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December 19, 1973

State of Washington
Department of Ecology

Memo to: Stew Messman and John Glynn

From: Grover Scott Jeane II

Subject: Sumas STP Efficiency Study.

I met with Stephen Koehler and John Glynn on November 28, 1973, at the Sumas STP. The system is a newly constructed oxidation channel. The facilities are well maintained with all equipment functioning. Eight composite samples (1000 ml) of both influent and effluent were taken during the eight hour survey. Grab samples of the oxidation channel mixed liquor, receiving water, and effluent were also collected.

Results

Treatment Plant

The effluent meets the proposed Federal standards of 30 mg/l of BOD_5 and T.S.S., and 200 col/100 ml of fecal coliform. The STP effluent also meets all DOE secondary treatment standards except T.S.S. Our T.S.S. standards are >90% reduction while only 79% reduction was observed. The other parameters measured revealed no unusual values (see Efficiency Study form). The mixed liquor 30 minute settleability (500 ml) may be approaching the upper limits denoting a possible need to waste sludge. The operators' understanding of the mixed liquor analysis (D.O., computed 30 minute settleability, and T.S.S.) should be increased to aid their understanding of when to waste sludge or change the height in the oxidation channel. These methods, including sludge index, can be found on pages 114 to 118 of Operation of Waste Water Treatment Plants, WPCF Manual of Practice #11, 1968.

Receiving Water

The receiving water (Sumas Creek) was sampled to determine impact on the creek of the STP effluent and city storm water. The two stations were located at the road bridges above and below the discharge point. The parameter values are presented in Table #1. Fecal coliform and fecal streptococci show increases but the fecal coliform/fecal strep ratio is below the value for human sewage. Nutrients are the area of greatest impact on the receiving water. The $O\text{-}PO_4\text{-}P$ and $T\text{-}PO_4\text{-}P$ values are in the critical plant growth and nuisance algae bloom range. The high $NO_3\text{-}N$ value above the discharge is erroneous (reason unknown). From the nutrient values observed, I would suspect Sumas Creek plant growth to be critical during average and low creek flows.

GSJ:jmh

Table 1 SUMAS CREEK - Receiving water analysis, November, 1973.

Parameter	Above Outfall*	Below Outfall*
Turbidity	10	10
Conductivity	230	230
COD	23	23
BOD_5	<2	<2
Tot. Coliform (Col/100 ml)	6400	6300
Fec. Coliform " "	480	680
Fec. Strep. " "	330	400
NO_3-N	14.0**	1.50
NO_2-N	.02	.02
NH_3-N	0.2	0.4
T.Kjeldahl-N	0.2	0.4
O-PO_4-P	0.2	2.40
T-PO_4-P	0.4	3.40
Chlorides	10	10

*Stations were located at road bridges.
**Erroneous data.

(EFFICIENCY STUDY)

City Sumas Plant Type Oxy Channel Population Served 700 Design Capacity 1,000

Receiving Water Sumas Creek Engineer

Date 11-28-73 Survey Period 0800-1600 hours Survey Personnel Scott Jeane

Comp. Sampling Frequency per 45 min. Weather Conditions (last 48 hours) Wind, rain & cold.

Sampling Alequot 1,000 ml

PLANT OPERATION

Total Flow 22,800 gals for 8 hr. How Measured Totalizer

Max. (Flow) Time of Max. Min. Time of Min.

Pre Cl_2 #/day Post Cl_2 #/day

FIELD RESULTS

Determinations	Influent Max.	Influent Min.	Influent Mean	Influent Median	Effluent Max.	Effluent Min.	Effluent Mean	Effluent Median
Temp. °C	17.5	12.0	12.0	12.0	9.0	8.0	8.5	8.5
pH	8.4	7.8	--	8.4	6.8	6.6	--	6.6
Conductivity (umhos/cm)	N.A.	------	------	------	N.A.	------	------	------
Settleable Solids	9	5	7	--	7	0	--	--

