Table 2.13 River Water Quality Records, Tatula River (18.8 km from the mouth)
(Above Birzai, at the left bank)
(Year: 1996)

Item	Unit	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Frequency	Mini.	Max.	Mean
Velocity	m/s	0.1	0.1		0.25	0.33	0.22	0.18	0.08	0.06	0.07	0.1	0.12	11	0.06	0.33	0.14
Discharge	cu m/s	0.16	0.10		0.51	1.40	0.50	0.31	0.22	0.16	0.17	0.25	0.40	11	0.10	1.40	0.38
Temperature	°C	15.0	4.0		6.0	15.0	19.0	17.0	19.0	14.0	6.0	5.2	4.0	11	4.0	19.0	11.2
Odour	.-	Scentless	Weak		Scentless	Scentless	Scentless	Scentless	Scentless	Scentless	Scentless	Scentless	Scentless				
Transparancy	cm	20	9	20	20	20	20	20	20	20	20	20	20	11	9	20	19
Colour	.-	Yellowish	Grey		Yellowish	Yellowish	Yellowish	Yellowish	Yellowish	Yellowish	Yellowish	Yellowish	Yellowish				
Suspeded solid	mg/l	14.0	5.0		17.0	14.0	15.0	4.0	5.0	5.0	9.0	2.0	7.0	11	2.0	17.0	8.8
PH	.-	8.00	7.40		7.50	8.00	8.00	8.10	7.80	7.80	8.20	8.10	7.70	11	7.40	8.20	7.87
O_2	mg/l	7.3	1.2		6.7	7.3	9.3	8.1	3.6	4.1	9.7	6.3	8.1	11	1.2	9.7	6.5
O_2	%	72.7	9.1		53.7	72.7	10.9	84.2	39.0	39.9	77.8	495.0	61.6	11	9.1	100.9	60.1
BOD_5	mgO_2/l																
BOD_7	mgO_2/l	2.0	47.0		13.0	2.0	3.2	1.4	2.4	1.8	1.4	1.4	1.4	11	1.4	47.0	7.0
COD, Cr	mgO_2/l	50	46		40	50	38	46	94	65	88	25	18	11	18	94	51
COD, Mn	mgO_2/l	19.0	16.0		16.0	19.0	13.0	17.0	13.0	15.0	10.0	12.0	15.0	11	10.0	19.0	15.0
NH_4-N	mgN/l	0.93	8.75		0.95	93.00	0.40	0.83	0.67	0.20	0.60	0.40	0.30	11	0.20	8.75	1.36
NO_2-N	mgN/l	0.010	0.170		0.064	0.010	0.040	0.012	0.001	0.001	0.000	0.012	0.014	11		0.170	0.030
NO_3-N	mgN/l	3.00	5.20		1.70	3.00	0.40	2.30	0.15	0.30	0.20	0.70	1.80	11	0.15	5.20	1.70
Inorganic N	mgN/l	3.940	14.120		2.714	3.941	0.840	3.142	0.821	0.501	0.800	1.112	2.114	11	0.501	14.120	3.094
N total	mg/l	4.1	15.0			4.1			0.9		0.9			5	0.9	15.0	5.0
PO_4-P	mgP/l	0.080	1.470		0.520	0.080	0.110	0.600	0.030	0.020	0.040	0.010	0.090	11	0.020	1.470	0.280
P total	mg/l	0.090	2.000			0.090			0.060		0.050			5	0.900	2.000	0.458
Ca	mg/l	106.0	120.0			106.0			140.0		115.0			5	106.0	140.0	117.4
Mg	mg/l	15.0	29.0			15.0			12.0		18.0			5	12.0	29.0	17.8
Na	mg/l					7.7			6.9		16.2			3	6.9	16.2	10.2
K	mg/l					3.8			5.8		15.9			3	3.8	15.9	8.5
Si	mg/l	2.0	4.5			2.0			2.0		1.0			5	1.0	4.5	2.3
HCO_3	mg/l	256	302			256			229		250			5	229	302	258
SO_4	mg/l	73	56			73			32		12			5	32	12	70
Cl	mg/l	31.0	51.0		23.0	31.0	26.0	32.0	19.0	51.0	63.0	51.0	31.0	11	19.0	63.0	37.1
Mineralization	mg/l					492.5			444.7		598.1			3	444.7	598.1	511.7
Total hardness	mgekv/l	6.5	8.4			6.5			8.0		7.3			5	6.5	8.4	7.3
Fe	mg/l	0.30	0.18			0.30			0.10		0.10			5	0.10	0.30	0.19
Mn	mg/l																
Cu	micro g/l																
Zn	micro g/l																
Cr	micro g/l																
Ni	micro g/l																
Pb	micro g/l																
Cd	micro g/l																
Detergent	mg/l																
Oil prod.	mg/l																
alfa HCH	micro g/l																
beta HCH	micro g/l																
gama HCH	micro g/l																
DDE	micro g/l																
DDT	micro g/l																
PCHB	micro g/l																
Kl total	col/l					6000			80000		<1000			3	1000	80000	29000
Kl fresh	col/l					<1000			80000		<1000			3	100	80000	27333
E	col/ml					10			1		1			3	600	11100	4533
HP	col/ml					80			2660		90			3	80	2660	943
HM	col/ml																
3,4-dichlor benzaine	mg/l																
penta chlor fenol	mg/l																
2-chlor fenol	mg/l																
2,4-dichlor fenol	mg/l																
2,4,6 trichlor fenol	mg/l																
2,3-dimetil fenol	mg/l																
3,4-dimetil fenol	mg/l																
4-chlor 3-metil fenol	mg/l																

