DISTRICT OF SOOKE
WASTEWATER TREATMENT
AND COLLECTION SYSTEM

OPERATED BY
EPCOR WATER SERVICES INC.

2008 ANNUAL REPORT

PERMIT NUMBER RE-17300

EPCOR

District of Sooke

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INTRODUCTION

The Sooke wastewater collection and treatment system is owned by the District of Sooke and operated by EPCOR Water Services Inc. The system encompasses the Sooke core area and services approximately 6,500 residents.

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 hook-ups began in January 2006 and continued throughout 2006 and 2007, with the majority completed by December 2006.

The system consists of:

- 34 km of collection system piping
- 4 pump lift stations (Sooke Road, West Coast Road, Helgeson Road & Sunriver)
- A secondary wastewater treatment plant
- 1.7 km long, 30 m deep outfall

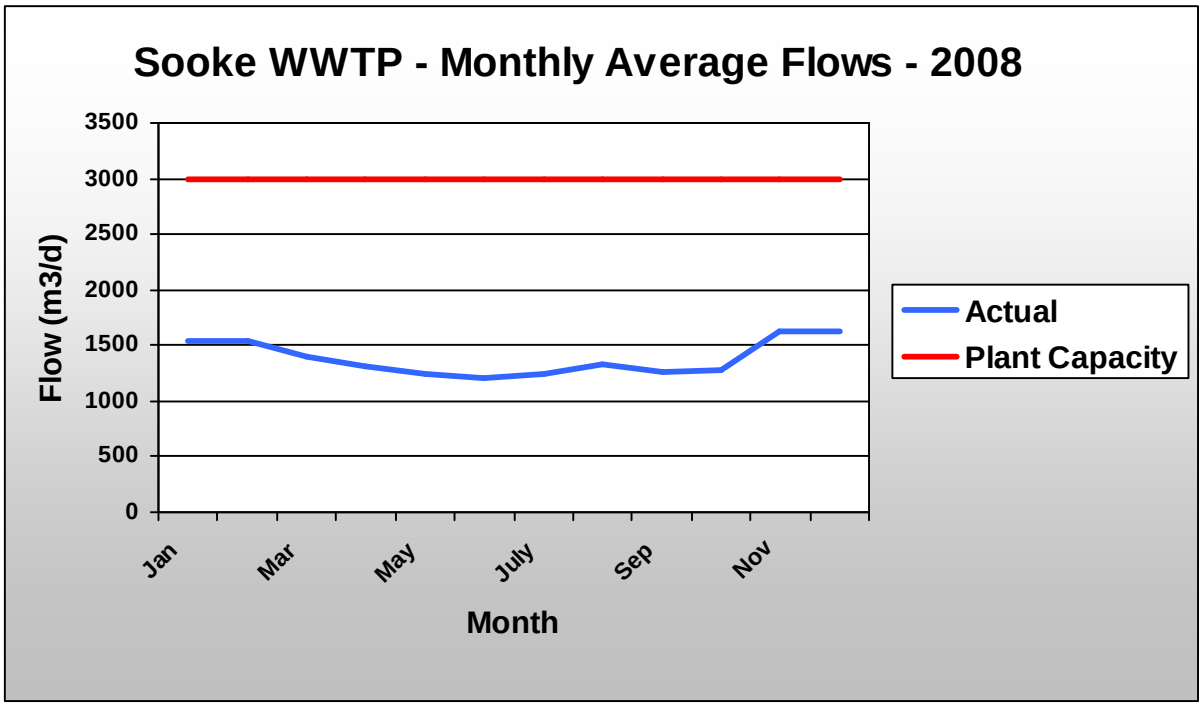
The treatment plant uses a Sequencing Batch Reactor (SBR) treatment process with UV disinfection to provide secondary wastewater treatment. Secondary sewage treatment removes over 95% of the total suspended solids and high levels of other contaminants, providing significant environmental benefits to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

The treatment plant has a designed capacity of 3,000 m^3/day (annual average daily flow), and is expandable by an additional 3,000 m^3/day.

OVERVIEW

The annual average efffluent flow treated in the plant during 2008 was 1391 m^3/day, which is approximately 215 L/person/day. This is significantly less than the original design assumption of 300 L/person/day.

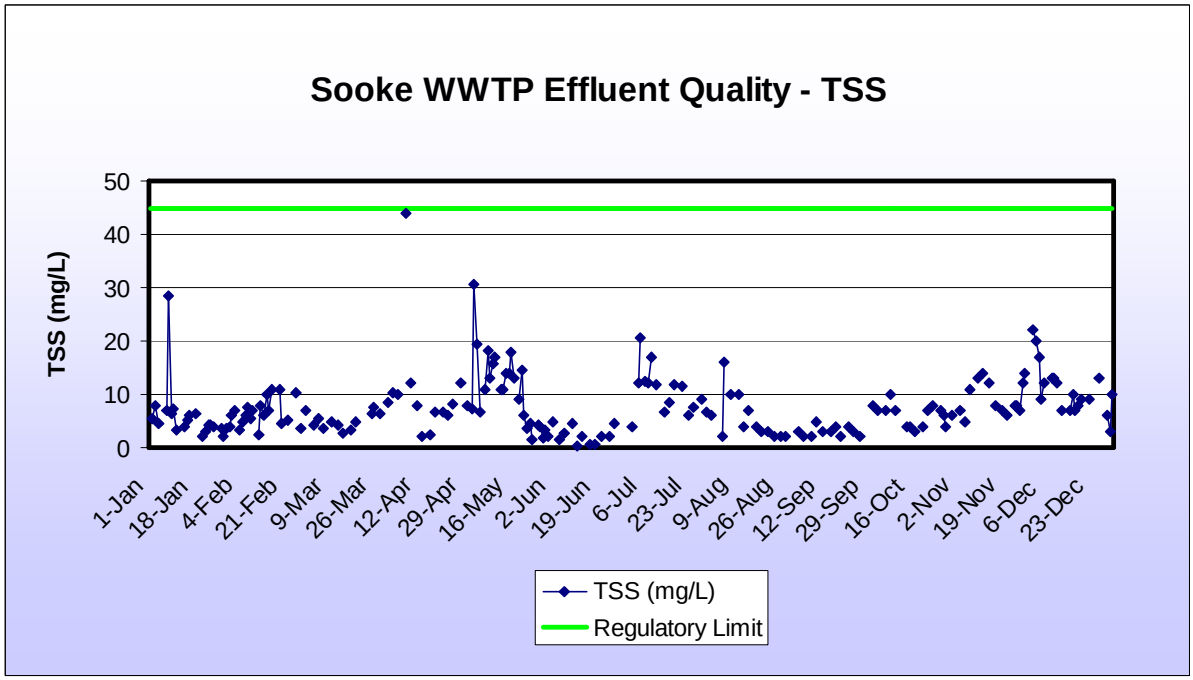
The following figure summarizes the monthly average flows during the year.

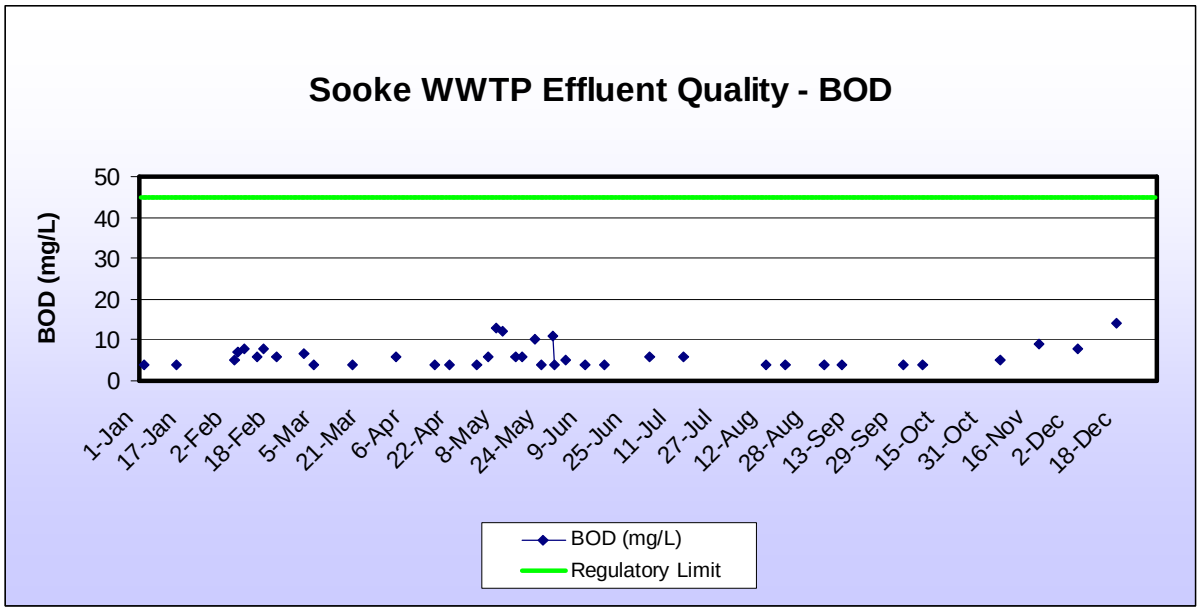


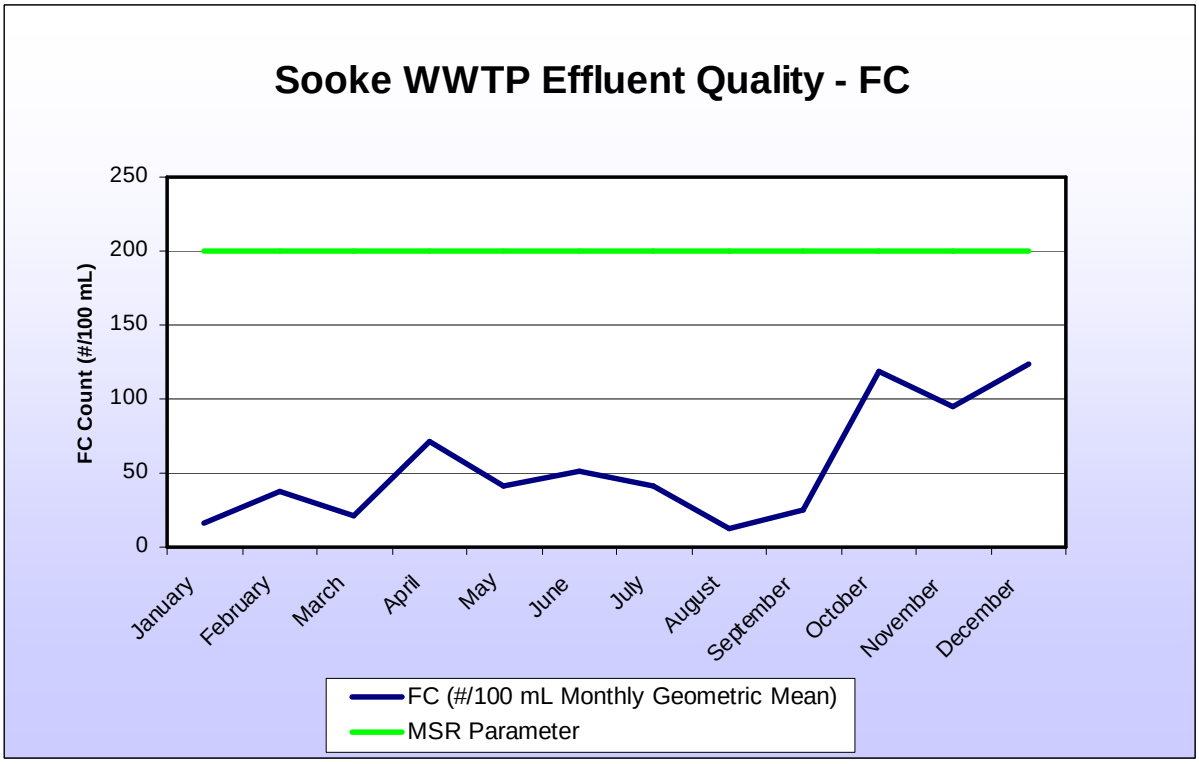
Plant Performance

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

The following figures summarizes the external lab test results for TSS, BOD and FC in the plant effluent through the year compared to the regulatory standards. The TSS, BOD and FC in the plant effluent were consistently better than the regulatory requirements throughout the year.


