA computers in control room and utilities room.

A contractor was on site in September to recalibrate the gas detectors in the headworks building.
In September, interviews for a replacement operator commenced. A new operator started work on Sept. 29.
On September 16, operators started lowering levels in the digesters for sludge storage for the scheduled SBR takedown inspection and membrane replacement. On September 30, more preparations commenced including dewatering basin #1 with portable pump. All effluent from dewatering was routed through the UV channel for complete secondary treatment and tests were performed to confirm all effluent leaving the plant was well within regulatory limits,

On October 2, the SBR#1 draining was completed in preparation for basin cleaning and membrane replacement. During the membrane replacement, EPCOR operators conducted a mock confined space rescue exercise as a safety initiative. A “man down” scenario was simulated and the worker was extracted from the SBR via a lifeline/retrieval winch. The Sooke Fire Dept. was on standby as back-up. A debriefing session was conducted immediately after the exercise to evaluate the rescue and make recommendations for improvements to future rescues. The retrieval winch was sent out for recalibration following the SBR confined space mock rescue. On October 9, WAS pump #1 was inspected during membrane work and it revealed no abnormalities and SBR refilling began. On Oct. 10, SBR#1 was checked for uniform and complete aeration as soon as water level was above membranes.

In October, high winds and heavy rains resulted in power outages at the plant and four lift stations. The operator on stand-by dealt with equipment resets and monitored operations throughout the night and into the next morning.

In November, there were several after hour call-outs, including aeration valve #2 fail to close alarm and aeration valve #2 leak alarm, requiring adjustments to correct the issues. On November 7, a replacement aeration valve actuator # 2 was installed.
During the month, cooler temperatures continued to challenge operations. Food to microorganism ratio was impacted and mixed liquor suspended solid concentration was lowered to compensate.

Storms and high winds caused power outages at Sunriver, Sooke Road and Helgesen Road lift stations.

In November, operators made necessary repair to the polymer feed system. The polymer system positive displacement pump required servicing. Also, operators found biosolids dewatering process was not normal. The polymer feed pump required regular clearing, as the last batch of polymer delivered contained partially congealed polymer, which tends to clog the feed pump.

On November 15, the on-call operator responded to an aeration valve #2 leak alarm. The depressurization solenoid was found to be frozen in the sub-zero temperatures. Once the solenoid was thawed, it returned to normal operation. A spare solenoid was ordered for spare parts inventory.

Heavy rains, over four days, doubled flows to the treatment plant. Extra effort was required to accommodate the increased flows and maintain quality effluent.

In December, UV lamps and sleeves were replaced in modules of bank "B" as per preventative maintenance calendar.

On December 4, the lead hand operator participated in an EPCOR Safety Summit webinar.

During December, cooler temperatures necessitated that outside water supplies and portable pumps be drained to prevent freezing as temperatures dropped below zero degrees. Heavy rains caused high flows to the treatment plant and operators responded to high level UV channel alarms. Influent gates were raised to accommodate substantially increased flows. The on-call operator enacted a "working alone" procedure by staying in contact with the alarm company throughout the night. Changes to process were made to increase the number of decants which helped tp move the higher flows through the plant. Additional TSS tests were conducted to confirm effluent quality was maintained.

On December 19, an operator attended Confined Space Entry training course.

On December 23 and, 24, solids dewatering operations were increased to provide additional digester storage capacity over the holidays.

On December 30, operators continuing to decrease sludge volume in reactors to compensate for slower bacterial metabolization that occurs with lowered temperatures.

On December 31, sub-zero temperatures caused an air depressurization solenoid in an SBR reactor to freeze. The on-call operator attended the plant and found power supply to winter heat tape had "tripped out" due to recent wet weather. Power was restored and there were no further issues with freezing.

LIFT STATIONS

Regular maintenance was conducted at the stations throughout the year including inspections and generator run tests. Wet well cleaning, generator servicing, load tests, pump inspections and servicing were completed as part of the annual maintenance.

In January, Sooke Road lift station pump #2 was reinstalled after being rebuilt and tested.

On January, all alarm dialers at all lift stations were tested. On January 31, odour control chemical at Sunriver lift station was increased to assist with odour control while Sooke Rd. odour control equipment was out of service. Also, operators lowered pump start setpoints at Sooke Road lift station to keep wastewater fresher until pelletized carbon shipment arrived. A repaired motor was later reinstalled to the odour equipment.

In February, routine checks revealed a small leak on a piece of forcemain in West Coast Road lift station valve chamber. Also, faulty hour meters were discovered during routine checks at West Coast Road and Prestige lift stations.
On February 18, operators responded to a hydro power interruption which caused West Coast Road, Helgesen and Sunriver lift station pumps to fault. The same day, operators responded to fallen limbs from trees that interrupted power to Sunriver lift station.

On March 7, following a pump fault alarm at Prestige Hotel, a contractor was called to pull the pump. He found a rag stuck in the impellor, cleared the obstruction and reinstalled pump. Again on March 17, an alarm at Prestige Hotel necessitated a contractor call-out to pull pump again and remove another rag that was in the impellor. Prestige management was contacted to apprise them of the issue.
A welding contractor made repairs to a minor forcemain leak at West Coast Road valve chamber in March. He found loose bolts in valve chamber flanges, spool, etc. After tightening, all other lift stations were followed up on to ensure all bolts were torqued to manufacturers' specifications.

In April, wetwells at Sunriver, Sooke Road, Helgesen Road, West Coast Road were cleaned with vacuum truck services between 12:30 am and 05:30 am.
A contractor did annual service work to the standby generator at Prestige Hotel lift station. Additional work included installation of a new block heater and overflow tank, and a valve adjustment
ATS operation was tested, as were the generators at Sunriver, Sooke Road, Helgesen Road, West Coast Road. Batteries were replaced in standby power generators at Sunriver and Helgesen Road lift stations. Operators performed auto-dialer checks.
In April, operators tested and checked float and LIT operation at West Coast Road. They also load tested batteries and operated ATS at Mariner's Village lift station.

In May, odour control equipment at Sooke Road lift station was emptied, cleaned and refilled with new carbon.
The Sooke Road pump #1 had impellor and wear ring replaced.
Annual pump inspections were completed at all lift stations. Three pumps were found to be in need of repairs to typical parts (wear rings/impellors).
On May 26, an operator responded to a high level alarm at the Prestige Hotel lift station and found the LIT to be faulty. An electrical contractor was called out after hours and the work was completed.

In June, operators worked with EPCOR SCADA specialists, to troubleshoot Mariner's Village PLC communication fault, using elimination process to determine cause.
EPCOR programmers looked into routers and modems functions. Telus technicians confirmed data transfer on ADSL lines. Also, EPCOR specialists confirmed data transfer on lines from the

plant concentrator to lift station. It was determined that there was no response from lift station communication equipment. Electrical connection to SCADAPACK at the Mariner's Village lift station was re-secured, tested and proved to be the issue.
As part of preventative maintenance calendar work continued, a contractor performed loadbanking for the standby power generators at all lift stations as well as the onsite standby power generator.

On July 2, notification was made to the District of Sooke regarding the deteriorating road conditions at Mariner's Village lift station.
Carbon was replaced in the odour control equipment at West Coast Road lift station on July 3, in response to odour concern from a nearby property owner.
On July 16, UPS batteries were replaced at Sooke Road, Sunriver, West Coast Road and Helgesen lift stations.
As a safety precaution, on July 25, a contractor installed a remote keypad for VFD operations for pump #2 at Helgesen Road lift station. The installation of pump VFD remote resets will be performed at Sooke, Helgesen (pump #1), and West Coast road pumps in 2015.
Alarms for high levels in the wetwell were triggered at the Prestige Hotel lift station on July 25 when the Prestige Hotel drained their pool after hours. An operator responded to ensure both pumps were running and monitored until the wetwells reached a safe level.
With sports fishing at its busiest, there were more vehicles parked at the Mariner's village lift station. Access to the lift station must be continually maintained 24/7 in the even of an emergency. Brush was cleared around the "Do Not Block Access" sign and "No Parking" notices were prepared and will be distributed as necessary.
Throughout July, a recently planted cedar tree hedge was watered regularly at Sooke Road lift station, as a customer service initiative.

In August, an operator was called out after hours for PLC communication fault for Mariner's Village and Prestige Hotel lift stations.
On August 31, operators received a call from Prestige Hotel saying the pool will be drained so that an operator could be in attendance to monitor the lift station. The wetwell reached high levels during the drain and Prestige staff had to adjust the flow periodically. The plant and lift station were monitored and alarms were cleared.

In September, operators followed up on odour concerns from a resident at Sooke Road lift station. Odours were present and operators increased odour control chemical upstream of the lift station. Also carbon was changed in the odour control equipment.
A contractor manufactured and installed venting louvres on the standby power generator kiosk at Prestige Hotel for improved cooling efficiency. The generator requires re-loadbanking to determine increased power output capability.
On September 23, an operator attended a low pressure system connection to forcemain, closed a valve to isolate the area of the new connection and ensured normal flows were restored.

In October, routine lift station checks found a leaking check valve at Helgesen Road lift station. Operators took spare parts from shop and made repairs immediately.

A level indicator at Prestige Hotel malfunctioned and a contractor was brought out after hours to install a replacement from the spare parts inventory. Heavy winds and rain caused a power outage at the Sunriver lift station. The standby generator started and the on-call operator attended to confirm the lift station pumps were working. Several days later, standby power generators were started and tested at Sunriver and Helgesen lift stations. Automatic Transfer Switches (ATS) were also tested. Routine checks found a level indicator at Sunriver was being interfered with by a strain relief cable and necessary repairs were made. Auto dialers were checked at Sunriver, Sooke Road, Helgesen Road and West Coast Road lift stations.

In November, routine lift station checks found a leaking check valve at Sooke Road. Operators made necessary repairs to check valve #2 to put line back in service. Checks at Sunriver were performed to confirm auto-dealer operation. Helgesen Road lift station was checked during wet weather, as increased pump starts were noted in trends. Operators confirmed proper check valve function.
On November 7, an electrical contractor confirmed ATS test procedures at Sooke Road, and Sunriver lift stations. ATS testing revealed a pump fault condition when power transfers from utility to standby. On November 10, operators attended Sunriver lift station for trouble-shooting ATS operation. They pinpointed which alarms were caused during operation of ATS and relayed the info to electrical contractor to prioritize the repair.
On Nov.14, operators assisted a development contractor with the commissioning of a new lift station at Journey/Ecole Poirier Schools. The developer opened isolation valves to accommodate new flows from schools' connections and confirmed pump rotation.
On November 21, an EPCOR Senior Control Technician was on site to address PLC updates for Sunriver, West Coast Road and Prestige Hotel lift stations as well as PLC battery changes and firmware updates to the plant.
A contractor installed equipment to prevent fault condition during power transfer from utility to standby at Sunriver.
Operators cleaned level indicators at Sooke, West Coast and Helgesen Road on Nov.27 as grease was noted at last cleaning.

