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August 9, 1974

Memo to: John Glynn

From: Dan Glantz

Subject: STP Study at Larabee State Park

A study of the sewage treatment facilities at this park was made on June 12, 1974. The park, approximately 12 miles south of Bellingham, is situated between Highway #11 and Bellingham Bay. The bay is the receiving water.

Two 200 GPM pumps lift from the wet well to the lagoons located at a much higher level, across the highway. The two lagoons are in series, the first is mechanically aerated. Overflow from the second lagoon is piped underneath the highway to the chlorination chamber for one hour retention, then piped to the bay.

The system is nearly new and in good condition. The lagoon area is fenced, locked and well maintained. On the day of inspection, the weather was clear and warm. The ranger told me there were about 1,000 people being served at the time and flow was very light. The plant as designed should be able to handle a capacity crowd.

The attached lab and field results show good performances in all parameters. It appears the plant, with its lagoons, is serving the park well.

DG:jmh

STP Survey Report Form

Efficiency Study

City Larabee State Park Plant Type Lagoon Pop. Served 1000-1500 Design Capacity 15,000 (35,000 GPD)

Receiving Water Bellingham Bay Perennial X Intermittent ____

Date 6/12/74 Survey Period 0900 - 1300 Survey Personnel D. Glantz

Comp. Sampling Frequency Hourly Sampling Alequot 1000 ml

Weather Conditions (24 hr) Clear, warm Are facilities provided for complete by-pass of raw sewage? ____ Yes X No/Frequency of bypass ____

Reason for bypass ____ Is bypass chlorinated? ____ Yes ____ No

Was DOE Notified? ____ Discharge - Intermittent ____ Continuous ____

Plant Operation

Total flow 2,200 GPD How measured Recorder

Maximum flow 2,400 GPD Time of Max. 1200 - 2400 hours

Minimum flow 1,800 GPD Time of Min. 0300 - 0600 hours

Pre Cl_2 NONE #/day Post Cl_2 2.5 #/day

Field Results

	Influent				Effluent			
3 Determinations	Max.	Min.	Mean	Median	Max.	Min.	Mean	Median
Temp °C	14.0	14.0		14.0	22.0	19.0		19.0
pH (Units)	7.6	7.4	=	7.4	10.2	9.8		9.8
Conductivity (µmhos/cm²)	900	825		850	175	150		175
Settleable Solids (mls/l)	.3	.3	.3	.3	Tr	Tr	Tr	TR

Laboratory Results on Composites

	Influent	Effluent	% Reduction
Laboratory No.	74-2551	74-2552	
5-Day BOD ppm	106	< 20	81%
COD ppm	209	39	81%
T.S. ppm	342	166	51%
T.N.V.S. ppm	174	90	48%
T.S.S. ppm	82	9	89%
N.V.S.S. ppm	9	2	78%
pH (Units)	7.6	9.9	
Conductivity (µmhos/cm²)	890	250	
Turbidity (JTU's)	40	4	

Laboratory Bacteriological Results

Lab No.	Sampling Time	Colonies/100 ml (MF) Total Coliform	Fecal Coliform	Fecal Strep	Cl_2 Residual
74-2553	0930	Est 200	10		
54	1030	Est 320	10		
55	1300	Est 320	10		