Sooke WWTP Effluent Quality - TSS
TSS (mg/L)
50
40
30
20
10
0
1-Jan
18-Jan
4-Feb
21-Feb
9-Mar
26-Mar
12-Apr
29-Apr
16-May
2-Jun
19-Jun
6-Jul
23-Jul
9-Aug
26-Aug
12-Sep
29-Sep
16-Oct
2-Nov
19-Nov
6-Dec
23-Dec
TSS (mg/L)
Regulatory Limit


Sooke WWTP Effluent Quality - BOD
BOD (mg/L)
50
40
30
20
10
0
1-Jan
17-Jan
2-Feb
18-Feb
5-Mar
21-Mar
6-Apr
22-Apr
8-May
24-May
9-Jun
25-Jun
11-Jul
27-Jul
12-Aug
28-Aug
13-Sep
29-Sep
15-Oct
31-Oct
16-Nov
2-Dec
18-Dec
BOD (mg/L)
Regulatory Limit



OPERATIONS

Certification

The wastewater treatment plant is a Class III Wastewater Treatment Plant, Certification # 1358, in accordance with the Environmental Operators Certification Program.

Operators working at the Sooke WWTP in 2007:

Name	Position	Qualifications
John Reynolds	Senior Operator	Class IV MWWT (EOCP) Class III IWWT (EOCP)
Jim Lloyd	Operator (May to Dec. 2008)	Class IV WWT (EOCP) Class III WWC (EOCP)
Tami Wetmore	Operations Manager	Level III WWT (AB) Level II WWC (AB) Level IV WT (AB) Level II WD (AB)
WWT- Wastewater Treatment; WWC – Wastewater Collection; WT – Water Treatment; WD – Water Distribution; IWWT – Industrial Wastewater Treatment		

Quality

The table on the following page summarizes the monthly plant quality through the year. Appendix 1 includes the detailed quality data for each month.

As the District of Sooke moves forward in developing a Liquid Waste Management Plan (LWMP) for the area, EPCOR continues to provide input regarding the quality parameters contained in the Operating Certificate for the plant. Registration for discharge was submitted to the Ministry of Water, Land and Air Protection in 2002 as required for the grant funding process, however, this was before the plant design was finalized and the building contract was awarded. Two parameters contained in the registration (flow and fecal coliform concentration) do not reflect the final design of the plant and need to be updated. This will be done when the LWMP is completed and an Operational Certificate established for the plant. During the process to finalize the operational certificate, EPCOR uses the provincial Municipal Sewage Regulation (MSR) as guidance for quality parameters.

Receiving environment monitoring around the outfall was conducted in March and November 2008. Results continue to be excellent, with most parameters below detection limits. The reports are attached in Appendices 2 and 3.

Effluent toxicity testing was completed by Environment Canada in July 2008. The results were 100% survival of salmonid species (Chinook salmon) on a 96 hour Lethal Concentration 50 toxicity test.

2008 MONTHLY AVERAGE DATA SHEET

	INFLUENT				EFFLUENT			
MSR Limit				*	45 mg/L	45 mg/L	*	*
	BOD mg/L	TSS mg/L	NH_3 mg/L	Average Flow (m3/d)	BOD mg/L	TSS mg/L	NH_3 mg/L	Fecal Coliform CFU/100mL
January	134	144	27	1609	<4	5	2.8	16
February	190	172	35	1536	6	4	1	49
March	424	191	32	1400	4	3	0.7	22
April	181	214	33	1313	5	5	4	72
May	206	149	39	1251	9	5	6	132
June	213	225	42	1241	4	2	9	51
July	176	162	42	1236	6	5	1.6	18
August	177	203	40	1337	4	5	1	12
September	249	229	44	1267	4	4	.3	22
October	183	182	43	1270	4	8	.4	139
November	282	202	43	1624	7	11	9.7	95
December	262	238	27	1632	11	12	3.6	124
Average	223	193	37	1391	6	6	3.3	63

Total Annual Flow: 473,802 m3

NOTES:

Data presented in table is conducted by an external CAEL certified laboratory.

Monthly average reported for fecal coliforms is a geometric mean.

* Limits being clarified with Ministry of Environment.

Operations, Maintenance & Improvements

Ongoing operations and maintenance activities and improvements occurred throughout the year. Some highlights are included below.

- Bio-solids extracted from the centrifuge are trucked to the Hartland Landfill for disposal under Control Waste Permit # 08-005. During 2008, on average, approximately 28 tonnes of bio-solids per month were trucked to the landfill.

- At the start of the year flows into the plant had reached a high enough level for the running of both SBR basins.

- Experienced four pump failures in the Sunriver lift station, a large amount of rock and gravel suspected to be construction debris was found in the impeller. Discussions between the developer and the District should help alleviate further problems of this nature.

- Operations were unstable during July due to a toxic shock in the raw influent the previous month causing a plant upset, impacting the plant effluent quality. The cause of the toxic shock was unknown.

- A power outage on Oct. 6 at the Sooke Road Lift Station caused the main power fuse to blow. As a result, the main fuses at all the pump stations were replaced with slow blow type fuses to help prevent a reoccurrence. An investigation into ongoing power issues at the Sun River lift station, identified power surges and spikes as the problem. A time-delay relay switch was installed and there have been no problems since.

- In September sound reduction ducting was installed in the blower room at the plant to reduce the high level of noise emitted from the blower intake vents as the blowers are ramping up and down. The sound level has been greatly reduced.

- During the year, a number of power outages of varying duration (from one to seven hours) occurred. Back up generator power at the plant and the four lift stations started and functioned properly during the outages.

- During December, heavy rain caused the plant to go into storm mode operation on three separate occasions. During each occurrence, the plant performed well and effluent quality remained high.

- The carbon filter system at Sooke Road lift station was completed in April with installation of a noise reduction system, greatly reducing fan noise, which had been disturbing neighbours.

- In August an engineered permanent carbon filter system was installed at West Coast Road lift station to reduce odours associated with that lift station.

Audits & Inspections

A number of internal and external audits and inspections were completed in 2008. Internally, EPCOR quality control staff completed an annual lab audit which included calibration of lab equipment, and a review of procedures and documentation.

Externally, the District of Sooke Fire Department and WorkSafe BC carried out inspections on emergency equipment and workplace practices.

The Ministry of Environment conducted their annual inspection of the facilities on March 26th with the District of Sooke and EPCOR. The inspection went well, and the only outstanding issue is the inaccurate registration with MOE. This will be addressed when the District completes the Liquid Waste Management Plan.

During 2008, Worley Parsons Komex carried out a dive inspection on the outfall for purposes of inspecting the structural integrity of the entire outfall infrastructure, particularly the outfall diffuser ports, and to document the environmental monitoring of the marine habitat components. The habitat survey summarized the condition of the ocean habitat to satisfy monitoring requirements of Fisheries and Oceans Canada for their authorization to construct the outfall.

The inspection found the outfall to be in good working condition with all four diffuser ports functioning well. As expected, there were no signs of structural problems along the exposed pipe and there is no evidence of movement or shifting of the pipeline.

The environmental monitoring report notes natural re-colonization of vegetation along the outfall corridor with the outfall structure itself providing relief, complexity and crevice space for a number of fish species such as lingcod, rockfish and kelp greenling. The monitoring report is attached for reference.

Incidents

A wastewater spill occurred at the Sunriver lift station on August 15 when a fuse in the control panel blew, resulting in loss of power to the pump control and alarm systems. The spill was 0.5 m3 and was contained to the site. The same electrical problem resulted in another spill on September 16, of 3.0 m3. As a result, the control/alarm system has been modified so that if there is a failure of the control system power supply the alarm system will still function. The alarm circuit is now powered through the UPS. Further, all of the other lift station alarm systems were tested to confirm they run properly using the battery back up system. PEP# 801406 (Aug 15), PEP# 801721 (Sept 16)

On August 24 the forcemain at the Sooke Road lift station blew a gasket at the isolation valve on the station site. The 3 m3 spill resulting from wastewater draining back down the forcemain to the lift station flowed into Belvista Creek and into Sooke Harbour. EPCOR staff were on site all night containing the spill and overseeing repairs to the broken forcemain. EPCOR conducted external water quality testing upstream and downstream of the spill and confirmed that no fecal contamination occurred. Procedures were changed to include notification of the nearby local seafood processing plant should a spill occur. PEP# 801496

A spill, covering a two metre area (0.15 m3), occurred near the plant on West Coast Road on Oct. 9 while flow to the plant was shut off during emergency repairs in the Headworks Building. As a result of the emergency repairs, maintenance to clear the excessive build up of gravel and rocks in the grit removal chamber and channels in the Headworks Building necessitated bringing in a vacuum truck to remove the debris. During the cleaning operation, a spill of 1.0 m3 occurred at the same place on West Coast Road on Oct 21. As a result, we have changed our maintenance procedures to ensure that this will not occur in future. PEP# 802041(Oct 9.), PEP# 802086 (Oct 21)

In December while a contractor was carrying out a tie-in to the main gravity main near the plant on West Coast Rd., flow from the West Coast Road lift station had to be shut off. When the time estimated to complete the work in the manhole was exceeded a sewage spill of 1m3 occurred at the West Coast Road lift station. PEP# 802504

All spills were promptly reported to the proper authorities. Each spill was considered minor in size and all areas were remediated.

Odours

A carbon filter treatment system for odour control was installed at the Sooke Road lift station and has been successful in eliminating odours and resulting complaints from adjacent neighbours.

The new nitrate based odour control chemical is now being injected fulltime at the Sunriver lift station, and has proven more effective than hydrogen peroxide at reducing odours.

The odour and noise issues have been resolved at the Sooke Road lift station with the carbon filter system and the nitrate based odour control chemical injected at the Sunriver lift station. Also, a testing program of a different brand of odour control chemical for the Sunriver pump station was conducted during the year.

An odour control injection system using Bioxide was also installed at the Helgeson Rd. Lift Station during October, but did not solve the issue with the odour complaint on the gravity line. An addition at the homeowner's IC referred to as an "Add-a-flap" was installed. This seems to have resolved the odour issue.

COMMUNITY INVOLVEMENT

EPCOR continues to be committed to investing in communities in numerous ways. These investments include direct contributions and sponsorships, employee volunteerism, and our support as a major contributor to the United Way.

One of the ways EPCOR supports the District of Sooke is by investigating opportunities in the community that provide us with chances to connect with customers. For example, we support annual sponsorships of Canada Day celebrations, Sooke Legion Remembrance Day ceremonies, the Sooke Salmon Enhancement Society fishing derby and Christmas family skate and swim sessions at SEAPARC recreation centre.

In past years we have sponsored the Sooke Philharmonic Orchestra, the Sooke Arts Council, the District of Sooke golf tournament, the Safe Halloween event and the Sooke Volunteer Firemen. For 2008, in additional to our annual sponsorships, we chose to support the Chamber of Commerce Community Awards Gala, Sooke Community Arts Council's Whiffin Spit Beach Art Event, and was a major sponsor of the District's Sustainability Conference, sponsoring keynote speaker former Premier Mike Harcourt. As well, EPCOR participated in the Sooke Rotary Fair and Auction. EPCOR partnered with the District of Sooke to sponsor the Pump Station Art project, a community art project in which each of the four pump stations were painted by Sooke artists.