In December, routine lift station checks included high level float "dial-out" confirmation for four lift stations.
Prestige Hotel wetwell grease build-up had been increasing. Operations made use of vacuum truck availability to clean the wetwell at the Prestige Hotel. Wetwell level indicators were also cleaned. Wetwell pumps "air-locked" as a result of the cleaning but were quickly remedied.
On December 8, a contractor installed additional timers at Sunriver lift station to prevent pump "no-run" condition experienced when power transfers from utility to stand-by.

COLLECTION SYSTEM

Operators, on routine inspections, observed a broken service connection and overflow condition. Prompt action found a nearby vacuum truck. The blockage cleared and the service connection flow restored. This work was out of scope and due to abnormal circumstances.

In February, operators installed missing bolts in manhole lid in the Townsend Road storm pond. Operators installed brooks box and lid to IC on Phillips Road, near Sunriver lift station.

In March, operators were called out to clear blocked IC.

In April, operators corrected an IC installation at Stonecreek Place and installed a concrete brooks box and steel lid.
Camera work inspection of the complete gravity flow system in the Helgesen catchment area was done as part of ongoing I/I investigations. Some grease deposits were noted in the area and a vacuum/flush truck was contracted to flush the lines.
There was follow up to concerns from a resident within the low pressure system found that a suspect check valve at the connection to the municipal system was functioning correctly. Through several tests of the system, operators determined the problem was within private property.

On June 17, a request for service was received from the District of Sooke for odour concerns at French Road. Operators plugged the manhole lid in the area where the forcemain turns to gravity flow, recorded concerns and completed the request for service form.

On July 10 a request for service was completed and returned to the District of Sooke. It involved IC repairs and a brooks box with lid installation completed at a private residence on Churchill Drive.

On Aug. 29, an operator attended a connection tie-in along new Grant Road connector. No issues were noted and the completed connection inspection data sheet will be forwarded to the District.

In September, odour concerns in French Road N. area had operator investigating. One solution was to install air admittance valves at address of concern and issue is being monitored.
A Standard Operating Procedure (SOP) was created for entering cleaning equipment into gravity mains as per WorksafeBC.
On September 22, a request for service was received from the District office for a backed up IC at residence. Operator attended, removed broken lid pieces from IC bottom which restored flow. A new IC collar and lid was installed.

In October, operators witnessed a new connection to the low pressure system on Townsend Road.
October 20 – An EPCOR operator was brought in from southern Alberta to assist operations with manhole inspections. 171 inspections were completed to date, with very few requiring minor work.
On Oct.28, operators checked manholes downstream of Ayre Manor for possible blockage as the maintenance person from the facility called EPCOR to report wastewater and stormwater backing up on site. No issues were detected within the municipal system.

On Dec.7, the weekend on-call operator received contact from a resident about suspicious leakage from a manhole near his backyard. Operators attended, confirmed an overflow was occurring and tried, unsuccessfully, to clear blockage with hand tools. A vacuum/flushing truck was called in. A call was made to BC One and it was arranged that an on-call Fortis representative attend, locate and mark all underground gas services in area. Fortis confirmed there was no risk of the sewer line being cross-bored by gas service line. Flush equipment was then authorized to enter the sewer line. Blasted rock from construction area upstream was found to have entered the sewer pipe and ultimately blocked the next manhole downstream. Crews worked several hours to restore partial flow by removing some rocks. A contractor returned to the manhole site to perform a confined space entry and remove the remaining rocks. The sewer line was flushed again and full unobstructed flow was confirmed. Operators followed up at the manhole overflow area to restore condition of landscaping in resident's backyard.

On December 12, as per agreement, Prestige Hotel staff notified the on-call operator that the swimming pool was being drained. The wetwell had reached high level alarm setpoint as operator arrived. An operator and hotel maintenance staff monitored flows to prevent wetwell overflow.

Inflow and Infiltration (I/I)

Infiltration and Inflow allowance (I/ I) is a typical allowance which is factored into sanitary sewer systems at design. It represents infiltration of unwanted stormwater into the sanitary sewer system which is an unavoidable occurrence, regardless of the age of the system. Stormwater infiltrates the system via a number of points, such as manholes (manhole lids have lifting holes which allow stormwater in), potential cross connections (homeowners may incorrectly connect their home drainage infrastructure into the sanitary service), lift station hatches and pipe joints, manhole walls, or pipes. New systems typically have low I/ I values, but these values increase as the system ages. EPCOR has a systematic program of identifying new and significant sources of I/I and minimize this flow from the collection and treatment stream.

During the year, the inflow and infiltration investigation program was ongoing to monitor the system for I/I sources. This included camera inspection of the gravity flow system in the Helgesen catchment area and manhole inspections in the west side of the sanitary sewer system.

Maintenance

Continuous and ongoing maintenance of the treatment plant and lift station equipment was conducted throughout the year. Equipment inspections, preventative maintenance and repairs were completed. These activities included the following:

- Backup power generator monthly run tests and annual load testing
- Lift station inspections and annual maintenance
- DO probe calibrations and maintenance
- Oil changes for rotating equipment such as digester blowers, SBR blowers, SBR decanter gearboxes

- Regular greasing schedules for all rotating equipment
- Upgrades to communication systems
- Digester blower belt changes
- Annual maintenance of UV lamps and channel
- Annual pump inspections
- Annual wetwell cleaning
- Annual loadbanking - 7 lift station generators
- Backflow Preventers & Annual Fire Equipment Inspection
- PLC maintenance

Basic Service work and repairs, outside of the Asset Renewal Fund, included:

- UV channel cleaning
- Gas alarm calibration in the headworks building
- Repaired bar screen brush in headworks
- Drained and cleaned grit vortex; removed accumulated grit, rags, rocks and other debris
- Installed new motor and spare gearbox on grit removal vortex equipment
- Repairs to biosolids bin
- Bearings replaced in centrifuge main motor
- Installed recently repaired exhaust fan on centrifuge room
- Installed replacement level indicator in SBR#2
- UV sensor in Bank “A” of UV system was replaced
- Waste pumps inspected
- Rebuilt sludge pump #2 in centrifuge room
- Serviced main gate locks and headworks door lock
- Odour control equip/new carbon Sooke Road
- Fuel tanks filled in all standby generators
- Manhole overflow @ Stone Creek Place
- Various IC repairs

Completed Non-Capital Improvements & Asset Renewal Works included the following:

- SBR#1 aeration valve actuator replacement
- Outfall dive debris removal
- Sooke Road pump #2 repairs
- WWTP SBR PLC failure repairs
- SBR#2 aeration valve alarm repairs
- UV channel repairs
- Receiving Environment Monitoring Plan

Audits & Inspections

As part of EPCOR's commitment to quality, there are a variety of audits and inspections that are conducted as a regular part of the operations.

The Sooke Fire Department performed the annual fire inspection of the treatment plant on February 28. The operation was deemed to be in good shape and there were no deficiencies to report.

On July 17, a contractor was on site to complete annual HVAC system inspection and service work.

On August 2, Quality Assurance Specialists from EPCOR were onsite on for the annual internal laboratory audit. This audit is to ensure laboratory tests and procedures are being conducted as per EPCOR's Standard Operating Procedures (SOPs) and laboratory equipment is assessed to verify accuracy.

Western Canada Fire Protection performed the annual testing of all backflow preventers at the treatment plant and all lift stations on August 19. They also completed all fire equipment testing, including fire extinguishers, emergency lighting and alarms.

CUSTOMER SERVICE

Customer Inquiries

EPCOR operates a customer service phone line to address concerns and answer questions for the District of Sooke. In 2014, a total of 28 new inquiries were recorded (summarized in Table 5).

Table 5– 2014 Customer Calls

Customer Query Types	Comments	Year-To-Date
Odour	• Report of odour at Sooke Road Lift Station (1) • Report of odour at Sunriver Lift Station (1) • Report of odour from manhole (1) • Odours from private properties/ internal plumbing issues (3)	6
Pump	• Inquiries about pump alarm/repairs (10)	10
Connection	• Inquiries regarding connecting to collection system (1) • Inquiry about connection specs (1)	2
General	• Reports of plugged IC (2) • Request for information about sewer line location (1) • Report of overflow on private property (3) • Report of noise around plant (brush-clearing on reservation) (1) • Report of noise at Sunriver Lift Station (1) • Reports of toilet backing up/erupting (2)	10
TOTAL		**28**

Community Involvement

EPCOR continues to be committed to investing in communities in numerous ways, including direct contributions, sponsorships and support.

In 2014, EPCOR supported the community of Sooke with continued annual support to the:

- Sooke Salmon Enhancement Society
- Sooke Branch of Royal Canadian Legion Poppy Campaign
- Sooke Harbourside Lions 24-hour Relay Team – Camp for Kids With Disabilities
- Sooke Chamber of Commerce Santa Parade

EPCOR also participated and /or contributed to the:

- Sooke Rotary Spring Fair and Auction
- 9th Annual Consultants' Invitational Fishing Derby
- Shaw Ocean Discovery Centre
- Communities in Bloom presentation

.

APPENDICES

1. Monthly Data Summary
2. Sooke Outfall August 2014 - Environmental Monitoring Report

JANUARY 2014 MONTHLY DATA

INFLUENT

Jan.	Effluent flow (m³/d)	IN HOUSE pH	IN HOUSE TSS (mg/L)	IN HOUSE COD (mg/L)	EXTERNAL COD (mg/L)	EXTERNAL BOD (mg/L)	EXTERNAL TSS (mg/L)	EXTERNAL NH3-N (mg/L)	EXTERNAL TP (mg/L)	EXTERNAL Conductivity (µS/cm at 25 C)	EXTERNAL Surfactants (mg/L)
1	1950										
2	2078										
3	2613	7.5	150	474							
4	2175										
5	2167										
6	2050	7.5	465	1023							
7	2049										
8	2146	7.8	215	624	534	166	315	32	7.2	523	1.48
9	2172										
10	2369	7.8	250	363							
11	4385										
12	3934										
13	3693	7.5	70	145							
14	3427										
15	2895	7.9	175	488							
16	2481										
17	2291	7.6	210	273							
18	2173										
19	2116										
20	1996	7.6	195	402							
21	1967										
22	1996	7.6	255	520	465	143	234	33	8.0		
23	1990										
24	1749	7.8	155	510							
25	1822										
26	1871										
27	1758	7.8	230	617							
28	1758										
29	2058	7.9	250	523							
30	2155										
31	2135	7.7		290							
Min	1749	7.5	70	145	465	143	234	32	7.2	523	1.48
Max	4385	7.9	465	1023	534	166	315	33	8.0	523	1.48
Avg	2336	7.7	218	481	500	155	275	33	7.6	523	1.48