N.A.= Not Available

LABORATORY RESULTS ON COMPOSITE IN PPM

Laboratory Number	Influent	Effluent	% Reduction
5-Day BOD	149	<18	>88%
COD	220	31	86%
T.S.	405	313	33%
T.N.V.S.	210	177	16%
T.S.S.	132	28	79%
N.V.S.S.	14	4	71%
pH	8.2	7.0	
Conductivity	520	420	
Turbidity	45	10	78%
Oils	None Detected		

NO_3-N	3.00
NO_2-N	N.D.
NH_3-N	0.3
T-K-N	1.0
O-PO_4-P	4.70
T-PO_4-P	9.6

Sumas STP

BACTERIOLOGICAL RESULTS

$Na_2S_2O_3$ added to sample at lab After _____ min.

LAB #	SAMPLING TIME	COLONIES/100 MLS (MF) Tot. Col.	Fecal Col.	F. Strep	Cl Residual ppm	(after secs)
73-4334	0810	[illegible]	<200	<200	0.2	3 min.
65	1015	<400	<200	<200	0.5	"
66	1200	<400	<200	<200	0.5	"
67	1330	<400	<200	<200	0.4	"

Operator's Name Stephen Koehler Phone # 988-2401

Comments: 1) Receiving water analysis - see Table #1.

2) Influent pump to headworks may have damaged flapper valve because water drains back into pump station when pumps are not operating. This condition was not observed at Everson STP.

3) Total hours of equipment operation to date:

Sludge scraper = 6,639 hrs.

Sludge pump = 2,528 hrs.
Comminuter = 1,042 hrs.
Rotor Drive = 7,018 hrs.

4) Replace broken baffle in chlorine contact chamber.

Mixed Liquor Analysis:

Minutes	ml. of sediment
10	910
20	600
30	500
40	370
45	350
50	330
60	300
5 hr.	Sludge had not risen.

Solids Analysis:

T.S.	5800
T.N.V.S.	1600
T.S.S.	5800
T.S.N.V.S.	2400
Dissolved Oxygen	5.0 ppm

MEMORANDUM

CHECK
INFORMATON ____
FOR ACTION ____
PERMIT ____
OTHER ____

State of Washington Department of Ecology

TO: Pete Hildebrandt, Ron Pine, Stew Messman & Files

FROM: John H. Glynn

SUBJECT: REQUEST FOR SURVEY - SUMAS STP

DATE: November 13, 1973

OBJECTIVE: To determine efficiency of the Sumas STP and make a preliminary estimate of the impact of the effluent on the receiving water.

The Town of Sumas has an oxidation ditch which was placed in operation earlier this year. The effluent empties into a storm sewer which enters the Sumas River about 300 m (328 yds) upstream of the Canadian Border. The sewage system is separate and there are no significant industrial wastes present.

The following design and current loading factors apply:

Average design flow	416 m^3/d	(110,000 gpd)
Peak hourly flow	1,700 m^3/d	(650,000 gpd)
Design Population	1000	
Estimated current daily flow	280 m^3/d	(75,000 gpd)
Estimated peak flow	1,120 m^3/d	(300,000 gpd)
Population served	700	
Average low flow - Sumas River	.7 m^3/d	(25 cfs) 16.1 MGD — ?

The following parameters are requested:

Flow	influent
BOD	influent and effluent
COD	influent and effluent
Settleable Solids	influent and effluent
Suspended Solids	influent and effluent
Grease	influent and effluent
Total Coliform organisms	~~influent~~ and effluent
Fecal Coliform organisms	~~influent~~ and effluent
Temperature	influent and effluent
Turbidity	influent and effluent

In addition, the following parameters are suggested:

	Storm Sewer		Sumas River	
	Upstream	Downstream	Upstream	Downstream
Suspended Solids	X	X	X	X
Total Coliform organisms	X	X	X	X
Fecal Coliform organisms	X	X	X	X

MEMORANDUM

CHECK
INFORMATON ____
FOR ACTION ____
PERMIT ____
OTHER ____

TO: Pete, Ron, Stew and Files

FROM: John H. Glynn

SUBJECT: REQUEST FOR SURVEY - SUMAS STP (cont'd.)