EPCOR's Road to Excellence program recognizes EPCOR's commitment to fostering innovation, creativity, leadership and achieving excellence among youth in its communities across Canada. In 2008 the Road to Excellence program was brought to Sooke and from a field of many eligible, talented youth, awards were presented to Jordan Vermes, for Youth Excellence in Arts and Culture, to attend the Victoria Conservatory Strings workshop, and to the Sooke Coho Swim Club, Sports Excellence award, for an underwater camera to aid in their training.

CUSTOMER SERVICE

EPCOR operates a customer service phone line to address concerns and answer question for the public. In 2008, a total of 39 calls were received (summarized below). The total number of calls is consistent with the number received in 2007.

2008 Customer Calls	
Construction Query	0
Pump Related Query	14
Service Area Query	1

Financial Query	0
Individual Service Query	5
General Query	0
Complaint	19
Total	39

- Construction – driveway issues, depth of connection, issues connected to original construction
- Pumps – requests for distribution info, pump specs
- Service Area – information requests re: inclusion in the SSA
- General – info on contractors, permitting, hook-ups, inspections
- Complaints – odours in system
- Individual Service – location of connection, requests for additional connections

All of the complaint calls were related to odours in the system. Of the 19, six were from residents of the adjacent mobile home park during construction at the park which disturbed the septic field. Five calls were from a homeowner on West Coast Road as we worked through the issue to resolve odours inside his home. In a similar situation, six calls were received from a homeowner on Grant Road West as we worked through his issues. The remaining calls were reports of odours in the system.

In addition to the customer service line, EPCOR contributed content to the District of Sooke's community newsletters for residents.

EPCOR also participated in a public information session in conjunction with the District of Sooke, providing information to homeowners on general care of the system, with specific information packages for those homeowners on pump systems.

APPENDICES

1. Monthly Data Summary
2. Outfall Monitoring Report – March 2008
3. Outfall Monitoring Report – November 2008
4. Sooke Outfall 2008 – Environmental Monitoring Report – June 2008

JANUARY 2008 MONTHLY DATA SHEET

		Influent							Effluent								
		In-house				External			In-house					External			
MSR Limits	Effluent Flow 1800* m^3	pH	TSS mg/L	COD mg/L	NH_3 mg/L	TSS mg/L	BOD mg/L	NH_3 mg/L	Temp °C	pH 6.0-9.0	TSS mg/L	COD mg/L	NH_3 * mg/L	TSS 45 mg/L	BOD 45 mg/L	Fecal Coliforms * #/100 ml	NH_3 * mg/L
1-Jan																	
2- Jan	1823	7.3	176	248		124	120	24	10	6.7	5	78		6	<4	23	4
3- Jan	1941	7.4	205	252	39				11	6.3	8	36	5				
4- Jan	1545	7.3	178	249					11	6.4	4	36					
5- Jan																	
6- Jan																	
7- Jan	1655	7.3	192	232					10	6.5	7	42					
8- Jan	1600	7.7	214	343					10	6.2	28	7				9	
9- Jan	1528	7.5	182	363					10	6.1	6.4	22					
10- Jan	1687	7.2	110	158					10	6.2	7.2	37					
11- Jan	2503	7.1	117	139					10	5.9	3.4	27					
12- Jan																	
13- Jan																	
14- Jan	1821	7.6	172	332	37	164	148	29	11	6.2	4	54	3	4	<4	16	1.7
15- Jan	2001	7.3	151	234	31				10	6.2	5	38	2			5	
16- Jan	1627	7.1	147	332					10								
17- Jan	1722																
18- Jan	1358	7.4	116	201	27												
19- Jan																	
20- Jan																	
21- Jan	1582	7.5	216	424					10	6.1	2	25				10	
22- Jan	1257	7.5	163	361	32				10	6.4	3	46	1				
23- Jan	1512	7.4	262	486	36				10	6.1	4	57	0			14	
24- Jan	1204	7.5	147	261	28				10	6.2	4	56	0				
25- Jan	1304	7.6	166	268	34				10	6.3	4	47	0				
26- Jan																	
27- Jan																	
28- Jan	1404	7.5	167	362					10	6.2	4	37				146	
29- Jan	1496	7.4	119	293					10	6.3	2	37					
30- Jan	1410	7.5	187	318					10	6.1	4	26				12	
31- Jan	1426	7.5	193	274					10	6.2	4	27					
MIN	1204	7.1	110	139	27	124	120	24	10	5.9	7	7	0	4	<4	5	1.7
MAX	2503	7.7	262	486	39	164	148	29	11	6.5	28	78	5	6	<4	146	4
AVG	1609	7.4	170	292	33	144	134	27	10	6	6	43	2	5	<4	16	2.85

Limits being clarified with Ministry of Environment. Monthly average reported for fecal coliforms is a geometric mean.

FEBRUARY 2008 MONTHLY DATA SHEET

		Influent							Effluent								
		In-house				External			In-house					External			
MSR Limits	Effluent Flow 1800* m^3	pH	TSS mg/L	COD mg/L	NH_3 mg/L	TSS mg/L	BOD mg/L	NH_3 mg/L	Temp °C	pH 6.0-9.0	TSS mg/L	COD mg/L	NH_3 * mg/L	TSS 45 mg/L	BOD 45 mg/L	Fecal Coliforms * #/100 ml	NH_3 * mg/L
1-Feb	1518	7.3	172	305					10	6.3	3	26					
2- Feb																	
3- Feb																	
4- Feb	1719	7.5	164	418		168	166		10	6.1	3	38		4	5		0.02
5- Feb	1391	7.6	207	376					10	6.3	2	40					
6- Feb	1659	7.4	152	236					10	6.1	4	20				310	
7- Feb																	
8- Feb																	
9- Feb																	
10- Feb																	
11- Feb	2046	7.2	141	189	28				10	6.1	2	39	1			11	
12- Feb	1840																
13- Feb	1756	7.3	112	238	29				10	6.3	3	44	1			19	
14- Feb	1646								10								
15- Feb	1498	7.4	99	203	23				10	6.4	5	38	1				
16- Feb																	
17- Feb																	
18- Feb																	
19- Feb	1445					178	214	35	10					3	6	29	2
20- Feb	1462	7.7	191	310	32				11	6.4	4	40	2			124	
21- Feb	1341								11								
22- Feb	1421	7.8	207	376	40				11	6.3	5	58	1				
23- Feb																	
24- Feb																	
25- Feb	1366	7.4	184	367	40				11	6.5	10	93	5			157	
26- Feb	1423																
27- Feb	1357	7.4	218	387	37				11	6.2	4	69	4			19	
28- Feb	1220																
29- Feb	1313	7.5	182	239	37				12	6.3	6	27	2				
MIN	1220	7.2	99	189	23	168	166	35	10	6.1	2	20	1	3	5	11	0.02
MAX	2046	7.8	218	418	40	178	214	35	12	6.5	10	93	5	4	6	310	2
AVG	1536	7.5	168	310	33	173	190	35	10	6.3	4	46	2	4	6	49	1

* Limits being clarified with Ministry of Environment. Monthly average reported for fecal coliforms is a geometric mean.

MARCH 2008 MONTHLY DATA SHEET

		Influent							Effluent								
		In-house				External			In-house					External			
MSR Limits	Effluent Flow 1800* m^3	pH	TSS mg/L	COD mg/L	NH_3 mg/L	TSS mg/L	BOD mg/L	NH_3 mg/L	Temp ^oC	pH 6.0-9.0	TSS mg/L	COD mg/L	NH_3 * mg/L	TSS 45 mg/L	BOD 45 mg/L	Fecal Coliforms * #/100 ml	NH_3 * mg/L
1-Mar	1469																
2- Mar	1469																
3- Mar	1469	7.5	224	338	37	224	233	30	11	6.4	4	45	2	2	<4	94	0.3
4- Mar	1469																
5- Mar	1394	7.3	210	330					11	6.3	5	28				42	
6- Mar	1475																
7- Mar	1333	7.6	142	274	37				12	6.3	4	34	0				
8- Mar	1387																
9- Mar	1387																
10- Mar	1387	7.2	165	341	36				12	6.3	5	64	2			36	
11- Mar	1355								12								
12- Mar	1353	7.4	224	366	36				12	6.4	4	45	2			13	
13- Mar	1357								12								
14- Mar	1352	7.2	203	293	35				12	6.2	3	46	3				
15- Mar	1414																
16- Mar	1414																
17- Mar	1414	7.4	165	363	40	158	614	34.3	12	6.4	3	34	5	4	<4	6	1.34
18- Mar	1372								12								
19- Mar	1195	7.1	220	268	37				12	6.2	2						
20- Mar	1371																
21- Mar	1370																
22- Mar	1370																
23- Mar	1332																
24- Mar	1332																
25- Mar	1332	7.1	128	324					12	6.1	6	43				15	
26- Mar	1532	7.3	176	318	42					6.2	8	53	4				
27- Mar	1448								12								
28- Mar	1445	7.0	168	360	37				11	6.0	6	45	2			14	
29- Mar	1471																
30- Mar	1471																
31- Mar	1471	7.1	276	457	41				12	6.1	9	62	3				
MIN	1195	7.0	128	268	35	158	233	30	11	6.0	2	28	0	2	4	6	0
MAX	1532	7.6	276	457	42	224	614	34	12	6.4	9	64	5	4	4	94	1
AVG	1400	7.3	192	336	38	191	424	32	12	6.2	5	45	3	3	4	22	1

* Limits being clarified with Ministry of Environment. Monthly average reported for fecal coliforms is a geometric mean.

APRIL 2008 MONTHLY DATA SHEET

		Influent							Effluent								
		In-house				External			In-house					External			
MSR Limits	Effluent Flow 1800* m^3	pH	TSS mg/L	COD mg/L	NH_3 mg/L	TSS mg/L	BOD mg/L	NH_3 mg/L	Temp ^oC	pH 6.0-9.0	TSS mg/L	COD mg/L	NH_3 * mg/L	TSS 45 mg/L	BOD 45 mg/L	Fecal Coliforms * #/100 ml	NH_3 * mg/L
1-Apr	1432																
2- Apr	1440	7.1	181	290	40	26	155	34.5									
3- Apr	1558								11	6.4	4	45	2	2	<4	94	0.3
4- Apr	1571	7.4	199	313													
5- Apr	1257								11	6.3	5	28				42	
6- Apr	1293																
7- Apr	1416	7.5	324	353					12	6.3	4	34	0				
8- Apr	1304																
9- Apr	1371	7.3	250	329	43												
10- Apr	1276								12	6.3	5	64	2			36	
11- Apr	1205	7.4	250	328	43				12								
12- Apr	1222								12	6.4	4	45	2			13	
13- Apr	1254	7.5	170	380					12								
14- Apr	1332								12	6.2	3	46	3				
15- Apr	1227																
16- Apr	1162	8.0	208	459		212	193	31.7									
17- Apr	1262								12	6.4	3	34	5	4	<4	6	1.34
18- Apr	1286	7.2	142	322					12								
19- Apr	1255								12	6.2	2						
20- Apr	1267																
21- Apr	1265	7.3	255	300		300	195	31.3									
22- Apr	1578																
23- Apr	1313	7.4	204	416													
24- Apr	1215																
25- Apr	1160	6.8	270	435					12	6.1	6	43				15	
26- Apr	1199									6.2	8	53	4				
27- Apr	1205								12								
28- Apr	1258	7.2	158	350					11	6.0	6	45	2			14	
29- Apr	1313																
30- Apr	1483	7.4	233	445													
MIN	1160	6.8	158	290	40	158	233	31.3	11	6.0	2	28	0	2	4	6	0
MAX	1578	8.0	324	459	43	224	614	34.5	12	6.4	9	64	5	4	4	94	1
AVG	1313	7.3	219	363	42	191	424	32.5	12	6.2	5	45	3	3	4	22	1

* Limits being clarified with Ministry of Environment. Monthly average reported for fecal coliforms is a geometric mean.