SBR 1 EFFLUENT

Jan.	IN HOUSE pH	IN HOUSE TSS (mg/L)	IN HOUSE COD (mg/L)	IN HOUSE Calculated Un-ionized NH3-N (mg/L)	EXTERNAL COD (mg/L)	EXTERNAL TSS (mg/L)	EXTERNAL CBOD (mg/L)	EXTERNAL NH3-N (mg/L)	EXTERNAL Temp (°C)	EXTERNAL pH	EXTERNAL NH3-N (un-ionized)* (mg/L)	EXTERNAL TP (mg/L)	EXTERNAL *Enterococci* (CFU/100mL)	EXTERNAL FC (CFU/100 mL)
1														
2		8												
3	6.7	7	21	0.0070										
4														
5														
6	6.7	5	56	0.0096										
7														
8	6.8	11	17	0.0097	32	8	<4	5.08	15.0	6.71	<0.02	1.96	35	22
9														
10	6.7	9	16	0.0045										
11														
12														
13	6.6	8												
14														
15	6.6	8	39	0.0047										110
16														
17	6.6	8												
18														
19														
20	6.6	12		0.0138										
21														
22	6.8	10	57	0.0152	59	14	7	6.84				2.16		109
23														
24	6.6	16												
25														
26														
27	6.7	18	81	0.0142										
28														
29	6.8	16	92	0.0225										207
30														
31	6.8	14												
Min	6.6	5	16	0.0045	32	8	<4	5.08	15.0	6.71	<0.02	1.96	35	22
Max	6.8	18	92	0.0225	59	14	7	6.84	15.0	6.71	<0.02	2.16	35	207
Avg	6.7	11	47	0.0112	46	11	4	5.96	15.0	6.71	<0.02	2.06	35	86

SBR 2 EFFLUENT

Jan.	IN HOUSE pH	IN HOUSE TSS (mg/L)	IN HOUSE COD (mg/L)	IN HOUSE Calculated Un-ionized NH3-N (mg/L)	EXTERNAL COD (mg/L)	EXTERNAL TSS (mg/L)	EXTERNAL CBOD (mg/L)	EXTERNAL NH3-N (mg/L)	EXTERNAL Temp (°C)	EXTERNAL pH	EXTERNAL NH3-N (un-ionized)* (mg/L)	EXTERNAL TP (mg/L)	EXTERNAL *Enterococci* (CFU/100mL)	EXTERNAL FC (CFU/100 mL)
1														
2	10.2													
3	6.5	8	15	0.0017										
4														
5														
6	6.5	<4	51	0.0036										
7														
8	6.5	9	19	0.0032	44	6	<4	3.32	15.0	6.70	<0.02	1.60	26	28
9														
10	6.6	9	1	0.0011										
11														
12														
13	6.7	5												
14														
15	6.6	5	37	0.0022										32
16														
17	6.5	6												
18														
19														
20	6.7	6		0.0106										
21														
22	6.8	5	53	0.0136	53	9	<4	5.16				1.99		46
23														
24	6.6	16												
25														
26														
27	6.7	11	68	0.0142										
28														
29	6.5	20	80	0.0072										72
30														
31	6.4	21												
Min	6.4	<4	1	0.0011	44	6	<4	3.32	15.0	6.70	<0.02	1.60	26	28
Max	10.2	21	80	0.0142	53	9	<4	5.16	15.0	6.70	<0.02	1.99	26	72
Avg	6.8	10	41	0.0064	49	8	<4	4.24	15.0	6.70	<0.02	1.80	26	42

Note: Monthly average reported for fecal coliforms is a geometric mean. Proposed OC limits <45 mg/L for TSS/CBOD. External testing done by an ISO 17025 accredited Lab, EXOVA , Surrey, BC

FEBRUARY 2014 MONTHLY DATA

INFLUENT

		IN HOUSE			EXTERNAL						
	Effluent flows	pH	TSS	COD	COD	BOD	TSS	NH3-N	TP	Conductivity	Surfactants
Feb.	m³/d		mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	μS/cm at 25 C	mg/L
1	2125										
2	2064										
3	1991	7.8	165	497							
4	1933										
5	1903	7.4	280	591	583	157	292	38	7.4	490	2
6	1753										
7	1715	7.8	260	522							
8	1776										
9	1731										
10	1892	7.6	15	359							
11	1910										
12	2095	7.8	235	519							
13	2448										
14	2281	7.7	155	397							
15	2344										
16	2867										
17	4036	7.7	150	416							
18	3696										
19	3501	6.8	235	345	383	122	152	20			
20	3579										
21	2850	6.7	125	507							
22	2674										
23	3245										
24	3109	7.7	105	272							
25	3328										
26	2852	7.8	150	262							
27	2390										
28	2308	7.8	180	505							
Min	1715	6.7	15	262	383	122	152	20	7.4	490	2
Max	4036	7.8	280	591	583	157	292	38	7.4	490	2
Avg	2514	7.5	171	433	483	140	222	29	7.4	490	2

SBR 1 EFFLUENT

	IN HOUSE					EXTERNAL									
	pH	TSS	COD	NH3-N	Cal-culated Un-ionized NH3-N	COD	TSS	CBOD	NH3-N	Temp	pH	NH3 (un-ionized) *	TP	*Enter-ococci*	FC
Feb.		mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	°C		mg/L	mg/L	CFU/ 100mL	CFU/ 100mL
1															
2															
3	6.8	12		18	0.0342										
4															
5	7.0	9	53	19	0.0479	59	8	5	15.7	15	6.73	<0.05	2.02		172
6															
7	6.9	8		19	0.0384										
8															
9															
10	6.9	9	57	25	0.0494										
11															
12	7.0	8	62	17	0.0483									460	1110
13															
14	6.8	7	48	15	0.0261										
15															
16															
17	6.8	8	47	11	0.0184										
18															
19	6.5	4	52	8	0.0076	38	6	5	7.45		6.56				310
20															
21	6.5	5		8	0.0076										
22															
23															
24	6.7	4	47	14	0.0176										
25															
26	6.7	5	41	11	0.0135										88
27															
28	6.7	<4													
Min	6.5	<4	41	8	0.0076	38	6	5	7.45	15	6.56	<0.05	2.02	460	88
Max	7.0	12	62	25	0.0494	59	8	5	15.7	15	6.73	<0.05	2.02	460	1110
Avg	6.8	7	51	15	0.0281	48.5	7	5	11.6	15	6.65	<0.05	2.02	460	269

SBR 2 EFFLUENT

	IN HOUSE					EXTERNAL									
	pH	TSS	COD	NH3-N	Cal-culated Un-ionized NH3-	COD	TSS	CBOD	NH3-N	Temp	pH	NH3 (un-ionized) *	TP	*Enter-ococci*	FC
Feb.		mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	°C		mg/L	mg/L	CFU/ 100mL	CFU/ 100mL
1															
2															
3	6.6	31		5	0.0060										
4															
5	6.8	35	93	11	0.0172	98	25	9	7.34	15	6.58	<0.05	2.78		114
6															
7	6.8	30		17	0.0266										
8															
9															
10	6.9	24	98	24	0.0538										
11															
12	6.9	22	71	36	0.0753									430	800
13															
14	6.9	14	65	21	0.0399										
15															
16															
17	6.8	14	50	2	0.0032										
18															
19	6.8	10	51	8	0.0131	51	10	7	7.54		6.66				8
20															
21	6.5	9		8	0.0074										
22															
23															
24	6.8	5	50	17	0.0271										
25															
26	6.7	4	32	10	0.0126										172
27															
28	6.7	4		8											
Min	6.5	4	32	2	0.0032	51	10	7	7.34	15	6.58	<0.05	2.78	430	8
Max	6.9	35	98	36	0.0753	98	25	9	7.54	15	6.66	<0.05	2.78	430	800
Avg	6.7	17	64	14	0.0257	75	18	8	7.44	15	6.62	<0.05	2.78	430	106

Note: Monthly average reported for fecal coliforms is a geometric mean. Proposed OC limits <45 mg/L for TSS/CBOD. External testing done by an ISO 17025 accredited Labs: EXOVA , Surrey, BC and Maxxam Analytical, Victoria, BC.

MARCH 2014 MONTHLY DATA

		INFLUENT									SBR 1 EFFLUENT														SBR 2 EFFLUENT													
		IN HOUSE			EXTERNAL						IN HOUSE					EXTERNAL									IN HOUSE					EXTERNAL								
	Effluent flows	pH	TSS	COD	COD	BOD	TSS	NH3-N	TP	pH	TSS	COD	NH3-N	Cal-culated Un-ionized NH3	COD	TSS	CBOD	NH3-N	NH3-N (unionized)*	Temp	pH	TP	FC	pH	TSS	COD	NH3-N	Cal-culated Un-ionized NH3	COD	TSS	CBOD	NH3-N	NH3-N (unionized)*	Temp	pH	TP	FC
Mar.	m³/d		mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L		mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	°C		mg/L	CFU/100 mL		mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	°C		mg/L	CFU/100 mL
1	2159																																				
2	2199																																				
3	2205	7.8	195	470						6.8	4	34	13	0.0209										6.7	6	27	12	0.0183									
4	2284																																				
5	3150	7.7	145	300	367	136	156	18.4	5.01	6.9	4	43	14	0.0294	44	5	5	9.8	<0.05	15	6.60	1.74	286	6.9	7	44	10	0.0216	36	6	5	7.2	<0.05	15	6.47	1.60	68
6	4284																																				
7	3601	7.6	133	350						6.7	<4		4	0.0059										6.6	4		4	0.0042									
8	3050																																				
9	3902																																				
10	3145	7.7	113	374						6.7	4	36	8	0.0096										6.7	6	40	8	0.0096									
11	2711																																				
12	2402	7.7	130	260						6.6	<4	17	7	0.0085										6.6	5	30	10	0.0102									
13	2092																						12														32
14	2364	7.7	170	335						6.7	<4		8	0.0103										6.6	4		7	0.0082									
15	2558																																				
16	4021																																				
17	3310	7.6	103	224						6.7	4		5	0.0055										6.7	4		5	0.0063									
18	2643																																				
19	2682	7.7	110	179	295	106	136	20.4	5.23	6.8	<4	22	7	0.0111	36	<2	<4	4.4		15	6.48	1.54	24	6.7	4	40	5	0.0065	47	3	4	3.35		15	6.45	1.79	42
20	2235										4														<4												
21	2358									6.8	4	75	11	0.0206		4	<4						42	6.6		162	5	0.0058		4	<4						58
22	2136																																				
23	2129																																				
24	2054	7.7	160	483						6.7	<4	28	9	0.0135										6.6	4	32	8	0.0087									
25	1967																																				
26	2240	7.1	195	420						6.4	<4	38	6	0.0038									24	6.7	6	48	3										72
27	2051																																				
28	1945	7.2	155	314						7.2	<4		5	0.0213										6.5	<4		2										
29	2126																																				
30	2195																																				
31	2156	6.9	163	394						6.5	2	36												6.9	4	50											
Min	1945	6.9	103	179	295	106	136	18.4	5.01	6.4	<4	17	4	0.0038	36	<2	<4	4.4	<0.05	15	6.48	1.54	12	6.5	<4	27	2	0.0042	36	3	<4	3.35	<0.05	15	6.45	1.60	32
Max	4284	7.8	195	483	367	136	156	20.4	5.23	7.2	4	75	14	0.0294	44	5	5	9.8	<0.05	15	6.60	1.74	286	6.9	7	162	12	0.0216	47	6	5	7.2	<0.05	15	6.47	1.79	72
Avg	2592	7.5	148	342	331	121	146	19.4	5.12	6.7	4	37	8	0.0134	40	4	4	7.1	<0.05	15	6.54	1.64	59	6.7	<4	53	7	0.0099	42	4	4	5.28	<0.05	15	6.46	1.70	48

