DISTRICT OF SOOKE
WASTEWATER TREATMENT PLANT
AND COLLECTION SYSTEM

OPERATED BY
EPCOR WATER SERVICES INC.

OPERATIONS REPORT
AUGUST 2015
REGISTRATION NUMBER 17300

INTRODUCTION

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

The system consists of:

- 54 km of collection system piping
- 522 manholes
- 7 pump lift stations (Sooke Road, West Coast Road, Helgesen Road, Sunriver, Prestige Hotel, Mariner's Village and Treatment Plant)
- A secondary treatment wastewater 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 December 2005. Individual domestic and commercial connections began in May 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.

OPERATIONS

Wastewater Treatment Plant

In August, the effluent quality was good with the TSS (total suspended solids) averaging 12 mg/L and CBOD averaging 5 mg/L. (MWR limit is ≤45 mg/L and WSER limit is ≤25 mg/L quarterly average). The results, as detailed in this report, are obtained from samples tested at an independent ISO/IEC 17025 accredited lab.

August 3 Effluent quality was deteriorating due to hot weather. Warmer water temperatures have bacterial population metabolizing all available organics at a much faster rate. This leads to depletion of food source for bacteria much sooner than duration of aeration cycle. When this occurs the result is starvation of bacteria and a greasy substance is produced in the treatment reactors. This greasy substance becomes a suspended solid that contributes to a higher TSS in the effluent.

August 4 Bacterial starvation/die-off contributed to reduction in sludge volume. Operators responded by reducing sludge wasting to digesters and increasing MCRT (mean cell retention time), which helps to build up sludge volume.

SBR #2 blower air temperature faults occurred from hot weather. Operators double-checked SBR blower equipment and confirmed it is operating within specs.

August 6 Continuing to leave WAS (waste activated sludge) pump off in SBR #2 to help increase sludge volume.

Electrical contractor on site to perform calibration of headworks gas detectors, calibration of influent and effluent flow meters, PLC terminal torque checks and PLC cabinet cleaning.

Due to centrifuge age and operational challenges, a PowerPoint presentation on centrifuge operation/theory was obtained.

In response to increased bacterial metabolization of organics/food, operators reduced dissolved oxygen level set point in an attempt to slow metabolization rate which should decrease bacterial starvation.

August 7 As alarms continue, operators increased SBR blower air temperature alarm shutdown set point with confirmation from manufacturer, as hot weather continues.

August 10 VFDs for SBR blower motors are shutting motors down for “overload” condition as motors are running beyond maximum output design. Blower motors have been running at or

beyond maximum design since plant commissioning and are additionally overloaded during summer temperatures. Estimates are underway to acquire higher horsepower motors.

Centrifuge service included internal/external greasing, belt inspections and gearbox oil checked. Gearbox oil was changed to synthetic type on July 14. Metal filings that were discovered in previous oil changes have diminished. Gearbox condition appears much improved.

Several UV lamp intensity alarms have been occurring. UV lamp intensity has not been near an alarm set point, subsequently operators put SCC (service control centre) through configuration, checked all values and are monitoring closely.

August 11 Annual fire alarm inspection and function tests performed by contractor. Back-flow preventers in collection system and treatment plant also inspected.

August 12 Routine lab analysis of effluent show that ammonia is on the rise. Operators made an increase to aeration time and reduced anoxic time.

August 13 Centrifuge difficult to start (took three attempts) and is making metal on metal sounds when bowl empty.

August 17 Similar metallic sounds noticed during centrifuge operation when first started.

August 18 Operators holding back decants when basin levels are low in an effort to increase sludge age which should provide better process/effluent quality.

August 19 Centrifuge operation continuing to be challenging as it is difficult to start and is shutting down due to low differential speeds.

Service DO probe in basin #2 as unstable readings have been noticed.

August 20 PRV (pressure regulating valve) on polymer batching system leaking. Water supply turned off at end of shift.

August 21 WAS pumps off during day shift again to help increase sludge volume.

August 25 Replaced water PRV on polymer day tank. Electrical contractor brought in to disconnect/reconnect power supply.

August 27 Lead hand operator attended EPCOR Incident Management meeting as ongoing safety initiatives are scheduled monthly.

August 28 Earlier operational changes to aeration proving effective for ammonia removal. Lab results show effluent ammonia concentrations to be back to normal.