MAY 2008 MONTHLY DATA SHEET

		Influent							Effluent								
		In-house				External			In-house					External			
MSR Limits	Effluent Flow 1800* m^3	pH	TSS mg/L	COD mg/L	NH_3 mg/L	TSS mg/L	BOD mg/L	NH_3 mg/L	Temp °C	pH 6.0-9.0	TSS mg/L	COD mg/L	NH_3 * mg/L	TSS 45 mg/L	BOD 45 mg/L	Fecal Coliforms * #/100 ml	NH_3 * mg/L
1-May	1182								14								
2-May	1182	7.1	210	307					14	6.2	7	47					
3-May	1280																
4-May	1224																
5-May	1294	7.1	196	493		114	210	38.2	14	6.2	7	40		< 2	6	210	0.198
6-May	1444								14								
7-May	1334	7.3	208	393					14	6.2	7	54					
8-May	1188								14							62	
9-May	1109	7.3	162						14	6.2	9						
10-May	1205																
11-May	1215																
12-may	1281																
13-May	1260								15	6.2	11						
14-May	1393	7.2	260	363					15	6.3	10	60				6	
15-May	1200																
16-may	1429	7.3	210						16	6.3	8						
17-May	1409																
18-May	1156																
19-May	1208																
20-May	1295								15		6					137	
21-May	1096	7.3	405	382						6.2	14	89					
22-May	1173										4						
23-May	1173	7.4	355														
24-May	1145																
25-May	1192																
26-May	1279	6.7	330														
27-May	1177	7.3	152							6.3	4						
28-May	1302	7.3	187	782		184	201	40.4		6.4	4	57		8	11	248	11.8
29-May	1534															2000	
30-May	1257																
31-May	1177																
MIN	1096	6.7	152	307		114	201	38	14	6.2	4	40		2	6	6	0
MAX	1534	7.4	405	782		184	210	40	16	6.4	14	89		8	11	2000	12
AVG	1251	7.2	243	453		149	206	39	14	6.3	8	58		5	9	132	6

* Limits being clarified with Ministry of Environment. Monthly average reported for fecal coliforms is a geometric mean.

JUNE 2008 MONTHLY DATA SHEET

		Influent							Effluent								
		In-house				External			In-house					External			
MSR Limits	Effluent Flow 1800* m^3	pH	TSS mg/L	COD mg/L	NH_3 mg/L	TSS mg/L	BOD mg/L	NH_3 mg/L	Temp °C	pH 6.0-9.0	TSS mg/L	COD mg/L	NH_3 * mg/L	TSS 45 mg/L	BOD 45 mg/L	Fecal Coliforms * #/100 ml	NH_3 * mg/L
1-June	1208																13.4
2- June	1286	7.7	206	580		196	234	46		6.6	5	58		< 2	5	1570	
3-June	1253																14.9
4-June	1132	7.6	256	533	48			48		6.4	1	51	10			18	
5-June	1526	7.5			37					6.4			12				
6-June	1193	7.6	214							6.5	3						
7-June	1175																
8-June	1184																13.7
9-June	1229	7.4	202	588	48	86	191	38		6.4	4	46	13	3	< 4	770	
10-June	1315									6.3						12	
11-June	1349	7.5	240	769	48						0	152	5			52	
12-June	1125									6.2							
13-June	1125	7.5	145	310	41					6.4	2	48	4				
14-June	1151																
15-June	1168																0.6
16-June	1201	6.5	455	572	36	392	214	35		6.3	1		1	< 2	< 4	430	
17-June	1371																1.2
18-June	1154	7.3	168	523	36					6.1	1	25	0			18	
19-June	1133																
20-June	1343	7.3	110							6.4	2						
21-June	1311																
22-June	1181																
23-June	1197	7.3	165							6.1	2					4	
24-June	1154																
25-June	1221	7.4	219	430	41					6.0	5	0	1			6	
26-June	1098																
27-June	1242																
28-June	1137																
29June	1154																
30-June	1115																1
MIN	1098	6.5	110	310	36	86	191	35		6.0	0	0	0	2	4	4	15
MAX	1526	7.7	455	769	48	392	234	48		6.6	5	152	13	3	5	1570	9
AVG	1214	7.4	216	538	42	225	213	42		6.3	2	54	6	2	4	51	

* Limits being clarified with Ministry of Environment. Monthly average reported for fecal coliforms is a geometric mean.

JULY 2008 MONTHLY DATA SHEET

		Influent							Effluent								
		In-house				External			In-house					External			
MSR Limits	Effluent Flow 1800* m^3	pH	TSS mg/L	COD mg/L	NH_3 mg/L	TSS mg/L	BOD mg/L	NH_3 mg/L	Temp °C	pH 6.0-9.0	TSS mg/L	COD mg/L	NH_3 * mg/L	TSS 45 mg/L	BOD 45 mg/L	Fecal Coliforms * #/100 ml	NH_3 * mg/L
1-July	1395																
2- July	1207	7.4	335	662	46	169	254	49						4			.317
3-July	1192																
4-July	1321	7.2	149														
5-July	1285										21						
6-July	1221																
7-July	1488	7.2	188								12						
8-July	1297	7.2	128							6.8							
9-July	1164	7.3	197	445	38								2				
10-July	1201																
11-July	1298	7.4	228							6.2	12						
12-July	1135																
13-July	1162																
14-July	1178	6.8	156			154	224	36		6.0	7			5	6	122	2.8
15-July	1191								19								
16-July	1253	7.1	149	373	35				19	6.3	8	35	1				
17-July	1207								19								
18-July	1210		158						19	6.4	12						
19-July	1212																
20-July	1201																
21-July	1200		174						19	6.4	11					2	
22-July	1320								19							340	
23-July	1140	7.4	206	374	40				19	6.3	6	0	0			1	
24-July	1150								19							10	
25-July	1193		167						19	6.4	8						
26-July	1202																
27-July	1205																
28-July	1231	7.4	178						20	6.3	5					24	
29July	1282								19								
30-July	1242	7.2	273	314			50		19	6.4	7	0	0			26	
31-July	1327																
MIN	1135	6.8	128	373	35	154	50	36	19	6.0	5	0	0	5	6	1	2.8
MAX	1488	7.4	335	662	46	169	254	49	20	6.6	21	35	1	5	6	340	2.8
AVG	1236	7.2	192	434	39	162	176	42	19	6.4	9	12	0	5	6	18	2.8

* Limits being clarified with Ministry of Environment. Monthly average reported for fecal coliforms is a geometric mean.

AUGUST 2008 MONTLY DATA SHEET

		Influent							Effluent								
		In-house				External			In-house					External			
MSR Limits	Effluent Flow 1800* m^3	pH	TSS mg/L	COD mg/L	NH_3 mg/L	TSS mg/L	BOD mg/L	NH_3 mg/L	Temp °C	pH 6.0-9.0	TSS mg/L	COD mg/L	NH_3 * mg/L	TSS 45 mg/L	BOD 45 mg/L	Fecal Coliforms * #/100 ml	NH_3 * mg/L
1-Aug	1405	7.3	115							6.6	7	46					
2- Aug	1226																
3-Aug	1253																
4-Aug	1264																
5-Aug	1286	7.2	124						19	6.4	1						
6-Aug	1044	7.3	221	340	36				19	6.3	16	0	< DL				
7-Aug	1357								19								
8-Aug	1407	7.6	238						19	6.4	10						
9-Aug	1584																
10-Aug	1247																
11-Aug	1220	7.6	254						19	6.3	10						
12-Aug	1154																
13-Aug	1278	7.3	132	403	36	208	167	40	19	6.4	4	29	3	7	< 4	291	1.9
14-Aug	1265																
15-Aug	1459	7.2	163						20	6.3	7						
16-Aug	1098																
17-Aug	1287																
18-Aug	1381	7.0	207						20	6.3	3						
19-Aug	1333																
20-Aug	1361	7.4	200	467	15	198	187	40	20	6.5	3		< DL	< 2	< 4	20	0.3
21-Aug	1374								20							4	
22-Aug	1290	7.2	95						20	6.4	5						
23-Aug	1401																
24-Aug	1381																
25-Aug	1445	6.8	252						19	6.3	2						
26-Aug	1573								19							4	
27-Aug	1398	7.2	183	260	35				19	6.2	2	33	< DL			3	
28-Aug	1473								19								
29-Aug	1545	7.2	114						19	6.1	2						
30-Aug	1311																
31-Aug	1200																
MIN	1044	6.8	95	260	15	198	167	40	19	6.1	1	0	0	2	4	3	0
MAX	1584	7.6	254	467	36	208	187	40	21	6.6	16	46	3	7	4	291	2
AVG	1337	7.3	177	368	31	203	177	40	20	6.4	5	27	1	5	4	12	1

* Limits being clarified with Ministry of Environment. Monthly average reported for fecal coliforms is a geometric mean.

SEPTEMBER 2008 MONTHLY DATA SHEET

		Influent							Effluent								
		In-house				External			In-house					External			
MSR Limits	Effluent Flow 1800* m^3	pH	TSS mg/L	COD mg/L	NH_3 mg/L	TSS mg/L	BOD mg/L	NH_3 mg/L	Temp ° C	pH 6.0-9.0	TSS mg/L	COD mg/L	NH_3 * mg/L	TSS 45 mg/L	BOD 45 mg/L	Fecal Coliforms * #/100 ml	NH_3 * mg/L
1-Sept	1197																
2- Sept	1391	7.4	220						19	6.3							
3-Sept	1380	7.4	174	521	44	180	287	46	19	6.2	1	28	1	4	< 4	16	0.3
4-Sept	1354																
5-Sept	1197	7.5	188						19	6.3	1						
6-Sept	1359																
7-Sept	1184																
8-Sept	1299	7.4	109						19	6.4	1						
9-Sept	1302								19					3	< 4		
10-Sept	1301	7.5	300	740	47	282	230	42	19	6.8	5	0	0			14	0.2
11-Sept	1190								19							54	
12-Sept	1251	7.6	234						19	6.5	4						
13-Sept	1251																
14-Sept	1253																
15-Sept	1293	7.4	194						19	6.4	3						
16-Sept	1355								19								
17-Sept	1135	7.5	236	600		226	293		19	6.4	6	24				14	
18-Sept	1226								19								
19-Sept	1162	7.9	170						19	6.4	2						
20-Sept	1266								19								
21-Sept	1299																
22-Sept	1241	7.4	242						19	6.5	4						
23-Sept	1259								19								
24-Sept	1359	7.7	240	583	43	226	186		19	6.5	2	28	2			28	
25-Sept	1202								19								
26-Sept	1306	7.8	314						19	6.5	1						
27-Sept	1256																
28-Sept	1188																
29-Sept	1263	7.2	143						19	6.4							
30-Sept	1281								19								
MIN	1135	7.2	109	521	43	180	186	42	19	6.2	1	0	0	3	4	14	0.2
MAX	1391	7.9	314	740	47	282	293	46	19	6.8	6	28	2	4	4	54	0.3
AVG	1267	7.5	213	611	45	229	249	44	19	6.4	3	20	1	4	4	22	0.3

* Limits being clarified with Ministry of Environment. Monthly average reported for fecal coliforms is a geometric mean.