Table 2.14 River Water Quality Records, Tatula River (18.8 km from the mouth)
(Above Birzai, at the left bank)
(Year: 1997)

Item	Unit	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Frequency	Mini.	Max.	Mean
Velocity	m/s	0.09	0.18	0.48	0.65	0.48	0.35				0.12	0.3	0.35	9	0.09	0.65	0.33
Discharge	cu.m/s	0.17	0.29	1.85	3.00	1.85	1.24	0.68	0.22	0.24	0.19	0.82	1.15	12	0.17	3.00	0.958
Temperature	°C	4.0	4.0	6.0	5.0	5.0	16.0	22.0	19.0	18.0	17.0	4.0	5.0	12	4	22.0	10.4
Odour	-	Scentless	Scentless	Scentless	Scentless	Scentless	Scentless	Scentless	Scentless	Scentless	Scentless	Scentless	Scentless				
Transparancy	cm	15	20	20	20	20	19	20	14	18	20	19	19	12	14	20	18
Colour	-	Brown	Yellowish	Yellowish	Yellowish	Yellowish	Yellowish	Yellowish	Yellowish	Yellowish	Yellowish	Yellowish	Yellowish				
Suspended solid	mg/l	81.0	3.0	5.0	6.0	5.0	7.0	3.0	17.0	11.0	4.0	5.0	6.0	12	3	81.0	13.1
PH	-	7.8	7.3	7.7	7.8	8.1	7.3	7.8	8.2	8.0	8.0	8.0	7.6	12	7.3	8.2	7.8
O_2	mg/l	8.3	8.4	10.4	9.0	9.0	7.3	7.3	6.9	6.9	5.9	8.9	7.9	12	5.9	10.4	8.0
O_2	%	63.2	63.9	83.4	70.3	70.3	74.3	84.1	74.9	73.4	61.3	67.7	61.7	12	61.3	84.1	70.7
BOD_5	mgO_2/l																
BOD_7	mgO_2/l	7.2	2.4	1.5	2.2	2.1	1.8	1.8	5.0	1.4	1.2	1.5	1.4	12	1.2	7.2	2.4
COD, Cr	mgO_2/l	32.0	18.0	10.0	13.0	31.0	31.0	22.0	36.0	27.0	29.0	21.0	26.0	12	1.2	7.2	2.4
COD, Mn	mgO_2/l	26.0	8.0	10.0	11.0	17.0	16.0	22.0	22.0	10.0	10.0	11.0	14.0	12	8	26.0	14.7
NH_4-N	mgN/l	0.900	1.000	0.650	0.300	0.570	0.620	0.500	0.350	0.700	0.600	0.120	0.270	12	0.12	1.000	0.540
NO_2-N	mgN/l	0.048	0.014	0.012	0.030	0.019	0.064	0.055	0.000	0.000	0.000	0.016	0.022	12	0	0.064	0.023
NO_3-N	mgN/l	1.40	2.70	5.50	5.60	4.60	2.20	1.85	0.30	0.30	0.30	8.50	6.60	12	0.3	8.50	3.32
Inorganic N	mgN/l	2.348	3.714	6.162	5.930	5.189	2.884	2.405	0.650	1.000	0.900	8.636	6.892	12	0.65	8.636	3.892
N total	mg/l		3.90	6.80	6.50	5.30	4.00	2.60	0.70	1.20	1.30	11.00	7.70	11	0.7	11.00	4.60
PO_4-P	mgP/l	0.290	0.290	0.040	0.050	0.030	0.050	0.070	0.060	0.080	0.040	0.050	0.025	11	0.02	1.470	0.280
P total	mg/l		0.300	0.050	0.050	0.040	0.060	0.080	0.070	0.090	0.050	0.060	0.030	11	0.03	0.360	0.080
Ca	mg/l		268.0			122.0			132.0		140.0			4	122	268.0	165.5
Mg	mg/l		24.0			39.0			37.0		49.0			4	24	49.0	37.2
Na	mg/l		16.7			7.1			14.0		14.0			4	7.1	16.7	12.9
K	mg/l		5.4			3.7			6.3		7.6			4	3.7	7.6	5.7
Si	mg/l		6.0			2.0			4.0		5.0			4	2	6.0	4.2
HCO_3	mg/l		244			211			250		259			4	211	259	241
SO_4	mg/l		160			100			80		120			4	80	160	115
Cl	mg/l	61.0	34.0	34.0	34.0	55.0	34.0	61.0	27.0	30.0	30.0	36.0	30.0	12	27	61.0	38.8
Mineralization	mg/l		752.1			537.8			546.3		619.6			4	537.8	752.1	613.9
Total hardness	mgekv/l		15.0			9.3			9.7		11.0			4	9.3	15.0	11.2
Fe	mg/l		0.10			0.20			0.10		0.20			4	0.1	0.20	0.15
Mn	mg/l																
Cu	micro g/l																
Zn	micro g/l																
Cr	micro g/l																
Ni	micro g/l																
Pb	micro g/l																
Cd	micro g/l																
Detergent	mg/l		0.04											1	0.04	0.04	0.04
Oil prod.	mg/l																
alfa HCH	micro g/l																
beta HCH	micro g/l																
gama HCH	micro g/l																
DDE	micro g/l																
DDT	micro g/l																
PCHB	micro g/l																
KI total	col/l					<1000			2E+05		30000			3	1000	2E+05	77000
KI fresh	col/l					<1000			1E+05		30000			3	1000	1E+05	43666
E	col/ml					<1			110		1			3	1	110	37
HP	col/ml					1700			19300		7980			3	1700	19300	9660
HM	col/ml					17			7500		280			3	17	7500	2599
3,4-dichlor benzaine	mg/l																
penta chlor fenol	mg/l																
2-chlor fenol	mg/l																
2,4-dichlor fenol	mg/l																
2,4,6 trichlor fenol	mg/l																
2,3-dimetil fenol	mg/l																
3,4-dimetil fenol	mg/l																
4-chlor 3-metil fenol	mg/l																