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Wastewater Collection System

August 1 On-call operator responded to residential sewage back-up. First residents in newly constructed home reported sewage backing up into fixtures inside the home. Operator thought issue was within the home's plumbing. Received a call later from a plumbing contractor who reported that the trouble was within an IC, particularly sand, gravel causing blockage. The residence basement elevation requires a sewage pump and discharges to gravity at the IC location.

August 6 In response to odour concerns made by resident to the District of Sooke, EPCOR operators gasketed and plugged manhole lids on easement near residence. Operators found a grated lid on one of the manholes, covered with a garbage bag and dirt. Removed it and replaced with a proper sanitary manhole lid.

Routine checks/tests done at sani-vac pump at District of Sooke public boat launch.

August 11 Operated the sani-vac pump at District of Sooke public boat launch to confirm proper function.

August 14 More follow up to August 6 odour concerns saw operators gasket and plug manhole west of residence, which has all manholes sealed from 100 meters east of residence to approximately 100 meters west. Operators advised neighbours that if odours continue in this area, it is likely due to gases escaping from nearby roof vents. Operators also suggested air admittance valves be installed on these roof vents.

August 26 EPCOR operators worked with contractor to do annual inspections of lift station pumps.

August 27 EPCOR operators required to witness a new service connection. Contractor didn't realize the connection was being made to low pressure system forcemain. Operators advised that a vac truck would be required and to call EPCOR when ready.

August 28 EPCOR operators located isolation valve and flush valve on low pressure forcemain system in area of this new connection.

Lift Stations

The lift stations operated well throughout the month of August.

August 2 On-call operator responded to Prestige Hotel lift station high level alarm. Operator found both pumps running and lift station in a low level, shut pumps off, waited for level to rise

above low level alarm set point and cleared alarms. Monitored system. Investigation found draining of the hotel's pool had caused the alarm.

August 11 Routine lift station checks done at Prestige Hotel, Mariner's Village, Sooke Road, Sunriver and Helgesen lift station included high level call-outs.

Prestige Hotel lift station valve chamber door frame bolts are loose. Recommended repair will require widening of aluminum door frame which is being organized.

On-call operator received call from RCMP dispatch to inform that a sewage pipe had been vandalized and wastewater was being released. Operator questioned location and it became apparent that the pipe was irrigation and there had been no release of wastewater.

August 13 Routine checks done at West Coast Road lift station included high level alarm call-out. Pump and valve locations were stenciled to the hatchways to indicate components location within. Three pumps' gate valves and check valves are used at this lift station (all others use two) and components' locations must be confirmed for safety during maintenance/repairs.

August 17 Power cables to pumps #2 and #3 were swapped by an electrical contractor at West Coast Road lift station to make the pumps intuitive (parallel) with kiosk hand controls.

August 25 Operators responded to wet well high level alarm at Prestige Hotel lift station. Found hotel staff to be draining hot tubs. Operators monitored wet well until drain complete.

August 26 Operators responded to wet well high level alarm at Prestige Hotel lift station. Hotel staff were draining main swimming pool. Lift station wet well has excessive build up of grease and accumulation of debris/garbage. Scheduled vac truck to clean wet well September 1.

Plant and Operator Classification

The Wastewater Treatment Plant is a Class III plant, classified under EOCP # 1358 and is operated under MOE Guidelines. The Sooke WWT plant is operated in compliance with the MWR and meets the certification requirements.

The collection system is a Class II Wastewater Collection System, classified under EOCP # 1827 in accordance with the Environmental Operators Certification Program. Previously, the collection system was determined to be a Class III facility. The collection system classification is reviewable every five years and was recently reviewed. Discrepancies were noted in a previous classification application and most recent application information has resulted in a change to the collection system classification.

Table 1– Operator Certification

Name	Position	Qualifications
Shawn Pearson	Lead Operator	BC EOCP Certified: Level III Wastewater Treatment & Level I Wastewater Collection System
Corey Hodgson	Operator	Alberta Environment Level III Collection System
Jesse Forcier	Operator	BC EOCP OIT (Operator in Training)

QUALITY

The District of Sooke Liquid Waste Management Plan was approved by the Ministry of Environment in June 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 that was submitted by the District to the Ministry in 2002 or in the general guidelines provided in the Municipal Waste Regulations (MWR). The Operational Certificate will be finalized in the future and will become the standard for the plant operation.