OCTOBER 2008 MONTHLY DATA SHEET

		Influent							Effluent								
		In-house				External			In-house					External			
MSR Limits	Effluent Flow 1800* m^3	pH	TSS mg/L	COD mg/L	NH_3 mg/L	TSS mg/L	BOD mg/L	NH_3 mg/L	Temp ° C	pH 6.0-9.0	TSS mg/L	COD mg/L	NH_3 * mg/L	TSS 45 mg/L	BOD 45 mg/L	Fecal Coliforms * #/100 ml	NH_3 * mg/L
1-Oct	1366	7.3	217	629		136	202	35	19	6.4	10		0.5	10	4	260	0.3
2-Oct	1213																
3-Oct	1152								19	6.3	9						
4-Oct	1260																
5-Oct	1321																
6-Oct	1325	7.7	192						18	6.5	12						
7-Oct	1226																
8-Oct	1331	7.4	314	789	44	102	155	52	18	6.3	10		0.6	5	< 4	74	0.5
9-Oct	1323																
10-Oct	1255	7.4	129						18	6.4	7						
11-Oct	1201																
12-Oct	1393																
13-Oct	1259																
14-Oct	1346	7.4	339						17	6.4	4					260	
15-Oct	1314	7.5	188	560	21	218	174		17	6.4	4	31	< DL			128	
16-Oct	1202								17								
17-Oct	1321	7.4	330						17	6.4	3						
18-Oct	1218																
19-Oct	1243																
20-Oct	1318	7.5	218						17	6.4	4						
21-Oct	1448																
22-Oct	974	7.6	278	302	18	272	202		17	6.3	7	7	< DL			410	
23-Oct	1356															132	
24-Oct	1253	7.8	284						16	6.2	8						
25-Oct	1251																
26-Oct	1247																
27-Oct	1402	7.7	216						16	6.4	7					22	
28-Oct	1146										6					30	
29 Oct	1352	7.7	249	578	30				16	6.4	4	23	2			90	
30-Oct	1147															260	
31-Oct	1215	7.3	171						16	6.4	6						
MIN	974	7.3	129	302	18	102	155	35	16	6.2	3	7	0	5	< 4	22	0.3
MAX	1448	7.8	339	789	44	272	202	52	19	6.5	12	31	2	10	4	410	0.5
AVG	1270	7.5	240	572	28	182	183	43	17	6.4	7	20	0.6	7.5	4	118	0.4

* Limits being clarified with Ministry of Environment. Monthly average reported for fecal coliforms is a geometric mean.

NOVEMBER 2008 MONTHLY DATA SHEET

		Influent							Effluent								
		In-house				External			In-house					External			
MSR Limits	Effluent Flow 1800* m^3	pH	TSS mg/L	COD mg/L	NH_3 mg/L	TSS mg/L	BOD mg/L	NH_3 mg/L	Temp ° C	pH 6.0-9.0	TSS mg/L	COD mg/L	NH_3 * mg/L	TSS 45 mg/L	BOD 45 mg/L	Fecal Coliforms * #/100 ml	NH_3 * mg/L
1-Nov	1242																
2-Nov	1227																
3-Nov	1453	7.5	209						16	6.6	7						
4-Nov	1395															78	
5-Nov	1456	7.6	321	785	22	186	292	49	16	6.4	5	45	6	9	5	260	9.4
6-Nov	1189															100	
7-Nov	1794	7.3	185						15	6.1	11						
8-Nov	2591																
9-Nov	1977	7.5	210														
10-Nov	1764									6.7	13						
11-Nov	1605																
12-Nov	1744	7.4	136	226	13				14	6.6	14	62	12				
13-Nov	2952								14								
14-Nov	2089	7.3	134						14	6.5	12						
15-Nov	1752																
16-Nov	1625																
17-Nov	1632	7.2	190						14	6.7	8						
18-Nov	1547								15							240	
19-Nov	1598	7.5	291	790	22	217	272	36		6.6	7	25	15	12	9	58	10.0
20-Nov	1356								15							194	
21-Nov	1358	7.3	158							6.6	6						
22-Nov	1494																
23-Nov	1606																
24-Nov	1592	7.2	118						14		3					60	
25-Nov	1459								14		5					26	
26-Nov	1433	7.6	121	425	24				14	6.4	7	14	8			40	
27-Nov	1437								14							170	
28-Nov	1370	7.4	233						14	6.3	21						
29 Nov	1448																
30-Nov	1549																
MIN	1189	7.2	118	226	13	186	272	36	14	6.1	3	14	6	9	5	26	9.4
MAX	2952	7.6	321	790	24	217	292	49	16	6.7	21	62	15	12	9	260	10.0
AVG	1624	7.4	192	557	20	202	282	43	14	6.5	9	37	10	11	7	95	9.7

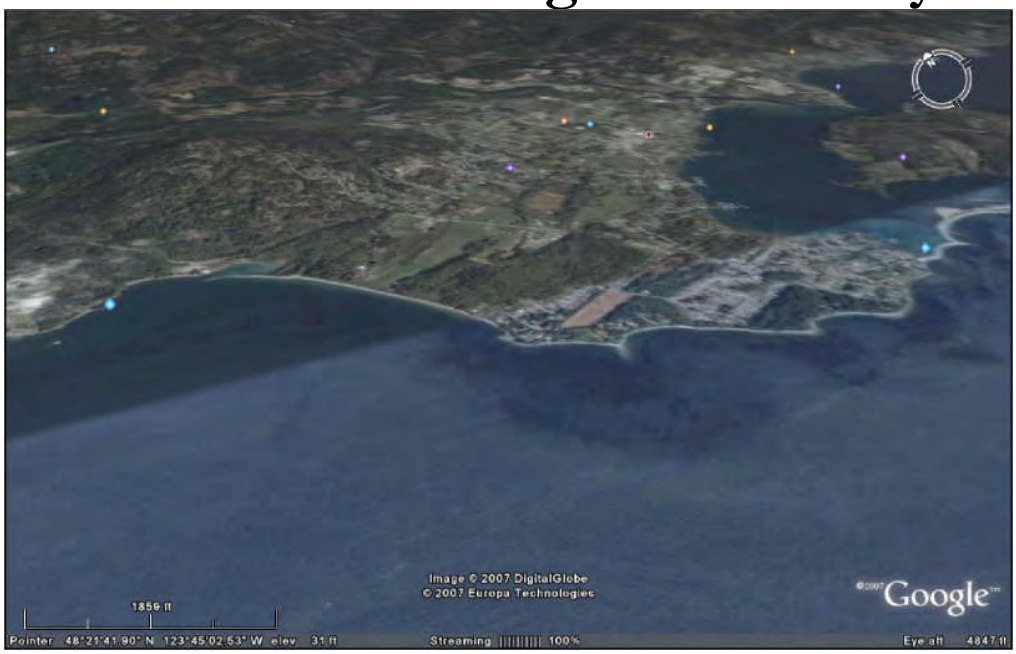
* Limits being clarified with Ministry of Environment. Monthly average reported for fecal coliforms is a geometric mean.

DECEMBER 2008 MONTHLY DATA SHEET

		Influent							Effluent								
		In-house				External			In-house					External			
MSR Limits	Effluent Flow 1800* m^3	pH	TSS mg/L	COD mg/L	NH_3 mg/L	TSS mg/L	BOD mg/L	NH_3 mg/L	Temp ° C	pH 6.0-9.0	TSS mg/L	COD mg/L	NH_3 * mg/L	TSS 45 mg/L	BOD 45 mg/L	Fecal Coliforms * CFU/100 ml	NH_3 * mg/L
1-Dec	1549	7.2	213						14	6.5			2				
2-Dec	1526								14		17					8500	
3-Dec	1599	7.4	224	370	21	188	108	20	14	6.2	12	23		14	8	80	0.3
4-Dec	1406								14		9					130	
5-Dec	1415	7.4	178						14	6.5	12						
6-Dec	1492																
7-Dec	1382																
8-Dec	1430	7.4	178						14	6.6	13					630	
9-Dec	1453								14		13					132	
10-Dec	1519	7.2	182	319	16				14	6.4	12	54	4			60	
11-Dec	1407															2	
12-Dec	1481	6.9	191						14	6.5	7						
13-Dec	1696																
14-Dec	1662																
15-Dec	1525	6.9	142						12	6.4	7					88	
16-Dec	1537								12		10					30	
17-Dec	1513	7.1	254	372	17	288	632	33	12	6.6	7	38	4	9	14	380	7.0
18-Dec	1557								12		8						
19-Dec	1587	7.7	240						11	6.5	9						
20-Dec	1402																
21-Dec	1618																
22-Dec	1551	7.4	184						11	6.6	9						
23-Dec	1495																
24-Dec	1784																
25-Dec	1468																
26-Dec	1556	7.3	301						11	6.7	13						
27-Dec	1465																
28-Dec	2311																
29 Dec	2607		92						10		6						
30-Dec	2979								10		3						
31-Dec	2675	7.1	62	165	16				10	6.4	10	15	2				
MIN	1382	6.9	62	165	16	188	108	20	10	6.0	3	15	2	9	8	2	0
MAX	2979	7.7	301	372	21	288	632	33	14	6.7	17	54	4	14	14	8500	7
AVG	1632	7.3	198	354	18	238	262	27	13	6.5	10	33	3	12	11	124	4

* Limits being clarified with Ministry of Environment. Monthly average reported for fecal coliforms is a geometric mean.

Wastewater Treatment Plant Receiving Waters Monitoring in Sooke Bay



March 2008

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Introduction

Sooke Bay is located approximately 35 km east of Victoria on the southwest coast of Vancouver Island, British Columbia (Figure 1). Epcor Water Services was contracted to construct a new wastewater treatment facility and outfall infrastructure to accommodate present and future population growth in the municipality of Sooke. This newly constructed system began operation in December 2005. To comply with the regulations outlined by the Ministry of Environment; discharge of effluent must be monitored to ensure that the guidelines outlined in the Municipal Sewage Regulation are adhered to.

Pacificus Biological Services was contracted to perform a marine environmental water sampling survey on March 26, 2008. The objectives of this survey were to measure the following within the receiving waters environment:

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

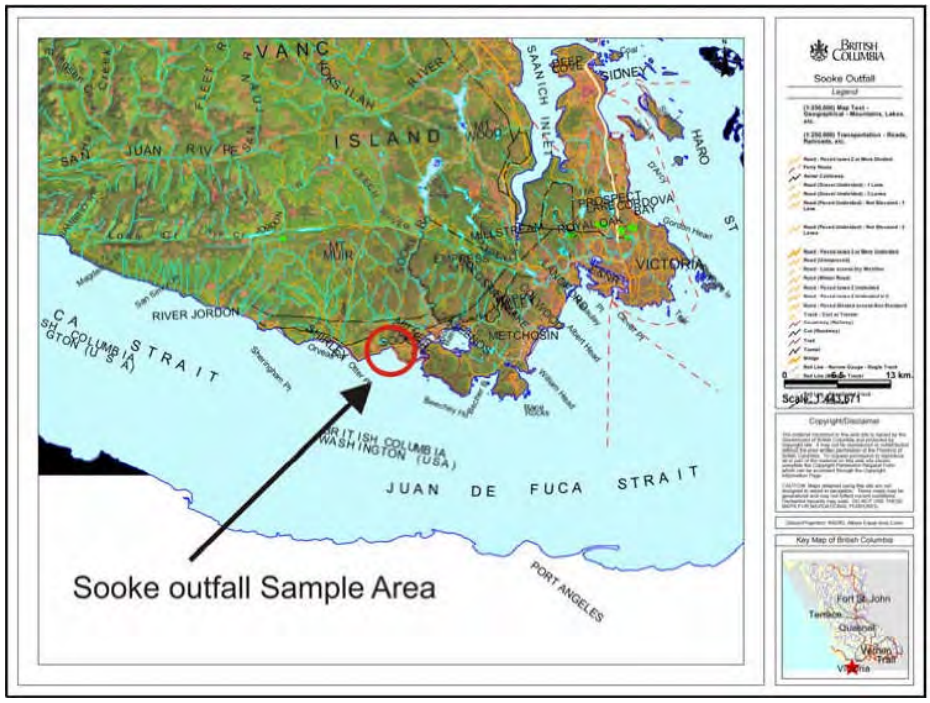

Figure 1: General Location of sample sites, Sooke Bay, British Columbia

Methodology

Four sampling points had been determined for the pre-discharge monitoring program by Epcor and provincial ministry staff including (figure 2):

1. One at the outfall location;
2. One at 100m initial dilution zone to north of the outfall diffuser, as required by the Ministry of Sustainable Resource Management;
3. One at 1 00m initial dilution zone to the south of the outfall diffuser, as required by the Ministry of Sustainable Resource Management;
4. One at 300m point toward the shore away from the outfall diffuser, as required by Environment Canada;

Figure 2: Sooke Bay receiving water-sampling locations (approximate).