Note: Monthly average reported for fecal coliforms is a geometric mean. Proposed OC limits <45 mg/L for TSS/CBOD. External testing done by an ISO 17025 accredited Lab, EXOVA , Surrey, BC

APRIL 2014 MONTHLY DATA

		INFLUENT								SBR 1 EFFLUENT														SBR 2 EFFLUENT													
		IN HOUSE			EXTERNAL					IN HOUSE					EXTERNAL									IN HOUSE					EXTERNAL								
	Effluent flows	pH	TSS	COD	COD	BOD	TSS	NH3-N	TP	pH	TSS	COD	NH3-N	Cal-culated Un-ionized NH3-N	COD	TSS	CBOD	NH3-N	Temp	pH	NH3 (unionized)*	TP	FC	pH	TSS	COD	NH3-N	Cal-culated Un-ionized NH3-N	COD	TSS	CBOD	NH3-N	Temp	pH	NH3 (unionized)*	TP	FC
April	m³/d		mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L		mg/L	mg/L	mg/L		mg/L	mg/L	mg/L	mg/L	°C		mg/L	mg/L	CFU /100mL		mg/L	mg/L	mg/L		mg/L	mg/L	mg/L	mg/L	°C		mg/L	mg/L	CFU/ 100mL
1	1998																																				
2	2025	6.6	187	495						6.5	<4	20	0.6	0.0006									16	7.1	4	35	1.4	0.0044									44
3	1807																																				
4	1778	6.9	207	338						6.5	<4		0.0											7.0	4		0.4										
5	1875																																				
6	1928																																				
7	1962	7.0	197	437						6.8	<4	37	0.2	0.0003										7.0	4	25	1.2	0.0035									
8	1879																																				
9	1784	7.1	107	533	563	229	266	38	8.60	6.8	<4	33	0.9	0.0015	44	<3	<4	0.09	15	6.34	<0.05	3.04	28	6.7	5	22	3.8	0.0054	54	4	<4	1.05	15	6.34	<0.05	3.37	38
10	1890																																				
11	1701	7.8	240	570						6.5	<4	47												6.5	<4	25	4.2	0.0033									
12	1728																																				
13	1805																																				
14	1734	7.7	183	537						6.6	<4		0.1	0.0001										6.7	<4		2.9	0.0037									
15	1754																																				
16	1751	7.9	255	673						6.7	6	15											20	6.5	7	27	0.0										15
17	2301																																				
18	2300																																				
19	2079																																				
20	2055	7.5	100	253						6.6	<4		0.1	0.0001										6.6	<4		1.4	0.0015									
21	2051																																				
22	1996																																				
23	1983	7.7	230	404	444	114	234	33	8.62	6.8	<4	40	0.4	0.0006	46	<3	<4	0.13	15	6.52		3.02	40	6.8	4	49	4.0	0.0076	54	5	5	0.84	15	6.53		3.28	76
24	2114																																				
25	2146	7.8	190	477						6.6	<4		0.2	0.0002										6.7	4		4.0	0.0055									
26	1981																																				
27	2255																																				
28	2299	7.8	153	453						6.6	<4	38	0.8	0.0009										6.6	<4	30	4.1	0.0045									
29	2097																																				
30	2086	7.7	237	469						6.6	<4	33											22	6.6	4	49											44
Min	1701	6.6	100	253	444	114	234	33	8.60	6.5	<4	15	0.0	0.0001	44	<3	<4	0.09	15	6.34	<0.05	3.02	16	6.5	<4	22	0.0	0.0015	54	4	<4	0.84	15	6.34	<0.05	3.28	15
Max	2301	7.9	255	673	563	229	266	38	8.62	6.8	6	47	0.9	0.0015	46	<3	<4	0.13	15	6.52	<0.05	3.04	40	7.1	7	49	4.2	0.0076	54	5	5	1.05	15	6.53	<0.05	3.37	76
AVG	1971	7.4	190	470	504	172	250	36	8.61	6.6	4	33	0.4	0.0005	45	<3	<4	0.11	15	6.43	<0.05	3.03	24	6.7	5	33	2.5	0.0044	54	5	4	0.95	15	6.44	<0.05	3.33	38

Note: Monthly average reported for fecal coliforms is a geometric mean. Proposed OC limits <45 mg/L for TSS/CBOD. External testing done by an ISO 17025 accredited Lab, EXOVA , Surrey, BC

MAY 2014 MONTHLY DATA

INFLUENT

		IN HOUSE			EXTERNAL						
	Effluent flows	pH	TSS	COD	COD	CBOD	TSS	NH3-N	TP	Conductivity	Surfactants
May	m³/d		mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	µS/cm at 25 C	mg/L
1	1856										
2	1813	7.8	195	294							
3	1825										
4	2074										
5	2309	7.8	240	430							
6	2155										
7	1948	7.8	240	485	577	235	257	38	8.6	641	2
8	2080										
9	1927	7.8	195	344							
10	1929										
11	1958										
12	1901	7.8	193	482							
13	1846										
14	1811	7.7	210	574							
15	1695										
16	1636	7.9	220	503							
17	1659										
18	1680										
19	1849	7.4	170	542							
20	1712										
21	1749	7.6	305	609							
22	1650										
23	1646	7.7	380	770							
24	1617										
25	1667										
26	1637	7.9	295	680							
27	1644										
28	1513	7.8	425	738	698	263	343	50	10.1		
29	1647										
30	1630	7.7	360	746							
31	1542										
Min	1513	7.4	170	294	577	235	257	38	8.6	641	2
Max	2309	7.9	425	770	698	263	343	50	10.1	641	2
AVG	1794	7.7	264	554	638	249	300	44	9.4	641	2

SBR 1 EFFLUENT

	IN HOUSE					EXTERNAL									
	pH	TSS	COD	NH3-N	Cal-culated Un-ionized NH3	COD	TSS	CBOD	NH3-N	Temp	pH	NH3 (unionized)*	TP	*Enter-ococci*	FC
May		mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	°C		mg/L	mg/L	CFU/ 100mL	CFU/ 100mL
1															
2	6.6	<4		1.2	0.0013										
3															
4															
5	6.7	4		0.5	0.0008										
6															
7	6.6	<4		0.3	0.0003	47	<3	5	0.3	15	6.23	<0.05	3.08		48
8															
9	6.6	<4	34												
10															
11															
12	6.7	4		1.3	0.0018										
13															
14	6.5	<4	20	0.9	0.0008										32
15															
16	6.7	4													
17															
18															
19	6.6	<4													
20															
21	6.7	4	26	1.0	0.0012									20	30
22															
23	6.7	<4	42	0.3	0.0004										
24															
25															
26	6.7	4													
27															
28	6.9	4	36	1.4	0.0028	47	3	<4	0.1	15	6.40	<0.05	4.27		84
29															
30	6.6	<4													
31															
Min	6.5	<4	20	0.3	0.0003	47	<3	<4	0.1	15	6.23	<0.05	3.08	20	30
Max	6.9	4	42	1.4	0.0028	47	3	5	0.3	15	6.40	<0.05	4.27	20	84
AVG	6.7	4	32	0.9	0.0012	47	<3	4	0.2	15	6.32	<0.05	3.68	20	44

SBR 2 EFFLUENT

	IN HOUSE					EXTERNAL									
	pH	TSS	COD	NH3-N	Cal-culated Un-ionized NH3	COD	TSS	CBOD	NH3-N	Temp	pH	NH3 (unionized)*	TP	*Enter-ococci*	FC
May		mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	°C		mg/L	mg/L	CFU/ 100mL	CFU/ 100mL
1															
2	6.6	<4		3.1	0.0013										
3															
4															
5	6.6	4		3.1	0.0008										
6															
7	6.6	4	39	1.4	0.0003	46	<3	5	0.9	15	6.31	<0.05	3.08		300
8															
9	6.6	6	38	4.7											
10															
11															
12	6.7	6		3.2	0.0018										
13															
14	6.6	8		1.8	0.0008										16
15															
16	6.6	6		2.1											
17															
18															
19	6.5	5													
20															
21	6.7	5	62		0.0012									40	64
22															
23	6.7	5	49	2.3	0.0004										
24															
25															
26	6.6	4		1.5											
27															
28	6.8	4	41	2.9	0.0028	57	<3	<4	0.4	15	5.37	<0.05	4.62		212
29															
30	6.5	<4		0.4											
31															
Min	6.5	<4	38	0.4	0.0003	46	<3	<4	0.4	15	5.37	<0.05	3.08	40	16
Max	6.8	8	62	4.7	0.0028	57	<3	5	0.9	15	6.31	<0.05	4.62	40	300
AVG	6.6	5	46	2.4	0.0012	52	<3	4	0.7	15	5.84	<0.05	3.85	40	90

Note: Monthly average reported for fecal coliforms is a geometric mean. Proposed OC limits <45 mg/L for TSS/CBOD. External testing done by an ISO 17025 accredited Labs: EXOVA , Surrey, BC and Maxxam Analytical, Victoria, BC.

JUNE 2014 MONTHLY DATA

		INFLUENT								
		IN HOUSE				EXTERNAL				
	Effluent flows	pH	TSS	COD	NH3-N	COD	CBOD	TSS	NH3-N	TP
June	m^3/d		mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
1	1650									
2	1678	7.8	230	434	>54					
3	1661									
4	1601	7.7	290	659	50					
5	1568									
6	1508	7.7	350	545	>54					
7	1539									
8	1649									
9	1573	7.8	325	780	>54					
10	1634									
11	1634	7.8	305	773	>54					
12	1560					862	271	360	55.8	9.8
13	1570	7.7	415	897	>54					
14	1553									
15	1698									
16	1827	7.7	380	823	>54					
17	1607									
18	1846	7.7	310	711	>54					
19	1601									
20	1594	7.9	310	744	54					
21	1536									
22	1638									
23	1618	7.8	340	716	>54					
24	1589									
25	1456	7.8	280	737	>54	665	106	320	56.8	11.4
26	1439									
27	1514	7.6	507	1130	>54					
28	1521									
29	1458									
30	1587	7.8	270	795	Over					
Min	1439	7.6	230	434	50	665	106	320	55.8	9.8
Max	1846	7.9	507	1130	>54	862	271	360	56.8	11.4
AVG	1597	7.7	332	750	52	764	189	340	56.3	10.6

	SBR 1 EFFLUENT												
	IN HOUSE				EXTERNAL								
	pH	TSS	COD	Cal-culated Un-ionized NH3-N	COD	TSS	CBOD	NH3-N	NH3-N (un-ionized)*	Temp	pH	TP	FC
June		mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	°C		mg/L	CFU/ 100mL
1													
2	6.7	<4		0.0007									
3													
4	6.6	<4	41	0.0008									48
5													
6	6.6	<4	15	0.0001									
7													
8													
9	6.6	<4	24	-0.0008									
10													
11	6.6	4	68	0.0021									
12					39	<3	<4	0.11	0.0005	15	7.16	4.65	14
13	6.6	<4	42	0.0006									
14													
15													
16	6.7	6		0.0004									
17													
18	6.6	<4	47	0.0001									22
19													
20	6.6	<4											
21													
22													
23	6.7	<4		0.0006									
24													
25	6.8	<4	54		49	<3	<4	0.14	0.0007	15	7.25	4.46	80
26													
27	6.5	<4											
28													
29													
30	6.6	<4											
Min	6.5	<4	15	-0.0008	39	<3	<4	0.11	0.0005	15	7.16	4.46	14
Max	6.8	6	68	0.0021	49	<3	<4	0.14	0.0007	15	7.25	4.65	80
AVG	6.6	4	42	0.0005	44	<3	<4	0.13	0.0006	15	7.21	4.56	33