The Wastewater Systems Effluent Regulations (WSER), under the Federal Fisheries Act, was gazetted on July 18, 2012. The Government of Canada worked with the provinces and engaged municipalities and others to establish the country's first national standards for wastewater treatment. It establishes limits for deleterious substances in the wastewater plant effluent that can be released into the natural environment.

Table 2 contains the WSER, MWR and the proposed OC requirements for information.

Table 2 – 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 15^0C (WSER)	<1.25 mg/L	Monthly (until June 30, 2014)	NA	NA	NA	NA
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
pH			6.0 - 9.0		6.0 - 9.0	Monthly (Grab)
Receiving Environment Testing			Required	Annually	As per Receiving Environment Monitoring Plan	1/year
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 (Grab)	≤ 45 mg/L	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/IEC 17025 accredited laboratory. "Grab" refers to a grab sample, which is a single sample that represents the composition of the water at that specific time and place.

Table 3 – Performance Measures – District of Sooke O&M Key Performance Indicators

Water Quality & Environmental Performance Measures			
Activity	Actual Values	Actual Values	Target Values
	August	YTD	Annual
Effluent Quality & Violations to Operational Certificates	0	0	0
Laboratory QA/QC Activities	42	299	200
Proactive Environmental/Quality Initiatives	1	4	5
Completion of Required Regulatory Reporting	100%	100%	100%
Activity	Actual Value	Actual Value	Acceptable Value
	August	YTD	Annual
Releases **	0	0	2
People & Safety Performance Measures			
Activity	Actual Values	Actual Values	Target Values
	August	YTD	Annual
Lost Time Accidents	0	0	0
Staff Training (hours)	0	130	40 hrs/ employee
Safety Preventative Activities	17	80	30
Customer Service Performance Measures			
Activity	Actual Values	Actual Values	Target Values
	August	YTD	Annual
Service Outages < 24 hours	100%	100%	90% Complete
Community Related Activities	2	6	4

* Uncontrolled discharges of wastewater that are reportable to Provincial Emergency Plan under legislation, excluding abnormal circumstances

Table 4 – Monthly Quality Summary

	Influent				Effluent																					Biosolids Shipped	
	CBOD 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	152	168	28	5.2	1931	5443	2613	<4	5	5	5	6	5	1.14	2.50	1.68	<0.05	<0.05	<0.05	2.18	3.28	2.72	10	64	29	72990	8
February	70	86	37	7.8	1767	3543	2313	<4	<4	<4	5	6	6	0.17	2.19	1.00	<0.05	<0.05	<0.05	2.33	4.35	3.25	4	96	19	41270	4
March	163	156	39	7.01	1574	3305	2220	<4	<4	<4	3	4	4	0.17	1.69	0.72	0.00021	<0.05	0.025	2.57	3.64	3.19	22	68	38	50410	5
April	214	239	43	8.30	1718	2485	1973	<4	5	4	<5	11	7	0.13	0.61	0.37	<0.05	<0.05	<0.05	3.25	4.37	3.89	6	76	19	68000	7
May	138	230	43	13.7	1516	1800	1643	<4	6	5	<5	8	7	0.08	0.51	0.28	<0.05	<0.05	<0.05	3.54	4.52	4.07	16	160	37	68830	7
June	340	195	45	14.0	1439	1709	1559	<4	6	5	<3	14	9	0.10	0.46	0.27	<0.05	<0.05	<0.05	3.52	6.80	4.54	18	72	33	40090	4
July	269	346	63	10.7	1387	1644	1514	<4	7	5	7	17	11	0.26	0.35	0.21	nr	nr	nr	2.35	8.40	4.75	8	260	43	29860	3
August	314	456	49	20.0	1410	1765	1500	<4	6	5	4	21	12	0.23	4.04	1.26	nr	nr	nr	2.80	9.60	5.85	4	2090	27	29880	3
September																											
October																											
November																											
December																											
Total																										401330	41
Annual	207	234	43	10.8	1387	5443	1917	<4	7	5	<3	21	7	0.08	4.04	0.72	0.00021	<0.05	<0.05	2.18	9.60	4.03	4	2090	29		