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 trap.

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. states: “The profile data indicate that the water column in Sooke Bay is generally well-mixed (unstratified) throughout the year”. At the time of sampling, the water column in Sooke Bay was not stratified, thus only surface samples were gathered.

A Pacificus biologist navigated to the sample sites using a handheld Garmin GPS (with pre-recorded sample site waypoints) and gathered water samples at the appropriate depths using an economy water sampler. Dissolved Oxygen, conductivity, salinity, pH and temperature readings were taken and recorded in the field. A YSI Model 85 handheld multi parameter testing system was used to measure oxygen, conductivity, salinity and temperature.

BOD, TSS, Ammonia and Fecal coliform parameters were stored in sample jars and analyzed by North Island Laboratories (within 4 hours). Sampling completed for the Receiving Waters Monitoring in Sooke Bay is in accordance to methodologies specified by the latest version of the "BC field Sampling Manual for continuous Monitoring plus the collection of Air, Air-Emission, Water, Wastewater, Soil, Sediments and Biological Samples".

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Ammonia in Water

Analysis was performed based on Standard Methods for the Examination of Water and Wastewater, 19th Ed. (1995); Method 4500-NH3.

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Microbiological Parameters

Analyses were performed using procedures based on those described in "B.C. Environmental Laboratory Manual for the Analysis of Water, Wastewater, Sediment and Biological Materials (2003 Edition) and "Standard Methods for the Examination of Water and Wastewater", 20th Edition (1998). Analysis was performed at CANTEST Ltd. Victoria Laboratory.

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

BOD	5 mg/L
Ammonia	0.002 mg/L
Fecal Coliforms	2 MPN/100mL
Total Suspended Solids	5 mg/L

Please contact CANTEST Ltd (1-800-865-8566) if you require more information with respect to sampling methodologies and procedures

All testing completed for the Receiving Waters Monitoring in Sooke Bay were carried out using methodologies specified by the latest version of the" BC Environmental Laboratory Manual for the Analysis of Water, Wastewater, Sediments, Biological Materials and Discrete Ambient Air Samples".

Results

Specific results for each of the sites are listed in Table 1. The receiving waters surrounding the Sooke outfall contained acceptable levels of ammonia, BOD, fecal

coliform, and total suspended solids. Photo 1 represents, in general, the areas designated for sites 1 through 4.

Photo 1: General location of sites 1 through 4

Table 1: Epcor wastewater treatment plant outfall receiving waters sampling results October 2005 through March 26, 2008.

Sample No	Date	Depth (m)	pH	Cond (mS/cm)	D.Oxygen %	Salinity (ppt)	Temperature °C	Fecal Col. CFU/100mL	BOD mg/L	TSS mg/L	Ammonia mg/L
#1 Outfall (pre discharge)	Oct-05	2	8.1	33.91	66%	30.7	9.9	2	<5.0	22	no data
	Oct-05	12	7.8	34.41	65.70%	31.6	9.6	2	<5.0	16	no data
#2 100m north of outfall (pre-discharge)	Oct-05	2	8	33.7	66%	30.5	9.8	<2	<5.0	16	no data
	Oct-05	12	7.7	34.39	65.50%	31.8	9.6	<2	<5.0	15	no data
#3 100m south of outfall (pre-discharge)	Oct-05	2	8.1	33.85	68%	30.6	9.9	5	<5.0	18	no data
	Oct-05	12	7.9	34.32	65.80%	31.7	9.5	<2	<5.0	22	no data
#4 300m south of outfall (pre-discharge)	Oct-05	2	8	33.8	66%	30.5	9.9	<2	<5.0	17	no data
	Oct-05	12	7.6	34	66%	31.7	9.5	<2	<5.0	17	no data
#5 Sooke Harbour (pre-discharge)	Oct-05	2	8.1	34.2	67%	30.8	9.8	<2	no data	no data	no data
	Oct-05	12	7.8	34.5	66%	31.8	9.7	<2	<5.0	15	no data
# 1 Outfall	Apr-06	2	8	32.98	9.75	30.4	9.4	<1	<5.0	38	<0.002
	Apr-06	9	7.9	33.04	9.22	30.7	9	<1	<5.0	23	0.042
# 2 100m north of outfall	Apr-06	2	8.1	31.87	9.74	30.1	9.5	<1	<5.0	21	<0.002
	Apr-06	9	8	33.67	9.31	31.1	9.1	1	<5.0	32	0.056
# 3 100m south of outfall	Apr-06	2	8.1	32.8	9.74	30.2	9.7	<1	<5.0	21	<0.002

Sample No	Date	Depth (m)	pH	Cond (mS/cm)	D.Oxygen %	Salinity (ppt)	Temperature °C	Fecal Col. CFU/100mL	BOD mg/L	TSS mg/L	Ammonia mg/L
3 100m south of outfall	**Apr-06**	9	8.1	15.3	9.9	30.6	9.9	<1	<5.0	18	<0.002
# 4 300m south of outfall	**Apr-06**	2	8.1	32.87	9.77	30.2	9.5	<1	<5.0	12	0.027
	Apr-06	9	8	18.95	9.87	30.9	9.2	<1	<5.0	43	<0.002
# 1 Outfall	**Sep-06**	2	8.3	35.5	65.8	30.7	10.8	<1	<5.0	18	0.023
	Sep-06	12	7.9	35.29	63.5	31.7	10.5	45	<5.0	20	0.023
# 2 100m north of outfall	**Sep-06**	2	7.9	35.56	66	30.6	10.8	4	<5.0	23	0.02
	Sep-06	12	7.8	35.34	60.7	31.8	10.5	39	<5.0	21	0.018
# 3 100m south of outfall	**Sep-06**	2	7.8	35.48	63.1	30.5	10.7	104	<5.0	18	0.018
	Sep-06	12	7.8	35.39	60.1	31.2	10.5	36	<5.0	18	0.016
# 4 300m south of outfall	**Sep-06**	2	7.8	35.59	63.6	31.1	10.9	56	<5.0	17	0.022
	Sep-06	12	7.8	35.38	59.4	31.8	10.5	52	<5.0	29	0.016
# 1 Outfall	**Jan-07**	2	8.3	46.7	75.9	30	7.2	1	<5.0	<1	0.01
	Jan-07	12	7.9	31.4	75.6	30.4	7.3	2	<5.0	4	0.02 <.01
# 2 100m north of outfall	**Jan-07**	2	8	31.52	75.8	30.9	7.1	<1	<5.0	4	<.01
	Jan-07	12	8	31.61	75.6	30.7	7.3	1	<5.0	5	<.01

Sample No	Date	Depth (m)	pH	Cond (mS/cm)	D.Oxygen %	Salinity (ppt)	Temperature oc	Fecal Col. CFU/100mL	BOD mg/L	TSS mg/L	Ammonia mg/L
# 3 100m south of outfall	Jan-07	2	8	31.56	78.1	30.8	7.1	<1	<5.0	3	<.01
	Jan-07	12	8	31.59	79.2	30.7	7.3	1	<5.0	3	<.01
# 4 300m south of outfall	Jan-07	2	8	31.62	76.9	30.3	7.2	2	<5.0	2	0.01
	Jan-07	12	7.9	31.58	79.3	30.4	7.4	2	<5.0	2	<.01
# 1 Outfall	May-07	2	8.3	33.84	80.9	31.5	9	<2	<5.0	18	0.01
# 2 100m north of outfall	May-07	2	8	33.63	77.3	31.5	8.9	<2	<5.0	11	0.05
# 3 100m south of outfall	May-07	2	7.9	33.82	80.9	31.5	9	<2	<5.0	13	0.01
# 4 300m south of outfall	May-07	2	8	33.8	83.6	31.6	9	<2	<5.0	24	0.01
# 1 Outfall	Sep-07	2	7.9	34.24	52.6	32.1	8.8	<1	<5.0	8	0.04

Sample No	Date	Depth (m)	pH	Cond ($_m$S/cm)	D.Oxygen %	Salinity (ppt)	Temperature ^oc	Fecal Col. CFU/100mL	BOD mg/L	TSS mg/L	Ammonia mg/L
# 2 100m north of outfall	**Sep-07**	2	7.6	35	52.8	31.8	8.7	<1	<5.0	8	0.05
# 3 100m south of outfall	**Sep-07**	2	7.8	34.36	52.7	32	8.8	<1	<5.0	9	0.04
# 4 300m south of outfall	**Sep-07**	2	7.5	33.69	52.8	31.9	8.7	<1	<5.0	8	0.04
# 1 Outfall	**Mar-08**	2	7.9	47.31	102.9	30.4	7.1	<1	<5.0	13	0.04
# 2 100m north of outfall	**Mar-08**	2	7.7	46.14	115.4	30.6	7.4	<1	<5.0	16	0.03
# 3 100m south of outfall	**Mar-08**	2	8	49.22	116.5	30.1	7.4	<1	<5.0	14	0.03
# 4 300m south of outfall	**Mar-08**	2	7.7	50.11	109.6	30.1	7.5	<1	<5.0	20	0.05

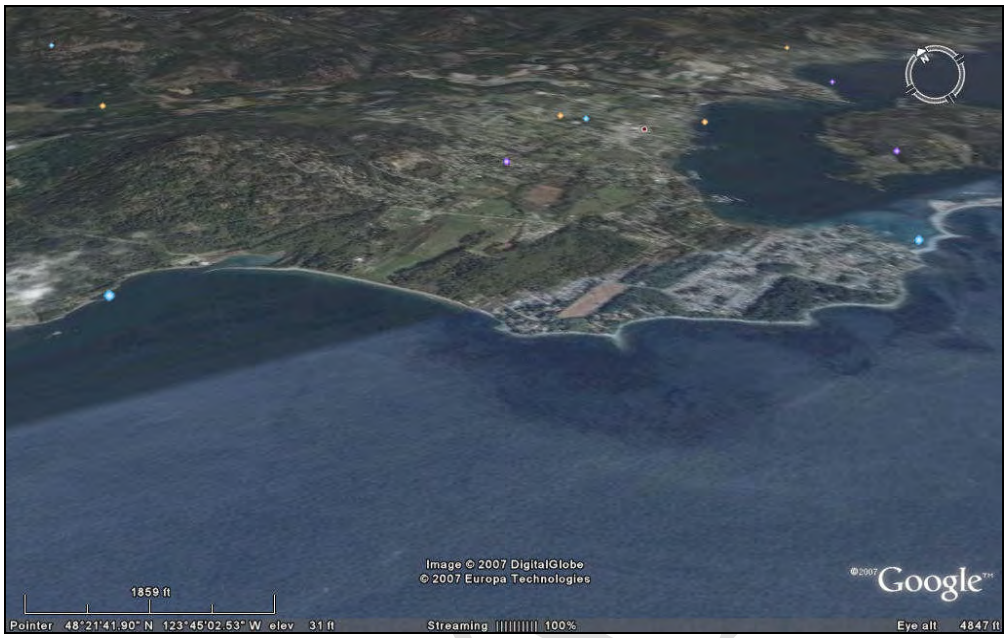
Conclusion

The March 2008 environmental monitoring of the Sooke outfall receiving waters is complete. All analyzed parameters were within acceptable ranges. Additional monitoring is recommended in 6 months time to ensure the plant is operating properly and the oceanic environment is not being negatively impacted.