DATE:

State of Washington Department of Ecology

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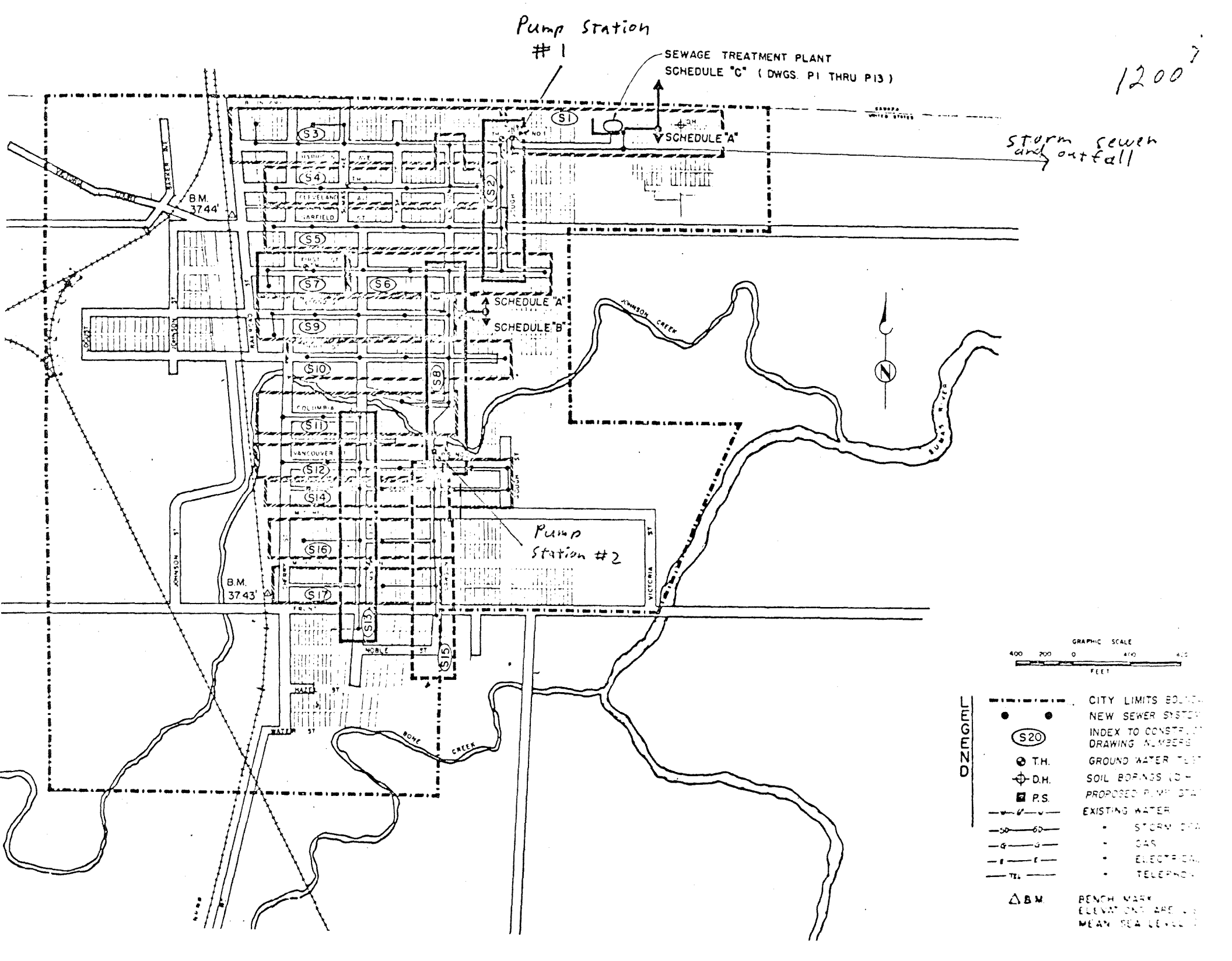
	Storm Sewer Upstream	Storm Sewer Downstream	Sumas River Upstream	Sumas River Downstream
Cl_2 residual		X		X
Chlorides STP Effluent -	X	X	X	X
Turbidity	X	X	X	X
Dissolved Oxygen	X	X	X	X
Aquatic Invertebrates			X	X