* WSER- Quarterly average, **MWR and proposed OC

Table 5 – Influent Water Quality

		INFLUENT								
		IN HOUSE				EXTERNAL				
	Effluent flows	pH	TSS	COD	NH3-N	COD	CBOD	TSS	NH3-N	TP
Aug.	m^3/d		mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
1	1427									
2	1430									
3	1550	7.6	215	836	47					
4	1496									
5	1450	8.0	325	765	44	632	159	425	44	30.0
6	1561									
7	1457	7.7	150	597	47					
8	1462									
9	1524									
10	1498	7.7	220	907	>55					
11	1531									
12	1432	7.6	315	934	>55					
13	1462									
14	1410	7.7	255	851	>55					
15	1473									
16	1559									
17	1488	7.9	200	632	>55					
18	1590									
19	1459	7.6	445	1371	>55	1250	469	487	54	10.0
20	1441									
21	1440	7.7	270	1036	>55					
22	1493									
23	1517									
24	1556	7.7	355	1099	>55					
25	1517									
26	1490	7.9	310	1311	>55					
27	1462									
28	1477	7.8	225	900	55					
29	1511									
30	1568									
31	1765	7.6	165	654	47					
Min	1410	7.6	150	597	44	632	159	425	44	10.0
Max	1765	8.0	445	1371	>55	1250	469	487	54	30.0
AVG	1500	7.7	265	915	48	941	314	456	49	20.0

Table 6 – Daily Water Quality of Effluent

	SBR 1 EFFLUENT												SBR 2 EFFLUENT											
	IN HOUSE				EXTERNAL								IN HOUSE				EXTERNAL							
	pH	TSS	COD	NH3-N	COD	TSS	CBOD	NH3-N	pH	TP	*Enter-ococci*	FC	pH	TSS	COD	NH3-N	COD	TSS	CBOD	NH3-N	pH	TP	*Enter-ococci*	FC
Aug.		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		mg/L	CFU/ 100mL	CFU/ 100mL
1																								
2																								
3	6.5	14		<0.4									6.7	22		<0.4								
4																								
5	6.6	12	53	0.7	66	12	<4	0.3	6.66	2.80		18	6.9	20	57	3.7	89	21	6	4.04	6.87	2.80		2090
6																								
7	6.5	10		<0.4									6.6	16		<0.4								
8																								
9																								
10	6.7	9		0.5									6.6	16										
11																								
12	6.7	6	53	1.3								30	6.8	5	67	6.2								6
13																								
14	6.7	4		<0.4									6.6	19		0.7								
15																								
16																								
17	6.8	4		<0.4									6.7	19		<0.4								
18														17										
19	6.6	<4	44	0.4	53	4	<4	0.50	6.75	8.2		4	6.9	16	71	0.5	81	10	<4	0.23	6.73	9.6		46
20																								
21	6.6	4		0.6									6.6	16		<0.4								
22																								
23																								
24	6.6	4		0.4									6.7	14		<0.4								
25																								
26	6.7	5	41	<0.4							60	14	6.6	13	56	<0.4							<10	16
27																								
28	6.6	5											6.6	11		1.7								
29																								
30																								
31	6.7	4		0.9									6.8	56	8	0.5								
Min	6.5	<4	41	<0.4	53	4	<4	0.3	6.66	2.80	60	4	6.6	5	8	<0.4	81	10	<4	0.23	6.73	2.80	<10	6
Max	6.8	14	53	1.3	66	12	<4	0.5	6.75	8.20	60	30	6.9	56	71	6.2	89	21	6	4.04	6.87	9.60	<10	2090
AVG	6.6	7	48	0.7	60	8	<4	0.4	6.71	5.50	60	13	6.7	19	52	2.2	85	16	5	2.14	6.80	6.20	<10	55

Note: Monthly average reported for fecal coliforms is a geometric mean. WSER limit is ≤25 mg/L quarterly average TSS/CBOD. pH is regular at 25 **°.** External testing done by an ISO/IEC 17025 accredited Labs, EXOVA , Surrey, BC.,

Table 8: Acronyms

Acronyms /Abbreviations	Description
ATS	Automatic Transfer Switch
AVE or AVG	Average
BC EOCP	British Columbia Environmental Operators Certification Program
BOD	Biochemical Oxygen Demand
BO/PO	Blow off /pump out
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
LPS	Low pressure system
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
TP	Total Phosphorus
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