Reference:

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

Wastewater Treatment Plant Receiving Waters Monitoring in Sooke Bay



November 2008

Prepared for:

Tami Wetmore
Operations Manager
7113 West Coast Road Sooke, BC
V0S 1N0

Prepared by:

PACIFICUS
Biological Services Ltd

TABLE OF CONTENTS

Introduction

Sooke Bay is located approximately 35 km east of Victoria on the southwest coast of Vancouver Island, British Columbia (Figure 1). Epcor Water Services was contracted to construct a new wastewater treatment facility and outfall infrastructure to accommodate present and future population growth in the municipality of Sooke. This newly constructed system began operation in December 2005. To comply with the regulations outlined by the Ministry of Environment; discharge of effluent must be monitored to ensure that the guidelines outlined in the Municipal Sewage Regulation are adhered to.

Pacificus Biological Services was contracted to perform a marine environmental water sampling survey on October 30, 2008. The objectives of this survey were to measure the following within the receiving waters environment:

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

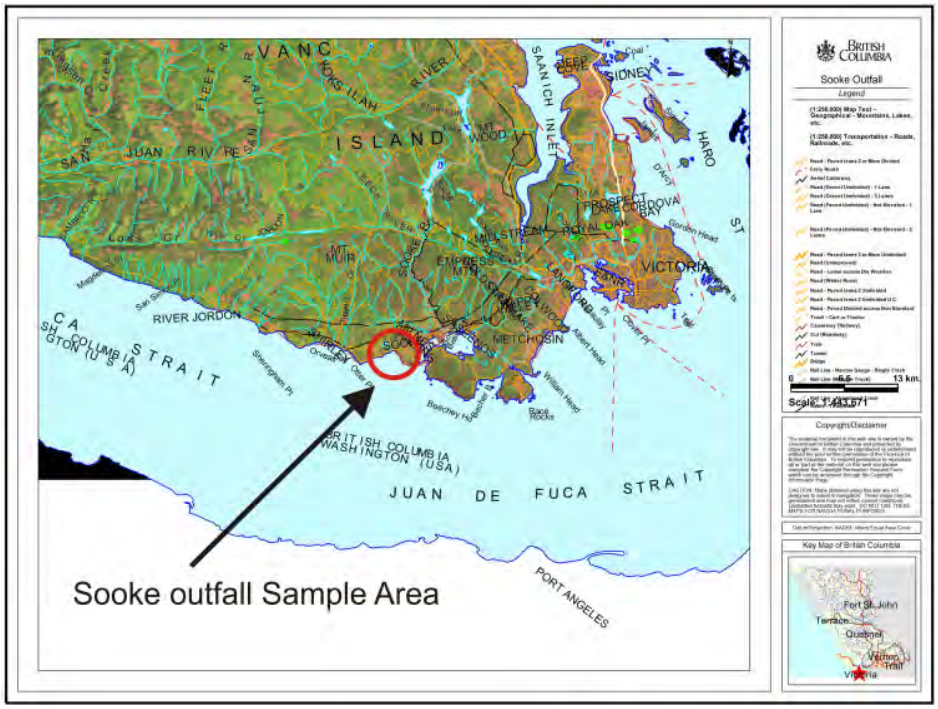


Figure 1: General Location of sample sites, Sooke Bay, British Columbia

Methodology

Four sampling points had been determined for the pre-discharge monitoring program by Epcor and provincial ministry staff including (figure 2):

1. One at the outfall location;
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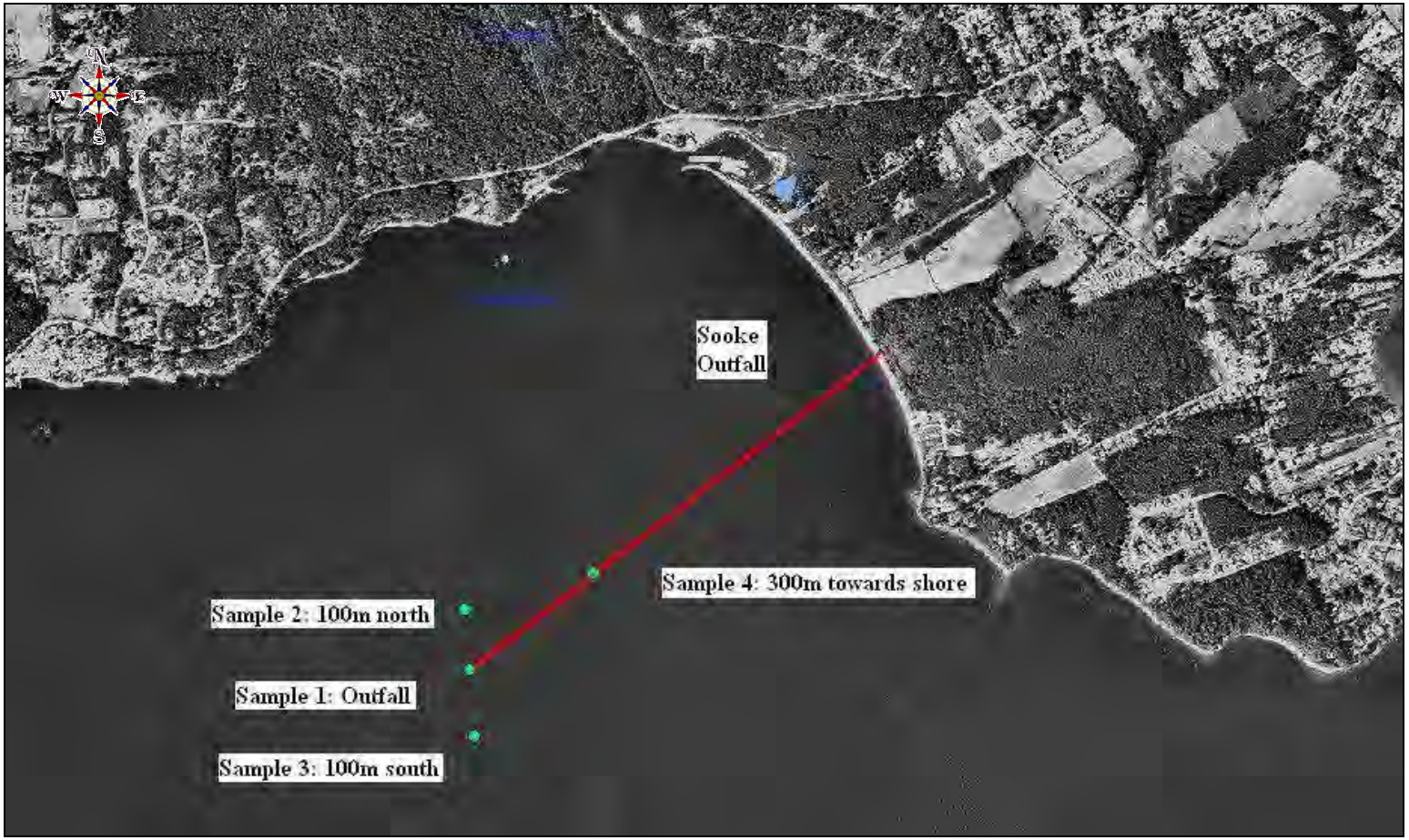

Figure 2: Sooke Bay receiving water-sampling locations (approximate).

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 trap.

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. states: "The profile data indicate that the water column in Sooke Bay is generally well-mixed (unstratified) throughout the year". At the time of sampling, the water column in Sooke Bay was not stratified, thus only surface samples were gathered.

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

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Fecal Coliforms	0.01 mg/L
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Please contact CANTEST Ltd (1-800-865-8566) if you require more information with respect to sampling methodologies and procedures

All testing completed for the Receiving Waters Monitoring in Sooke Bay were carried out using methodologies specified by the latest version of the" BC Environmental Laboratory Manual for the Analysis of Water, Wastewater, Sediments, Biological Materials and Discrete Ambient Air Samples".

Results

Specific results for each of the sites are listed in Table 1. The receiving waters surrounding the Sooke outfall contained acceptable levels of ammonia, BOD, fecal coliform, and total suspended solids. Photo 1 represents, in general, the areas designated for sites 1 through 4.

Photo 1: General location of sites 1 through 4

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# 1 Outfall	2	8.3	34.4	50.4	32.3	8.9	<1	<5	<1	0.02
# 2 100m north of outfall	2	8.3	34.4	50.1	32.3	8.9	1	<5	6	<.0.01
# 3 100m south of outfall	2	8.3	34.4	52.8	32.3	8.9	2	<5	2	<0.01
# 4 300m south of outfall	2	8.3	34.38	56.1	32	9.1	1	<5	<1	0.01

Conclusion

The October 2008 environmental monitoring of the Sooke outfall receiving waters is complete. All analyzed parameters are within acceptable ranges. Additional monitoring is recommended in 6 months time to ensure the plant is operating properly and the oceanic environment is not being negatively impacted.

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WorleyParsons Komex
resources & energy

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Facsimile: +1 250 384 1201
worleyparsons.com

4 June 2008

Proj. No.: V17420200
File Loc.: Victoria

EPCOR Utilities Inc.
7113 West Coast Road
Sooke, BC
V9Z 0S1

Attention: Mr. John Reynolds

RE: SOOKE OUTFALL - 2008 ENVIRONMENTAL MONITORING REPORT

1. INTRODUCTION

Fisheries Authorization 03-HPAC-PA3-000-000620, which authorized the construction of the Sooke Outfall within marine fish habitat, required the project proponent to carry out environmental monitoring one year (2006) and three years (2008) after construction was completed. This report summarizes the conditions observed in 2008, the final year of monitoring.

The monitoring program covered the following habitat components as recommended by the Fisheries Authorization and the post construction impact assessment (AMR 2005):

a) Replanted dunegrass

b) Re-colonization of the outfall corridor in the nearshore zone (primarily kelp and eelgrass/surfgrass habitat, Station 0+45 to 4+50)

c) Geoduck enhancement of 560 geoduck clams (conducted by the Underwater Harvesters Association)

2. MONITORING SURVEY

On April 4 and 5, 2008 WorleyParsons Komex conducted a dive survey and intertidal survey of the Sooke Outfall (Figure 1). Observations of vegetation, invertebrates and fish were recorded and documented on video. The following subsections describe the observed conditions of the three habitat monitoring components.

2.1 Dunegrass

In 2005, approximately 20 m^2 of dunegrass (*Elymus mollis*) was removed from the outfall corridor prior to construction and replanted following construction, within 1 week of removing the dunegrass (AMR 2005). Monitoring conducted in 2006 noted that winter storms in 2005 washed out the replanted dunegrass but also caused a broader loss of dunegrass in Sooke Bay as a result of the high water level conditions (WPK 2006). Since Sooke Bay is exposed, experiencing high wave energies, it was not recommended that further efforts to replant dunegrass be undertaken due to the anticipated difficulty in maintaining the plantings in a high wave energy zone.

Shoots of dune grass and sea milk-wort (*Glaux maritima*) were observed within the construction corridor during the 2008 monitoring survey. The shoots were likely rhizomes extending from established plant communities on either side of the construction corridor. This method of recolonization is anticipated to be the most effective for re-colonizing the construction corridor.