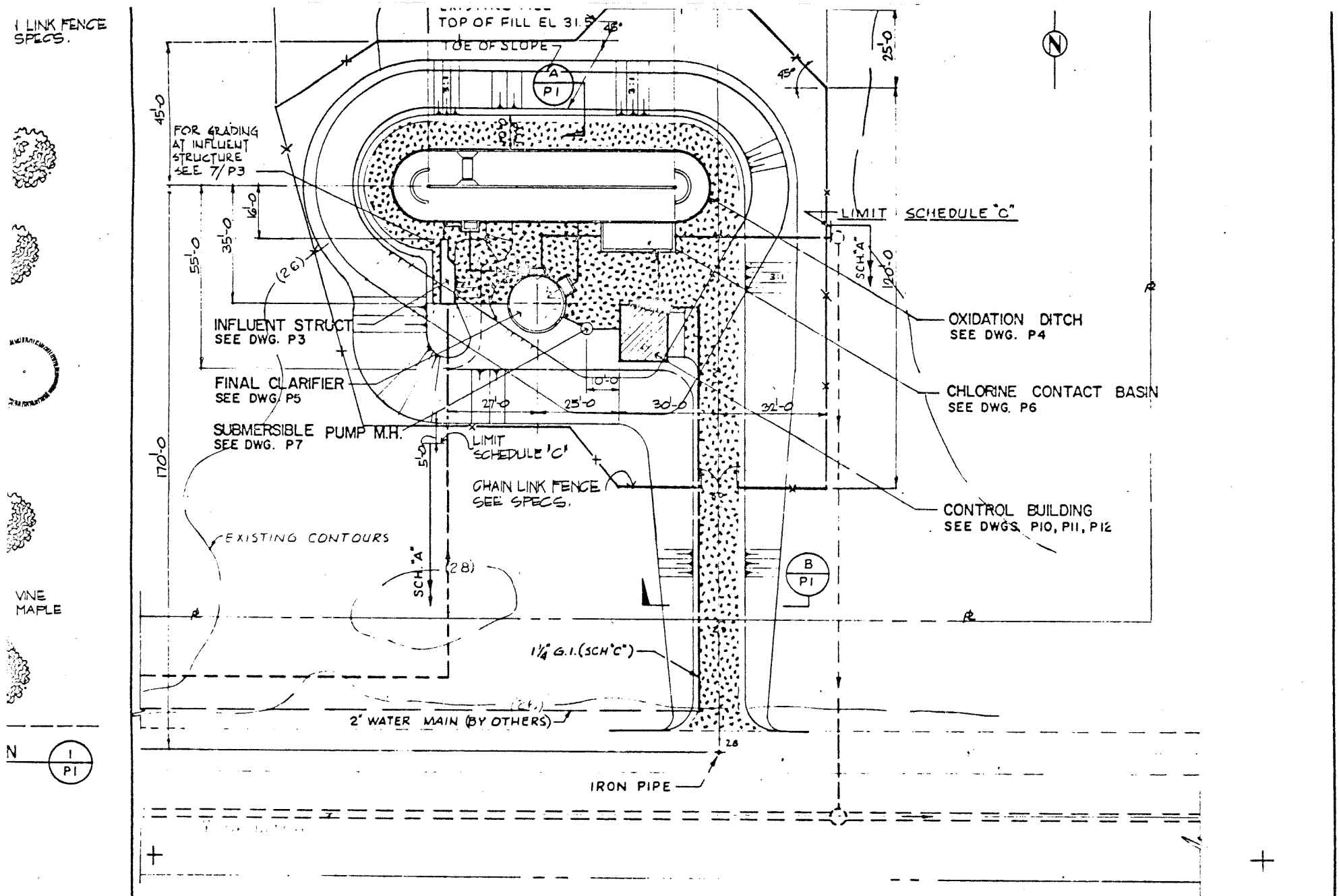
Reserve High water

A message for the operator, Stephen Koehler, can be left at the Sumas City Hall (988-2401).