	SBR 2 EFFLUENT												
	IN HOUSE				EXTERNAL								
	pH	TSS	COD	Cal-culated Un-ionized NH3-N	COD	TSS	CBOD	NH3-N	NH3-N (un-ionized)*	Temp	pH	PO_4	FC
June		mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	°C		mg/L	CFU/ 100mL
1													
2	6.6	<4		0.0006									
3													
4	6.5	<4	43	0.0011									22
5													
6	6.6	<4	63	0.0019									
7													
8													
9	6.6	<4	40	-0.0006									
10													
11	6.5	<4	72	0.0010									
12					45	<3	<4	0.40	0.0012	15	7.02	4.86	25
13	6.6	<4	45										
14													
15													
16	6.6	<4		0.0014									
17													
18	6.6	4		0.0002									28
19													
20	6.6	<4	52	0.0001									
21													
22													
23	6.6	<4											
24													
25	6.8	6	43		55	8	<4	1.26	0.0042	16	7.08	6.36	10
26													
27	6.6	4											
28													
29													
30	6.6	<4											
Min	6.5	<4	40	-0.0006	45	<3	<4	0.40	0.0012	15	7.02	4.86	10
Max	6.8	6	72	0.0019	55	8	<4	1.26	0.0042	16	7.08	6.36	28
AVG	6.6	4	51	0.0007	50	6	<4	0.83	0.0027	16	7.05	5.61	20

Note: Monthly average reported for fecal coliforms is a geometric mean. Proposed OC limits <45 mg/L for TSS/CBOD. External testing done by an ISO 17025 accredited Lab, EXOVA , Surrey, BC

JULY 2014 MONTHLY DATA

		INFLUENT								SBR 1 EFFLUENT											SBR 2 EFFLUENT										
		IN HOUSE			EXTERNAL					IN HOUSE			EXTERNAL								IN HOUSE			EXTERNAL							
	Effluent flows	pH	TSS	COD	COD	CBOD	TSS	NH_3	TP	pH	TSS	COD	COD	TSS	CBOD	NH3-N	pH	TP	*Enter-ococci*	FC	pH	TSS	COD	COD	TSS	CBOD	NH3-N	pH	TP	*Enter-ococci*	FC
July	m³/d		mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L		mg/L	mg/L	mg/L	mg/L	mg/L	mg/L		mg/L	CFU/ 100mL	CFU/ 100mL		mg/L	mg/L	mg/L	mg/L	mg/L	mg/L		mg/L	CFU/ 100mL	CFU/ 100mL
1	1457																														
2	1525	7.5	315	803						6.7	<4	53								10	6.6	<4	72								14
3	1634																														
4	1429	7.8	335	758						6.6	<4										6.7	<4									
5	1452																														
6	1483																														
7	1661	7.7	310	893						6.7	<4										6.8	<4									
8	1505																														
9	1476	7.6		890	932	248	330	49.5	10.8	6.9	<4	41	38	<3	<4	0.08	6.36	4.74		8	7.0	<4	55	40	<3	<4	0.47	6.46	3.79		12
10	1496																														
11	1418	7.9	365	798						6.8	<4										6.7	4									
12	1429																														
13	1486																														
14	1682	7.7	335	727						6.7	<4										6.7	<4									
15	1535																														
16	1521	7.7	355	941						6.7	4	40								<2	6.6	4	40								18
17	1411																														
18	1498	7.8	205	478						6.7	<4										6.6	4									
19	1464																														
20	1512																														
21	1577	7.7	180	588						6.7	<4										6.7	4									
22	1505																														
23	1603	7.7	200	847	517	161	195	59.0		6.7	4		40	<3	<4	0.12	6.31			8	6.6	6	65	47	4	<4	0.40	6.31			26
24	1437																														
25	1520	7.8	320	704						6.6	<4	45									6.6	4	64								
26	1505																														
27	1533																														
28	1584	7.7	265	622						6.7	5								10		6.6	11								10	
29	1575																														
30	1530	7.7	385	847						6.7	5	98								<2	6.6	10	45								6
31	1499																														
Min	1411	7.5	180	478	517	161	195	49.5	10.8	6.6	<4	40	38	<3	<4	0.08	6.31	4.74	10	<2	6.6	<4	40	40	<3	<4	0.40	6.31	3.79	10	6
Max	1682	7.9	385	941	932	248	330	59.0	10.8	6.9	5	98	40	<3	<4	0.12	6.36	4.74	10	10	7.0	11	72	47	4	<4	0.47	6.46	3.79	10	26
AVG	1514	7.7	298	761	725	205	263	54.3	10.8	6.7	4	55	39	<3	<4	0.10	6.34	4.74	10	5	6.7	7	57	44	<4	<4	0.44	6.39	3.79	10	14

Note: Monthly average reported for fecal coliforms is a geometric mean. Proposed OC limits <45 mg/L for TSS/CBOD. External testing done by an ISO 17025 accredited Labs: EXOVA , Surrey, BC and Maxxam Analytical, Victoria , BC for Enterococci only.

AUGUST 2014 MONTHLY DATA

		INFLUENT								SBR 1 EFFLUENT										SBR 2 EFFLUENT									
		IN HOUSE			EXTERNAL					IN HOUSE			EXTERNAL							IN HOUSE			EXTERNAL						
	Effluent flows	pH	TSS	COD	COD	CBOD	TSS	NH3-N	TP	pH	TSS	COD	COD	TSS	CBOD	NH3-N	pH	TP	FC	pH	TSS	COD	COD	TSS	CBOD	NH3-N	pH	TP	FC
Aug.	m³/d		mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L		mg/L	mg/L	mg/L	mg/L	mg/L	mg/L		mg/L	CFU/ 100mL		mg/L	mg/L	mg/L	mg/L	mg/L	mg/L		mg/L	CFU/ 100mL
1	1560	7.7	315	678						6.7	4									6.7	6	67							
2	1479																												
3	1456																												
4	1552	7.7	225	618						6.8	7	50								6.8	8	70							
5	1522																												
6	1554	7.6	135	92	492	242	280	44.7	8.36	6.7	6	37	48	5	<4	0.14	6.24	5.14	8	6.7	16	72	77	12	6	4.46	6.31	5.18	174
7	1605										<4										18								
8	1446	7.8	375	808						6.7	6	62								6.8	18	111							
9	1478																												
10	1460																												
11	1489	7.9	295	590						6.7	7									7.0	24	117							
12	1542										8										21								
13	1522	7.7	275	654						6.6	17	63							216	6.8	30	102							1130
14	1551										12										34								
15	1406	7.7								6.6	9	61								7.0	41	120							
16	1330										10																		
17	1637										10																		
18	1499	7.5	265	509						7.0	11	73								6.7	27	>150							
19	1404										12										20	103							
20	1656	7.5	345	814						7.3	11	65								6.5	16	111							
21	1439																												
22	1452	7.7	320	789						7.0	9	84								6.6	6	58							
23	1466																												
24	1504																												
25	1497	7.9	290	639						7.0	8									6.7	<4								
26	1434																												
27	1410	7.7	395	582	1140	272	343	49		7.0		25	59	4	5	11.2	6.67		22	6.8	<4	41	33	<3	<4	<0.10	6.55		<2
28	1467																												
29	1384	7.8	370	903						6.6	4									6.6	<4								
30	1389																												
31	1504																												
Min	1330	7.5	135	92	492	242	280	44.7	8.36	6.6	<4	25	48	4	<4	0.14	6.24	5.14	8	6.5	<4	41	33	12	<4	4.46	6.31	5.18	174
Max	1656	7.9	395	903	1140	272	343	49.2	8.36	7.3	17	84	59	5	5	11.2	6.67	5.14	216	7.0	41	120	77	12	6	4.46	6.55	5.18	1130
AVG	1487	7.7	300	640	816	257	312	47.0	8.36	6.8	9	58	54	5	4	5.67	6.46	5.14	34	6.7	17	88	55	12	5	4.46	6.43	5.18	443

Note: Monthly average reported for fecal coliforms is a geometric mean. Proposed OC limits <45 mg/L for TSS/CBOD. External testing done by an ISO 17025 accredited Lab, EXOVA , Surrey, BC.

SEPTEMBER 2014 MONTHLY DATA

		INFLUENT								SBR 1 EFFLUENT											SBR 2 EFFLUENT										
		IN HOUSE			EXTERNAL					IN HOUSE			EXTERNAL								IN HOUSE			EXTERNAL							
	Effluent flows	pH	TSS	COD	COD	CBOD	TSS	NH3-N	TP	pH	TSS	COD	COD	TSS	CBOD	NH3-N	pH	TP	Enter-ococci	FC	pH	TSS	COD	COD	TSS	CBOD	NH3-N	pH	TP	Enter-ococci	FC
Sept	m3/d		mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L		mg/L	mg/L	mg/L	mg/L	mg/L	mg/L		mg/L	CFU/ 100mL	CFU/ 100mL		mg/L	mg/L	mg/L	mg/L	mg/L	mg/L		mg/L	CFU/ 100mL	CFU/ 100mL
1	1504	7.8	133	476						6.7	<4										6.8	<4									
2	1471																														
3	1434										<4											<4									
4	1366																														
5	1537	7.9	335	756						6.7	4										6.9	8	40								
6	1421																														
7	1487																														
8	1392	7.7	170	618						6.7	6										6.7	<4									
9	1358																														
10	1329	7.7	260	904	1270	270	280	54	10.2	6.7	7	21	45	4	<4	0.34	6.45	2.90		20	6.8	<4	8	31	3	<4	0.12	6.53	3.30		2
11	1314																														
12	1365	7.8	205	541						6.7	4										6.7	<4									
13	1413																														
14	1468																														
15	1554	7.8	205	488						6.8	5										6.7	<4									
16	1438																														
17	1451	7.5	360	650						6.7	4										6.7	<4	29								
18	1526																														
19	1355	7.8	240	718						6.7	<4										6.7	4									
20	1468			600																											
21	1580																														
22	1410	7.8	275	985						6.7	4										6.7	<4									
23	1506																			38											8
24	1498	7.8	485	583	750	203	288	55	9.84	6.8	7	51	57	9	4	0.50	6.72	3.72	20	106	6.7	4	33	50	3	4	0.27	6.74	3.55	<10	<2
25	1412																														
26	1483	8.0	340	991						6.7	7										6.6	7									
27	1535																														
28	1596																														
29	1572	7.9	350	916						6.7	7										6.7	6									
30	1720																					4									
Min	1314	7.5	133	476	750	203	280	54	9.84	6.7	<4	21	45	4	<4	0.34	6.45	2.90	20	20	6.6	<4	8	31	3	<4	0.12	6.53	3.30	<10	<2
Max	1720	8.0	485	991	1270	270	288	55	10.02	6.8	7	51	57	9	4	0.50	6.72	3.72	20	106	6.9	8	40	50	3	4	0.27	6.74	3.55	<10	8
AVG	1465	7.8	280	710	1010	237	284	55	10.2	6.7	5	36	51	7	4	0.42	6.59	3.31	20	43	6.7	4	28	41	3	4	0.20	6.64	3.43	<10	4

Note: Monthly average reported for fecal coliforms is a geometric mean. Proposed OC limits <45 mg/L for TSS/BOD. External testing done by an ISO 17025 accredited Labs: EXOVA , Surrey, BC and Maxxam Analytical, Victoria , BC for Enterococci only.