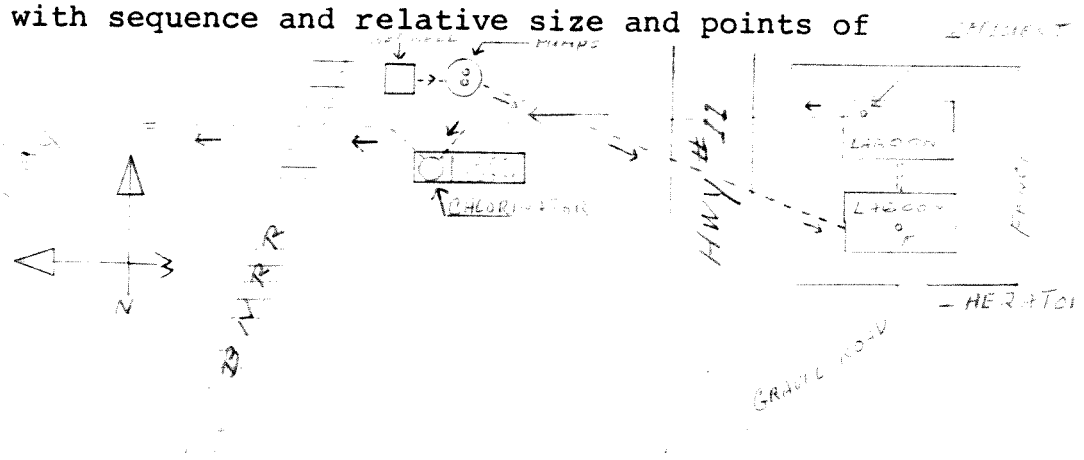
Additional Laboratory Results

NO_3-N ppm -	.16
NO_2-N ppm -	ND
NH_3-N ppm -	-- (1)
T. Kjeldahl-N ppm -	-- (1)
O-PO_4-P ppm -	2.30
T-PO_4-P ppm -	1.60

(1) Holding time expired

Operator's Name Al Boyle (ranger) Phone No. 676-2093

Furnish a flow diagram with sequence and relative size and points of chlorination.



Type of Collection System

__ Combined ~~X~~ Separate __ Both

Estimate flow contributed by surface or ground water (infiltration)

10% MGD

Plant Loading Information

Annual average daily flow rate(mgd)

Dry 2,000 GPD

Wet 3,000 GPD

Peak flow rate(mgd)

Dry 4,000 GPD

Wet 4,500 GPD

COMMENTS:

① Holding time expired,

STATE OF WASHINGTON

DEPARTMENT OF ECOLOGY

WATER QUALITY LABORATORY

ORIGINAL TO: D. Glantz

COPIES TO:

LAB FILES

DATA SUMMARY

Source Larabee St. Park Lagoon Collected By D. Glantz

Date Collected 6-12-74 Goal, Pro./Obj.

Log Number: 74-	2551	52	53	54	55						STORET
Station:	INF	eff	0930	1030	1300						
pH	7.6	9.9									00403
Turbidity (JTU)	40	4									00070
Conductivity (umhos/cm)@25°C	890	250									00095
COD	209	39									00340
BOD (5 day)	106	<20									00310
Total Coliform (Col./100ml)	-	-	EST 200	EST 320	EST 320						31504
Fecal Coliform (Col./100ml)	-	-	<10	<10	<10						31616
NO3-N (Filtered)		.16									00620
NO2-N (Filtered)		ND									00615
NH3-N (Unfiltered)		-*									00610
T. Kjeldahl-N (Unfiltered)		-*									00625
O-PO4-P (Filtered)		2.30									00671
Total Phos.-P (Unfiltered)		1.60									00665
Total Solids	342	166									00500
Total Non Vol. Solids	174	90									
Total Suspended Solids	82	9									00530
Total Sus. Non Vol. Solids	9	2									

Note: All results are in PPM unless otherwise specified. ND is "None Detected"
Convert those marked with a * to PPB (PPM X 10^3) prior to entry into STORET

* NOT ANALYSED DUE TO HEAVY LOADING IN THIS AREA AND THE HOLDING TIME EXPIRING

Summary By J. Taylor D. Aalto Date 7-17-74

6/12

	LAROSEE EFFLUENT					EFFLUENT				
TIME	TEMP	PH	COND	SS	FLOW	TEMP	PH	COND	SS	C1
0900	14°	7+	825	.3	2,000 gpd	19°	10?	150	TR	.05
1000										.05
1030	14°	7+	850	.3		19°	9?	175		.05
1230										.01
1300	14°	7+	900			22°	9?	175	TR	
										.15
										.2
									(algae)	

AL BOYLE (RANGER)
676-2093

Larabee PARK

Design

2000 ~~GPD~~ 8000 GPD

Hi = 1200 — 2400

Low = 0300 — 0600.

Designed for 35,000 GPD.

BOD Red = 90-95%

Sup Solids = 90%

Aeration — 1 pond.

2 pumps @ 200 GPM.

chlorine contact time = 1 hr.

" " = 20 min

" "