2.2 Kelp and Eelgrass/Surfgrass Habitat

Jetting operations during construction impacted a corridor of kelp habitat approximately 4 m x 125 m through physical damage and substrate disturbance in the shallow subtidal zone above 10 m depth between Stations 0+45 to 4+50 (AMR 2005). A dense (over 100% cover at some locations) and diverse growth of vegetation has recolonized the outfall and formerly disturbed substrate areas in the shallow (< 10 m depth) subtidal zone (Photo 1) as was also observed during the 2006 monitoring survey. Canopy, stalked, and bladed kelps were observed growing on the pipeline including bull kelp (*Nereocystis luetkeana*), *Pterygophora californica*, *Laminaria sp.*, *Desmarestia sp.*, *Costaria costata* and *Cymathere triplicata*. Other vegetation including rainbow leaf (*Mazzaella splendens*), sea lettuce (*Ulva sp.*) and filamentous red algae have also colonized the outfall and formerly disturbed substrate areas.

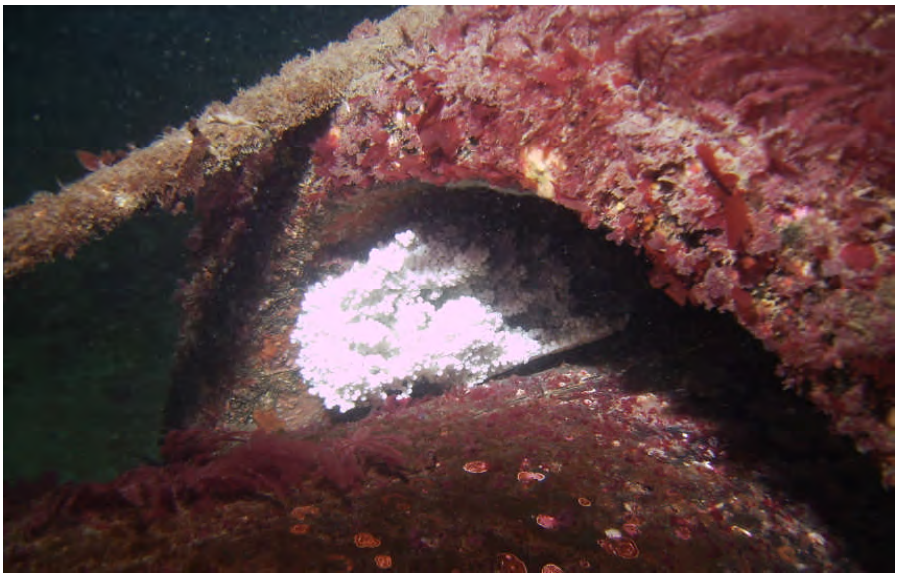
Photo 1 – Dense *Pterygophora* stalked kelp growing on pipeline (beneath kelp).

The outfall intersected small patches of sparse eelgrass (*Zostera marina*) impacting a total area of approximately 40 m^2 through covering and physical damage from jetting operations. Patches of eelgrass and surfgrass (*Phyllospadix sp.*) where the substrate was undisturbed continue to be surviving alongside the outfall (Photo 2).

Photo 2 – Sparse eelgrass growing next to pipeline (approximately near Station 2+20).

Abalone (*Haliotis kamtschatkana*), listed as "threatened" under the *Species At Risk Act* (SARA), were noted to occur in the area of the outfall as evidenced by a single abalone observed near the outfall alignment during the pre-construction baseline dive survey (February 2005). No abalone were observed during the pre-construction abalone survey (June 2005) and no abalone were observed in either the 2006 or 2008 monitoring surveys. The dense cover of understory vegetation obscures most of the seabed where abalone would be located.

The outfall pipe, concrete cylinder weights, doghouse weights and articulated concrete ballast mats have added relief, complexity, and crevice space to the original habitat and were observed being used, nearshore and offshore, by a number of fish species including kelp greenling (*Hexagrammos decagrammus*), quillback rockfish (*Sebastes maliger*), copper rockfish (*Sebastes caurinus*) and lingcod (*Ophiodon elongatus*). The outfall structure is being used as spawning habitat by lingcod. A number of lingcod egg masses were observed within the cylinder weights and wedged under the pipeline at a variety of depths from approximately 10 m depth (kelp habitat) to depths of 25 m (Photos 3 and 4).



Photos 3 and 4 – Lingcod eggs beneath pipeline (near Station 3+00) and inside concrete cylinder weight (near Station 6+50).

2.3 Geoduck Enhancement

As documented in a post construction survey report prepared by Archipelago Marine Research Ltd. in October 2005, the number of geoducks (Panopea abrupta) estimated to have been lost or excluded from the geoduck commercial fishery as a result of the outfall installation was 280. As a result, funding was provided to the Underwater Harvesters Association (UHA) for the planting of 560 geoducks.

According to Grant Dovey, UHA biologist (pers. comm.), the UHA planted 560 geoduck seed at the Qualicum Bay UHA enhancement site in June 2006. The geoduck seed were planted at water depths between 8 and 12 m using a diver operated planting machine developed by the UHA. The planting machine also deploys predator control mesh that covers the row of geoducks to protect the seed from predators such as flatfish, crab and sea stars. The seed is typically large enough in about 2 to 3 years to be surveyed for survival estimates by the UHA.

The preliminary survival estimates to 2008 are very low, and potentially none of the geoducks may have survived following planting (pers. comm. Dovey 2008). There was an unexpected conflict with sports fishermen dragging troll gear on the bottom near the enhancement site. Multiple rows of predator protection mesh covering planted geoducks were pulled out by snagged fishing gear during the summer of 2006. A good portion of the predator mesh that remained was lost in the winter of 2006 during intense storms. A number of shellfish growers, and the UHA's colleague Fan Seafoods, also lost installations during these storms. The UHA has not sampled Qualicum Bay for survival in 2008, but their preliminary observations at the site indicated very poor surviving shows from the 2006 planting.

3. SUMMARY

The following summarizes the fish habitat conditions observed at the Sooke Outfall in 2008:

a) The dunegrass that was removed and replanted in the upper intertidal zone within the outfall corridor did not remain intact through the 2005 winter high water/wave conditions. There is evidence (shoots observed) of natural recolonization of the corridor by dunegrass and milk wort vegetation.

b) Dense and diverse understory vegetation has recolonized the outfall and previously disturbed substrates within the bull kelp bed. The outfall has provided suitable substrate for canopy, stalked, and bladed kelps which is positively contributing to vegetated fish habitat. Patches of eelgrass and surfgrass where the substrate was undisturbed continue to be surviving alongside the outfall

c) The geoduck enhancement works (planting of 560 geoduck seed at Qualicum Bay), funded by the Sooke outfall project and carried out by the UHA are reported to have been unsuccessful due to the loss of predator control netting over the planted sites.

d) The outfall pipe, concrete cylinder weights, doghouse weights and articulated concrete ballast mats have added relief, complexity and crevice space to the original habitat that are being used, nearshore and offshore, by a number of fish species including kelp greenling, quillback rockfish, copper rockfish, and lingcod.

e) The conditions of the Fisheries Authorization relating to environmental monitoring in the final year (2008) have been achieved. It is recommended that any bond amounts held against the project be released back to the project proponent.

4. REFERENCES

Archipelago Marine Research Ltd. (AMR). 2005. As-built environmental monitoring report. October 17, 2005. Letter report prepared for Komex International Ltd.

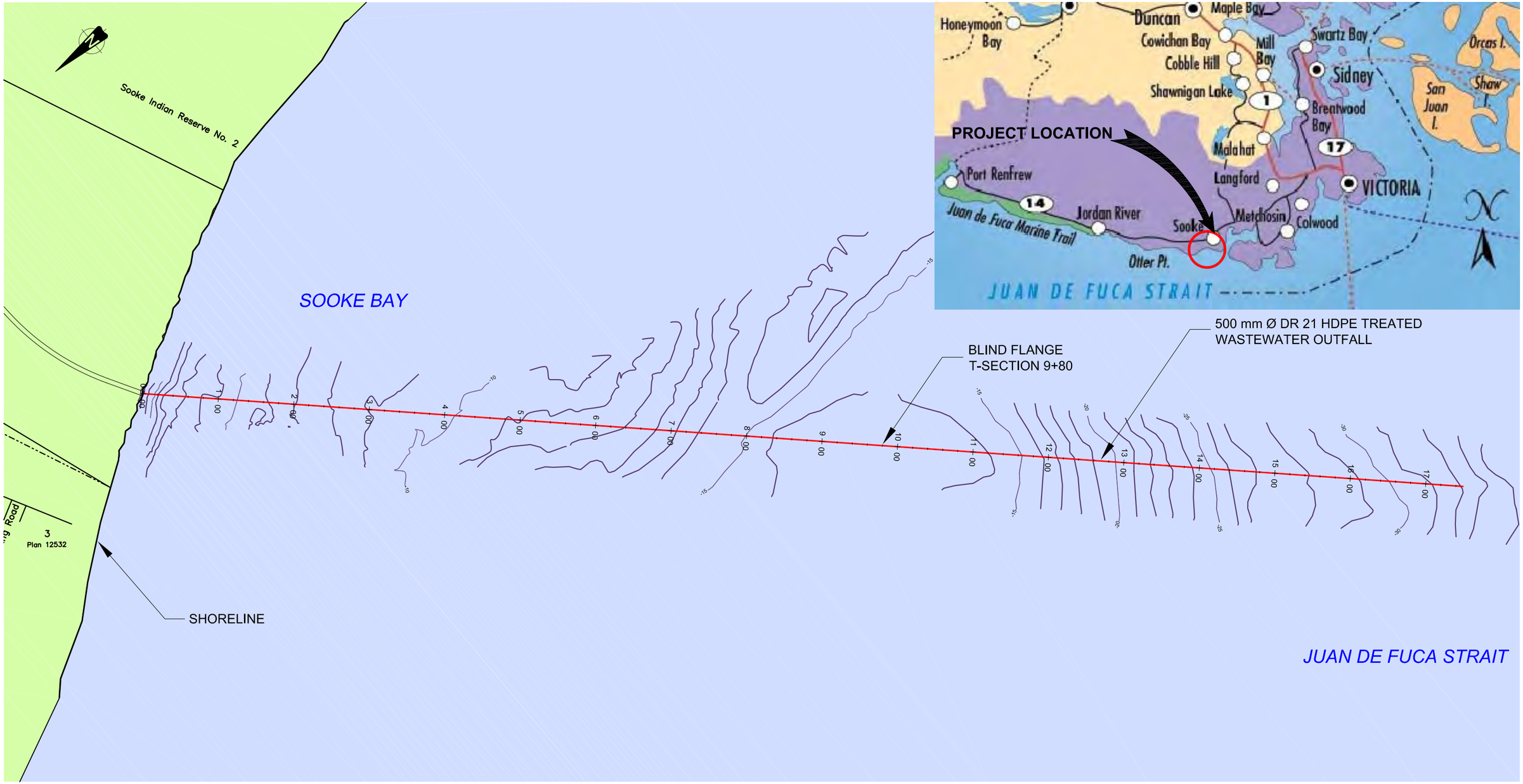
WorleyParsons Komex (WPK). 2006. Post construction marine environmental monitoring report. July 12, 2006. Letter report prepared for Chew Excavating Ltd.

5. CLOSURE

We trust that this report satisfies your current requirements and provides suitable documentation for your records. If you have any questions or require further details, please contact the undersigned at any time.

Sincerely,
WorleyParsons Komex

Jason Clarke, E.I.T.
Marine Environment Specialist



Environment & Water Resources

EPCOR UTILITIES INC.
SOOKE OUTFALL ENVIRONMENTAL MONITORING

SITE PLAN

WorleyParsons Komex
resources & energy

2008-05-30 date	MR edited by	KM drawn by	JC app by	PROJECT NUMBER: V17420200	FIGURE: 1

FILE: J:\1726-1750\V17420200\Drawings\V1742-0200-environmental monitoring.dwg Issued By: Victoria CAD