OCTOBER 2014 MONTHLY DATA

		INFLUENT										SBR 1 EFFLUENT												SBR 2 EFFLUENT											
		IN HOUSE			EXTERNAL							IN HOUSE			EXTERNAL									IN HOUSE			EXTERNAL								
	Effluent flows	pH	TSS	COD	COD	CBOD	TSS	NH3-N	TP	Conductivity	Surfactants	pH	TSS	COD	COD	TSS	CBOD	NH3-N	NH3-N (un-ionized)*	Temp	pH	TP	FC	pH	TSS	COD	COD	TSS	CBOD	NH3-N	NH3-N (un-ionized)*	Temp	pH	TP	FC
Oct	m^3/d		mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	µS/cm at 25° C	mg/L		mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	°C		mg/L	CFU/ 100mL		mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	°C		mg/L	CFU/ 100mL
1	2073	7.6	200	855									10											7.0	26	127									
2	1422																								6										
3	1413	7.7	260	884																				6.7	4										
4	1467																																		
5	1533																																		
6	1522	7.6	305	815																				6.9	<4										
7	1370																																		
8	1381	7.7	245	720																				6.8	4	16									12
9	1347																																		
10	874	7.6	220	950																				7.7	4										
11	924																																		
12	1568																																		
13	1568	7.6	225	557								7.1	11											6.7	<4										
14	1522	7.8	275	798	846	258	390	47.4	10.8			7.5	7		76	9	4	18.50	<0.05	15	6.29	0.59	640	6.7	<4		56	4	<4	0.47	<0.05	15	6.53	0.67	4
15	1538	7.6	310	660								6.8	10	53										6.7	<4	20									
16	1521																																		
17	1521	7.8	320	740								7.0	16											6.6	4										
18	1505																																		
19	1586																																		
20	1606	7.8	205	749								7.0	15											6.6	4										
21	1613																																		
22	1788	7.4	210	420								6.9	11	90									128	6.5	4	33									<2
23	2203																																		
24	2203	7.7	190	510								6.5	6	55										6.5	4	23									
25	2147																																		
26	2758																																		
27	2251	7.6	195	392								6.5	5											6.5	4										
28	2129																																		
29	2410	7.8	135	377	303	106	116	28.4	5.09	442	0.82	6.5	7	37	51	5	<4	1.13	<0.05		6.08	4.93	24	6.5	5	12	38	4	<4	0.41	<0.05		6.08	4.11	2
30	2198																																		
31	2372	7.8	160	392								6.7	13											6.6	5										
Min	874	7.4	135	377	303	106	116	28.4	5.09	442	0.82	6.5	5	37	51	5	<4	1.13	<0.05	15	6.08	0.59	24	6.5	<4	12	38	4	<4	0.41	<0.05	15	6.08	0.67	<2
Max	2758	7.8	320	950	846	258	390	47.4	10.8	442	0.82	7.5	16	90	76	9	4	18.50	<0.05	15	6.29	4.93	640	7.7	26	127	56	4	<4	0.47	<0.05	15	6.53	4.11	12
AVG	1720	7.7	235	673	575	182	253	37.9	7.9	442	0.82	6.8	10	59	64	7	4	9.82	<0.05	15	6.19	2.76	125	6.7	6	39	47	4	<4	0.44	<0.05	15	6.31	2.39	5

Note: Monthly average reported for fecal coliforms is a geometric mean. Proposed OC limits <45 mg/L for TSS/CBOD. External testing done by an ISO 17025 accredited Labs: EXOVA , Surrey, BC

.

NOVEMBER 2014 MONTHLY DATA

		INFLUENT											SBR 1 EFFLUENT													SBR 2 EFFLUENT												
		IN HOUSE				EXTERNAL							IN HOUSE				EXTERNAL									IN HOUSE				EXTERNAL								
	Effluent flows	pH	TSS	NH3-N	COD	COD	CBOD	TSS	NH3-N	TP	Conductivity	Surfactants	pH	TSS	NH3-N	COD	COD	TSS	CBOD	NH3-N	NH3 (unionized)*	Temp	pH	TP	FC	pH	TSS	NH3-N	COD	COD	TSS	CBOD	NH3-N	NH3 (unionized)*	Temp	pH	TP	FC
Nov	m³/d		mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	µS/cm at 25 C	mg/L		mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	°C		mg/L	CFU/ 100mL		mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	°C		mg/L	CFU/ 100mL
1	2137																																					
2	2056																																					
3	2356	7.7	220	53	619								6.7	10	0.30	53										6.5	6	2.10	<MDL									
4	3338													9													7											
5	2544	8.0	165	42	452	463	169	192	39.6	6.53	549	1.57	6.8	13	0.20	55	62	17	<4	1.04	<0.05	15	6.12	3.43	58	6.4	6	2.10	<MDL	51	6	<4	2.56	<0.05	15	6.07	2.99	26
6	2570																																					
7	2300	7.6	60	41	421								6.4	13	0.40											6.4	9	0.10										
8	2144																																					
9	2483																																					
10	2427	7.9	260	49	495								6.5	10		47										6.5	12	2.70	24									
11	2158																																					
12	1900	7.7	175	50	694								6.6	8	0.90	41									16	6.5	11	2.10	72									14
13	1820													7													12											
14	1800	7.7	290	40	982								6.7	8	0.40	44										6.6	13	2.30	62									
15	1819																																					
16	1819																																					
17	1815	7.6	230		502								6.6	4	2.30	35										6.6	13	3.00	73									
18	1654																										14											
19	1589	7.9	240	55	721	538	197	218	49.0	9.20			6.4	6	1.10	30	60	4	<4	0.79	<0.05	15	6.06	4.54	44	6.5	12	0.60	59	81	8	8	0.36	<0.05	15	6.03	4.24	22
20	1673																																					
21	1867	7.7	250		786								6.7	8	0.40	57										6.5	12	1.10	67									
22	2219																																					
23	2761																																					
24	2677	7.8	150	35	408								6.6	4	1.50											6.4	8	0.60										
25	3549																																					
26	3686	7.7	95	20	319								6.5	4	-0.30	20									<2	6.5	8	2.80	34									270
27	3401																																					
28	3262	7.8	100	26	382								6.6	13	0.20	77										6.6	7	1.40										
29	2773																																					
30	2506																																					
Min	1589	7.6	60	20	319	463	169	192	39.6	6.53	549	1.57	6.4	4	-0.30	20	60	4	<4	0.79	<0.05	15	6.06	3.43	<2	6.4	6	0.10	<3	51	6	<4	0.36	<0.05	15	6.03	2.99	14
Max	3686	8.0	290	55	982	538	197	218	49.0	9.20	549	1.57	6.8	13	2.30	77	62	17	<4	1.04	<0.05	15	6.12	4.54	58	6.6	14	3.00	73	81	8	8	2.56	<0.05	15	6.07	4.24	270
AVG	2370	7.7	186	41	565	501	183	205	44.3	7.87	549	1.57	6.6	9	0.67	46	61	11	<4	0.92	<0.05	15	6.09	3.99	17	6.5	10	1.74	44	66	7	6	1.46	<0.05	15	6.05	3.62	38

Note: Monthly average reported for fecal coliforms is a geometric mean. Proposed OC limits <45 mg/L for TSS/CBOD. External testing done by an ISO 17025 accredited Lab Labs: EXOVA , Surrey, BC

DECEMBER 2014 MONTHLY DATA

INFLUENT

Dec.	Effluent flows (m³/d)	IN HOUSE pH	IN HOUSE TSS (mg/L)	IN HOUSE NH_3 (mg/L)	IN HOUSE COD (mg/L)	EXTERNAL COD (mg/L)	EXTERNAL CBOD (mg/L)	EXTERNAL TSS (mg/L)	EXTERNAL NH_3 (mg/L)	EXTERNAL PO_4 (mg/L)
1	2299	7.7	130	30	46					
2	2147									
3	2098	7.9	270	37	984	450	180	298	43	7.5
4	1939									
5	1944	8.0	210	47	572					
6	1916									
7	1984									
8	2068	7.9	235	48	609					
9	2890									
10	3999	7.6	185	26	501					
11	4515									
12	3279	7.8	165	24	382					
13	2692									
14	2537									
15	2537	7.7	60	28	197					
16	2141									
17	1998	7.7	190	38	724	370	132	286	3	10.8
18	2154									
19	2202	7.9	100	42	487					
20	2451									
21	3335									
22	2946	7.6	70	22	276					
23	2858									
24	2853	7.7		23	411					
25	2474									
26	2234									
27	2693	7.9	130	22	245					
28	2754									
29	2545	7.6	95	28	338					
30	2300									
31	2300	7.6	145		500					
Min	1916	7.6	60	22	46	370	132	286	3	7.5
Max	4515	8.0	270	48	984	450	180	298	43	10.8
AVG	2551	7.8	153	32	448	410	156	292	23	9.2

SBR 1 EFFLUENT

Dec.	IN HOUSE pH	IN HOUSE TSS (mg/L)	IN HOUSE NH_3 (mg/L)	IN HOUSE COD (mg/L)	EXTERNAL COD (mg/L)	EXTERNAL TSS (mg/L)	EXTERNAL CBOD (mg/L)	EXTERNAL NH_3 (mg/L)	EXTERNAL NH3 (unionized)* (mg/L)	EXTERNAL Temp (°C)	EXTERNAL pH	EXTERNAL TP (mg/L)	EXTERNAL *Enterococci* (CFU/100mL)	EXTERNAL FC (CFU/100mL)
1	6.6	<4	0.8											
2														
3	6.6	5	-0.6	40	37	5	<4	0.25	nt	15	nt	2.76		6
4														
5	6.6	7	<0.04											
6														
7														
8	6.7	4	1.1											
9														
10	6.7	4	<0.04	27										20
11														
12	6.6	4	2.4	16										
13														
14														
15	6.7	<4	<0.04											
16														
17	6.6	6	1.3	32	43	8	5	0.79	<0.05	15	6.04	2.90	40	42
18														
19	6.5	5	1.8	24										
20														
21														
22	6.5	6	<0.04											
23														
24	6.4	6	1.4	20										
25														
26														
27	6.4	9	1.0											
28														
29	6.5	12	0.4											
30														
31	6.4	13		64										
Min	6.4	<4	<0.04	16	37	5	<4	0.25	<0.05	15	6.04	2.76	40	6
Max	6.7	12	2.4	40	43	8	5	0.79	<0.05	15	6.04	2.90	40	42
AVG	6.6	6	1.1	27	40	7	5	0.52	<0.05	15	6.04	2.83	40	17