Personnel from this office are available to assist in this survey. I would like to be advised of when the survey will be scheduled.

JHG:mk
11-13-73 dt


Pump Station #1
SEWAGE TREATMENT PLANT
SCHEDULE "C" (DWGS. P1 THRU P13)
1200'
Storm sewer and outfall
SCHEDULE "A"
SCHEDULE "A"
SCHEDULE "B"
B.M. 3744'
B.M. 3743'
Pump Station #2
JOHNSON CREEK
BONE CREEK
JOHNSON ST
VICTORIA ST
WATER ST
NOBLE ST
COLUMBIA
VANCOUVER
GRAPHIC SCALE
FEET
LEGEND
CITY LIMITS
NEW SEWER SYSTEM
INDEX TO CONSTRUCTION DRAWING NUMBERS
T.H. GROUND WATER TEST
D.H. SOIL BORINGS
P.S. PROPOSED PUMP STA
EXISTING WATER
STORM DRAIN
GAS
ELECTRIC
TELEPHONE
BENCH MARK
ELEVATIONS ARE IN
MEAN SEA LEVEL



SITE PLAN (2 / P1)

SCALE: 1"=20'

SCHED. "C"

THIS DRAWING REDUCED TO HALF SIZE

ARK G CHIN — STATE OF WASHINGTON — REGISTERED PROFESSIONAL ENGINEER

RONALD D MAYO — STATE OF WASHINGTON — REGISTERED PROFESSIONAL ENGINEER

MER CHIN & MAYO CONSULTING ENGINEERS	TOWN OF SUMAS WHATCOM COUNTY, WASHINGTON	SANITARY SEWERAGE SYSTEM IMPROVEMENTS SITE PLAN	DRAWING NUMBER P1 SHEET NUMBER 28 OF 40

STATE OF WASHINGTON

DEPARTMENT OF ECOLOGY

WATER QUALITY LABORATORY

ORIGINAL TO: G.S. JEANE

COPIES TO:

LAB FILES

DATA SUMMARY

Source SUMAS STP

Collected By G.S.S.

Date Collected 11-28-73

Goal, Pro./Obj.

Log Number:	73-4359	60	61	62	63	64	65	66	67		STORET
Station:	INF	EFF	OX. DITCH	SUMAS R. "UP"	→ "DOWN"	EFF 0810	→ 1015	1200	1330		
pH	8.2	7.0									00403
Turbidity (JTU)	45.	10.		10.	10.						00070
Conductivity (umhos/cm)@25°C	520.	420.		230.	230						00095
COD	220.	31		23	23						00340
BOD (5 day)	149	<18.		<2.	<2.						00310
Total Coliform (Col./100ml)	-	-	-	6400	6300	<400	<400	<400	<400		31504
Fecal Coliform (Col./100ml)	-	-	-	480	680	<200	<200	<200	<200		31616
NO3-N (Filtered)	-	3.00	-	14.0	1.50						00620
NO2-N (Filtered)	-	ND	-	.02	.02						00615
NH3-N (Unfiltered)	-	0.8	-	0.2	0.4						00610
T. Kjeldahl-N (Unfiltered)	-	1.0	-	0.2	0.4						00625
O-PO4-P (Filtered)	-	4.70	-	0.2	2.40						00671
Total Phos.-P (Unfiltered)	-	9.60	-	0.40	3.40						00665
Total Solids	405	313	5800.								00500
Total Non Vol. Solids	210	177	2600								
Total Suspended Solids	132.	28.	5800								00530
Total Sus. Non Vol. Solids	14.	4.	2400								
FECAL STREP (COC/100ml)	-	-	-	330	400	<200	<200	<200	<200		
CHLORIDES	20.	23.	-	10.	10.						
TOTAL OILS		ND									

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

Summary By Stephen D. Roth Date 12-14-73