SBR 2 EFFLUENT

Dec.	IN HOUSE pH	IN HOUSE TSS (mg/L)	IN HOUSE NH_3 (mg/L)	IN HOUSE COD (mg/L)	EXTERNAL COD (mg/L)	EXTERNAL TSS (mg/L)	EXTERNAL CBOD (mg/L)	EXTERNAL NH_3 (mg/L)	EXTERNAL NH3 (unionized)* (mg/L)	EXTERNAL Temp (°C)	EXTERNAL pH	EXTERNAL TP (mg/L)	EXTERNAL *Enterococci* (CFU/100mL)	EXTERNAL FC (CFU/100mL)
1	6.7	7	2.2											
2														
3	6.5	8	3.3	33	45	9	6	2.38	<0.05	15	6.03	2.91		46
4		8		52										
5	6.6	15	3.1											
6														
7														
8	6.6	6	3.2											
9														
10	6.6	7	2.1	36										32
11														
12	6.5	8	2.2	61										
13														
14														
15	6.6		1.8											
16														
17	6.5	8	0.9		49	9	6	1.86	<0.05	15	6.02	3.16	30	18
18														
19	6.5	5	0.6	62										
20														
21														
22	6.6	8	2.1											
23														
24	6.6	7	2.3	39										
25														
26														
27	6.6	11	0.5											
28														
29	6.6	12	1.6											
30														
31	6.5	15		52										
Min	6.5	5	0.5	33	45	9	6	1.86	<0.05	15	6.02	2.91	30	18
Max	6.7	15	3.3	62	49	9	6	2.38	<0.05	15	6.03	3.16	30	46
AVG	6.6	8	2.0	47	47	9	6	2.12	<0.05	15	6.03	3.04	30	30

Note: Monthly average reported for fecal coliforms is a geometric mean. Proposed OC limits <45 mg/L for TSS/CBOD. External testing done by an ISO 17025 accredited Labs: EXOVA , Surrey, BC and Maxxam Analytical, Victoria , BC for Enterococci only.

WATER SAMPLING FOR THE DISTRICT OF SOOKE WASTEWATER TREATMENT PLANT OUTFALL IN SOOKE BAY (OPERATED BY EPCOR)

October 2014

Pacificus Biological Services Ltd

T: 250-949-9450 F: 250-949-7656 PO Box 2760 Port Hardy, BC V0N 2P0
info@pacificus.ca www.pacificus.ca

Water Sampling for the Epcor Wastewater Treatment Plant Outfall in Sooke Bay

Sampling Date: August 14, 2014
Report Submission Date: October 17, 2014

Prepared for:
EPCOR WATER SERVICES
7113 West Coast Rd
Sooke, BC

Prepared by:

Greg Faasse, BSc.

Reviewed by:

Jennifer Russell, RPBio.

P.O. Box 2760
Port Hardy, B.C.
V0N 2P0

TABLE OF CONTENTS

INTRODUCTION

In 2005, Epcor Water Services was contracted to construct a wastewater treatment facility and outfall to accommodate present and future population growth in the municipality of Sooke. The facility discharges into Sooke Bay, which is located approximately 35 km east of Victoria on the southwest coast of Vancouver Island, British Columbia (Figures 1 & 2). The facility began operations in December 2005. In order to ensure compliance with the Municipal Sewage Regulation (MSR), and CCME standards, Epcor contracted Pacificus Biological Services Ltd. to conduct annual water sampling for 2014 in the receiving environment of the outfall. The following report provides information on the required water sampling conducted on August 14, 2014

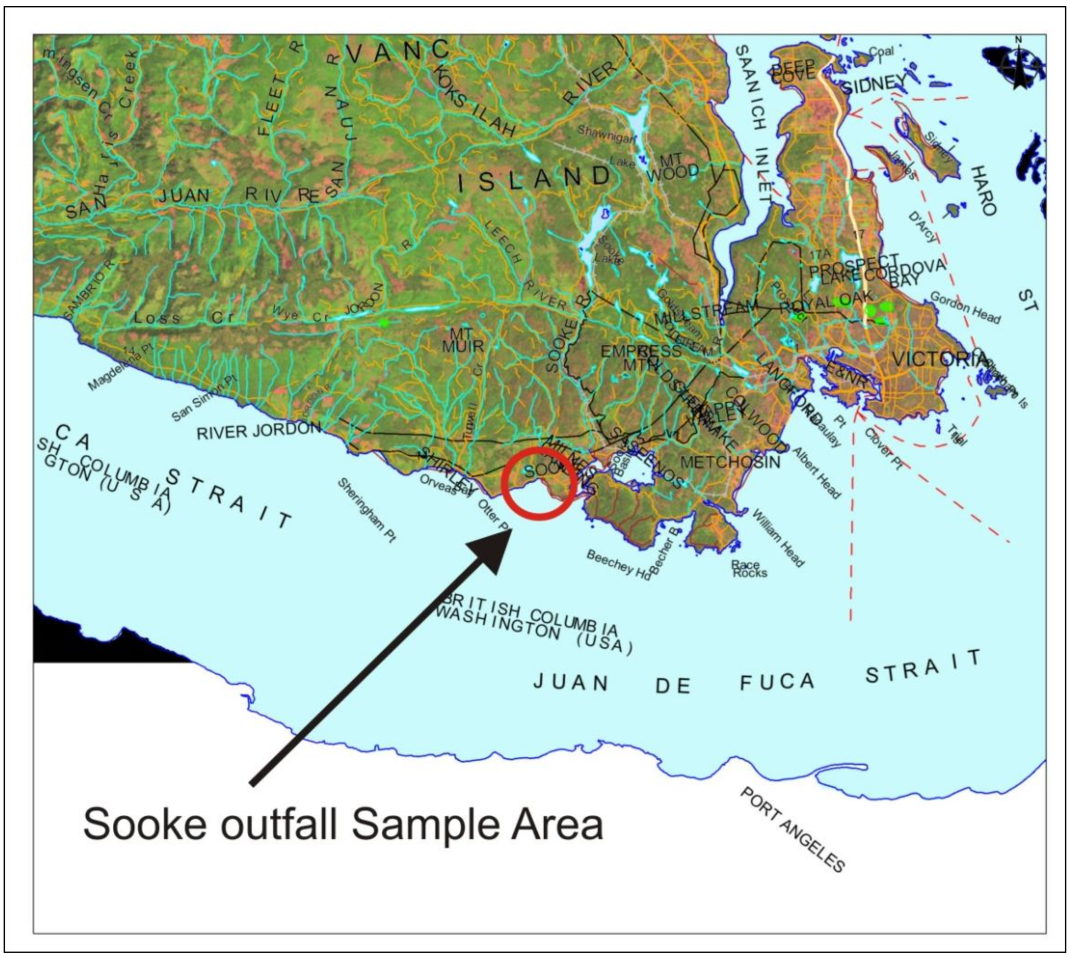


Figure 1: General location of sample sites, Sooke Bay, British Columbia

Figure 2: Aerial view of Sooke Bay outlining location of wastewater outfall with reference to Sooke and the Epcor Office.

METHODOLOGY

Effluent monitoring has previously consisted of water sampling at 4 index sites. In 2014 a fifth index site was added to the monitoring program. In October 2005, a pre-operational baseline survey was conducted to establish index sites and record water chemistry parameters which future sampling efforts could be compared against. The latest phase of sampling took place on August 14, 2014. The water sampling involved measuring the following parameters within the receiving waters environment:

Parameter
Biological Oxygen Demand
Total Suspended Solids
pH
Ammonia
Conductivity
Dissolved Oxygen
Salinity
Temperature
Fecal Coliforms
Enterococcus

The four index sampling sites were determined by Epcor and provincial ministry staff (Figure 3). The original four index sites were sampled before wastewater discharge commenced in 2005, and subsequently at regular intervals. A fifth index sampling site was added in 2014 to act as a control site (Pacificus, 2014). The new index site was selected by Pacificus personnel.

SAMPLE STATIONS

A total of five sample stations were selected for receiving environment monitoring (Figure 3). The locations of the sample sites are as follows:

1. **Location of outfall diffuser** *48° 21' 15"N,* *123° 46' 21"W*

2. **100m North of outfall** *48° 21' 17"N,* *123° 46' 17"W*
   (Initial dilution zone 100m from outfall diffuser)

3. **100m South of outfall** *48° 21' 13"N,* *123° 46' 24"W*
   (Initial dilution zone 100m from outfall diffuser)

4. **300m towards shore** *48° 21' 22"N,* *123° 46' 11"W*
   (300m away from the outfall diffuser towards shore)

5. **Control Site** *48° 21' 26" N,* *123° 46' 44"W*
   (600m northwest of diffuser)

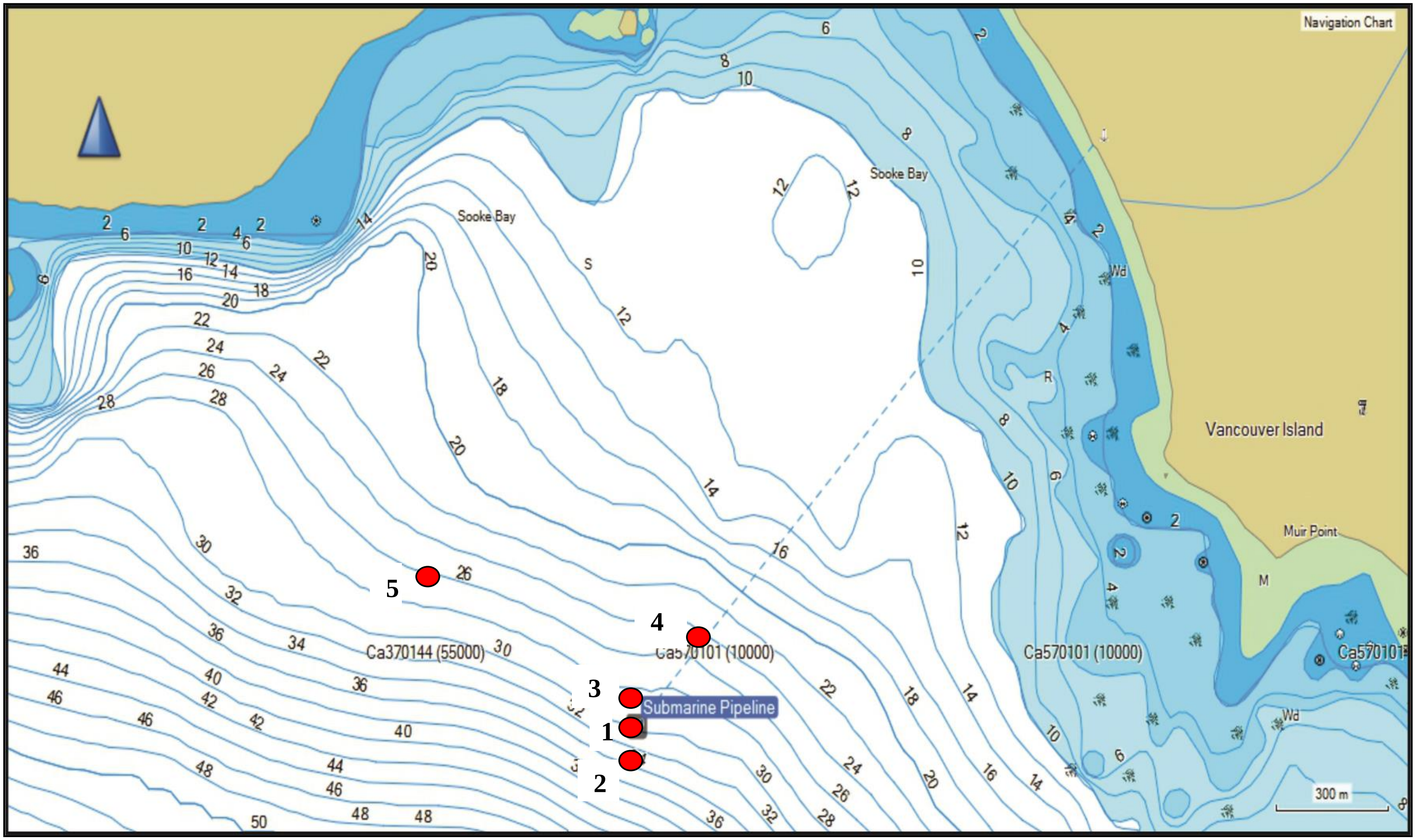


Figure 3: Sooke Bay receiving water-sampling locations (approximate)

SAMPLING PROCEDURES

Sampling was carried out in accordance with the procedures described in the most recent edition of the *British Columbia Field Sampling Manual for Continuous Monitoring and the Collection of Air, Air-Emission, Water, Wastewater, Soil, Sediment, and Biological Samples* (2003).

The sample design calls for the acquisition of samples at each sample location to be at 2m (to avoid any freshwater floating on the surface) and at the pycnocline where a plume would be likely to be trapped, if a pycnocline is present. A pycnocline is a layer of rapid change in water density with depth. In oceans, changes in water density are mainly caused by changes in water temperature and salinity. A study completed by Komex Environmental and Water Resource Engineering Ltd. found that the water profile data displayed homogeneity of the water column in Sooke Bay, indicating that the water is fully-mixed (unstratified) throughout the year. On the date that the latest phase of sampling occurred (August 14, 2014) the weather was foggy with no wind. The water column was measured to be unstratified at the time of sampling; therefore, only one set of samples were gathered from each site at a depth of 2m.

Tristan Gale, BSc, located the sample sites using a handheld Garmin GPS (with pre-recorded sample site waypoints) and gathered water samples from a depth of 2m. Dissolved Oxygen (DO), conductivity, salinity, pH and temperature readings were taken and recorded in the field using a YSI Model 85 handheld multi parameter testing instrument.

Biochemical Oxygen Demand (BOD), Total Suspended Solids (TSS), Ammonia (N) and Fecal Coliform parameters were submitted to Maxxam Laboratory in Victoria on the same date as collection. Samples for each of these parameters were gathered and transported in sealed and sterilized sample jars. In addition to the 5 site samples, duplicate samples at one site (Site 2) were collected for lab analysis in order to meet quality assurance/ quality control targets.

The laboratory detection limits for BOD, Fecal Coliforms, Enterococcus and TSS are as follows:

BOD	5 mg/L
Ammonia	0.005 mg/L
Fecal Coliforms	1 CFU/100mL
Enterococcus	1 CFU/100mL
Total Suspended Solids	2 mg/L

Maxxam Analytics can be contacted if further information is required with respect to sample analysis methodologies and procedures.

RESULTS

The 2014 monitoring of the Sooke Bay outfall receiving environment has been completed. All samples taken were measured for BOD, total ammonia, TSS, Enterococcus and fecal coliform bacteria. Guidelines and acceptable limit parameters are based on provincial guidelines for the Protection of Aquatic Life (BC Ministry of Environment, Environmental Protection Division, 1999, 2001a,b,c).

Specific results from the lab and field samples obtained during the August 14, 2014 receiving environment monitoring program are listed in Table 1. Quality assurance targets were achieved during this sampling program with the collection of duplicate samples for 16% of samples collected, which exceeded the acceptable provincial target of 10% duplication of samples.

Table 1: Water sampling results from the Epcor Sooke outfall August 14, 2014.

Sample #	Depth (m)	pH	Cond ($_m$S/cm)	D.Oxygen mg/L	Salinity (ppt)	Temperature ^{o}C	Fecal Col. CFU/100mL	BOD mg/L	TSS mg/L	Ammonia mg/L	Enterococcus CFU/100mL
# 1 Outfall	2	7.65	34.673	6.61	31.78	9.73	<1	<5	4	0.091	<1
# 2 100m north of outfall	2	7.68	34.825	7.3	31.79	9.81	<1	<5	6	0.045	<1
# 3 100m south of outfall	2	7.69	35.149	7.68	31.82	10.26	<1	<5	7	0.11	<1
# 4 300m towards shoreline from outfall	2	7.68	34.878	7.51	31.86	9.91	1	<5	5	0.042	<1
#5 Control Site 600m northwest of diffuser	2	pH Probe Malfunction	34.783	7.33	31.83	9.81	1	<5	5	0.035	<1

DISCUSSION

The maximum acceptable levels for fecal coliforms in waters outside of the initial dilution zone (IDZ) depend upon the usage of the receiving waters. The Sooke outfall discharges into shellfish bearing waters (though it should be noted that the beach has been closed for shellfish harvest) which allows for a maximum acceptable median fecal coliform count of 14 MPN/100ml with not more than 10% of samples exceeding 43MPN/100ml (Ministry of Environment, 2001c). The recreational use limit for primary contact is a mean sample value less than or equal to 200 MPN/100ml (Ministry of Environment, 2001c). It should be noted that the units for the guideline limits are in MPN/100ml (most probable number), while all fecal coliform samples are given in CFU/100ml. Both MPN/100ml and CFU/100ml are a measure of the number of colonies/100ml, therefore the results presented in CFU/100ml can be compared against the guideline limits in MPN/100ml. No samples collected for fecal coliforms during the 2014 monitoring event measured above 1 CFU/100ml.

The maximum acceptable level for Enterococcus bacteria in waters outside of the IDZ also depend on the usage of the receiving environment. Discharge into shellfish bearing waters allows for a maximum acceptable median Enterococcal colony forming unit (CFU) count of 4 CFU/100ml with not more than 10% of samples exceeding 11 CFU/100ml (Ministry of Environment, 2001c). The recreational use limit for primary contact is a mean sample value less than or equal to 20 CFU/100ml (Ministry of Environment, 2001c). All of the Enterococcus samples collected for the 2014 monitoring program measured <1CFU/100ml.

The maximum acceptable level for total suspended solids (TSS) outside of the IDZ is an increase of 5 mg/L for exposures longer than 24 hour duration during clear flow (normal) conditions in marine waters for the protection of aquatic life, which were the conditions on the date of sampling (MOE, 2001b). This corresponds to a total maximum allowable TSS level of 10 mg/L at the perimeter of the IDZ based on the background TSS measurements taken at the control site with a median value of 5 mg/L. None of the samples collected for TSS in the 2014 monitoring event exceeded 10mg/L. The highest TSS values was located at Sample Site #3 and only measured 7mg/L, the rest of the samples collected ranged from 4-6mg/L.

The maximum acceptable level for total ammonia outside of the IDZ of the Sooke Bay outfall based on Table 1 in the *Ambient Water Quality Criteria for Ammonia to Protect Marine Aquatic Life* overview report is 9.6 mg/L based on measured values as follows: salinity = 30 ppt; temperature = 10 °C; ph = 8.2 (MOE, 2001a). None of the samples collected during the 2014 monitoring event exceeded 9.6mg/L. The highest ammonia value was fond at Sample Site #3 with a value of 0.11mg/L, the rest of the samples collected ranged from 0.35-0.1mg/L.

The maximum acceptable level for Biological Oxygen Demand (BOD) outside of the IDZ of the Sooke Bay outfall is 10mg/L (MoE, 1999). All of the samples collected during the 2014 monitoring event were measured to be <5mg/L.

CONCLUSION

The 2014 environmental monitoring of the Sooke outfall receiving waters is complete. Ammonia, BOD, TSS, Entercoccus and fecal coliform levels were well within acceptable ranges and no concerns were identified as a result of this monitoring event. An analysis of the duplicate sample documented that quality control targets were achieved.

REFERENCES:

Canadian Council of Ministers for the Environment (CCME). 1999. Canadian Water Quality Guidelines for the Protection of Aquatic Life. Accessed Oct 10, 2014 from: http://ceqg-rcqe.ccme.ca/

Eaton, A.D., L.S. Clesceri, E.W. Rice, A.E. Greenberg, & M.A.H. Franson. 1998. *Standard Methods for the Examination of Water and Wastewater*. 21st Edition.

Environmental Quality Branch Ministry of Environment Province of BC and the British Columbia Environmental Laboratory Technical Advisory Committee. 2009. *British Columbia Environmental Laboratory Manual*.

Environmental Protection Division, Ministry of Environment. 1999. *Environmental Management Act, Municipal Wastewater Regulation.* Retrieved Oct 10, 2014, from: http://www.bclaws.ca/EPLibraries/bclaws_new/document/ID/freeside/87_2012

Environmental Protection Division, Ministry of Environment. 2001a. *Ambient Water Quality Criteria for Ammonia to Protect Marine Aquatic Life.* Overview Report. Retrieved Oct 10, 2014 from: http://www.env.gov.bc.ca/wat/wq/BCguidelines/ammonia.html

Environmental Protection Division, Ministry of Environment. 2001b. *Ambient Water Quality Guidelines (Criteria) for Turbidity, Suspended and Benthic Sediments.* Overview Report. Retrieved Oct 10, 2014 from: http://www.env.gov.bc.ca/wat/wq/BCguidelines/turbidity/turbidity.html

Environmental Protection Division, Ministry of Environment. 2001c. *Water Quality Criteria for Microbiological Indicators.* Overview Report. Retrieved Oct 10, 2014 from: http://www.env.gov.bc.ca/wat/wq/BCguidelines/microbiology/microbiology.html

Environmental Quality Branch Ministry of Environment Province of BC and the British Columbia Quality Assurance Users Committee and the Technical Subcommittee. 2007. *British Columbia Environmental Laboratory Manual for the Analysis of Water, Wastewater, Sediment, Biological Materials and Discrete Ambient Air Samples*.

Komex International Ltd. 2005. *Dilution Modelling Report District of Sooke Treated Wastewater Outfall (9).*

Pacificus Biological Services Ltd. November 2006. *Water Sampling for the Epcor Wastewater Treatment Plant Outfall in Sooke Bay.*

Pacificus Biological Services Ltd. November 2011. *Water Sampling for the Epcor Wastewater Treatment Plant Outfall in Sooke Bay.*

Pacificus Biological Services Ltd. March 2014. *RECEIVING ENVIRONMENT MONITORING PROGRAM FOR SOOKE WASTEWATER TREATMENT PLANT.*

Water, Air and Climate Change Branch Ministry of Water, Land and Air Protection Province of British Columbia. 2003. *British Columbia Field Sampling Manual For Continuous Monitoring and the Collection of Air, Air-Emission, Water, Wastewater, Soil, Sediment, and Biological Samples.*