Table 2.15 Summary of River Water Quality Records, Tatula River (1 Km from the mouth)
(Annual maximum, minimum, and mean records)

		Minimum				Maximum				Mean							
Item	Unit	1994	1995	1996	1997	1994	1995	1996	1997	1994	1995	1996	1997	No of Year	Mini	Max	Mean
Velocity	m/s	0.09	0.08	0.07	0.12	0.65	0.81	0.44	0.8	0.33	0.36	0.19	0.35	4	0.07	0.81	0.318
Discharge	cu m/s	0.41	0.390	0.210	0.38	5.86	10.600	2.850	6.5	2.515	2.522	0.749	2.111	4	0.21	10.6	1.974
Temperature	°C	2	4	4.0	4.0	25	22	19.0	22.0	10.9	10.1	9.5	10.6	4	2.0	22.0	10.275
Odour	-																
Transparancy	cm	19	8	17	16	20	20	20	20	19	18	19	19	4	8	20	18.750
Colour	-																
Suspeded solid	mg/l		4.0	3.0	4.0		30.0	26.0	28.0		12.7	10.5	9.9	3	3.0	30.0	11.033
PH	-	4	7.50	7.30	7.4	14	8.20	8.20	8.2	7.3	7.90	7.76	7.9	4	4.0	14.0	7.708
O_2	mg/l	8.2	3.8	3.4	6.3	8.9	10.1	10.2	9.2	8.45	6.0	6.9	7.7	4	3.4	10.2	7.263
O_2	%	3.7	33.5	32.7	57.0	9.8	81.1	100.9	83.0	7.5	52.4	61.8	69.1	4	3.7	100.9	47.700
BOD_5	mgO_2/l	41.7	1.5			103.2	3.2			68.4	2.3			2	1.5	103.2	35.350
BOD_7	mgO_2/l	1.2		1.5	1.2	3.8		14.0	5.3	2.3		3.3	2.0	3	1.2	14.0	2.533
COD, Cr	mgO_2/l		14	16.0	11.0		82	95.0	38.0		44	41.0	23.0	3	11	95	35.000
COD, Mn	mgO_2/l		5.0	5.0	8.0		20.0	16.0	21.0		11.0	10.4	12.7	3	5.0	21.0	11.367
NH_4-N	mgN/l	4.200	0.10	0.23	0.4	12.000	11.00	4.10	1.2	8.400	1.86	1.24	0.6	4	0.1	12	3.020
NO_2-N	mgN/l	0.06	0.018	0.010	0.000	2.10	0.220	0.200	0.065	0.70		0.055	0.018	4	0.000	2.100	0.193
NO_3-N	mgN/l	0.02	0.60	0.60	0.3	0.12	7.20	2.90	8.9	0.056	2.00	1.49	3.22	4	0.02	8.9	1.692
Inorganic N	mgN/l	0.200	0.882	0.840	0.700	5.600	12.900	6.114	9.316	2.870	3.977	2.789	3.837	4	0.200	12.900	3.368
N total	mg/l	0.74	1.2	1.1	1.0	5.87	4.2	4.0	12.0	3.66	2.7	2.7	4.8	4	0.74	12	3.465
PO_4-P	mgP/l	1.8	0.040	0.030	0.015	8.3	0.640	1.080	0.280	4.9	0.268	0.339	0.083	4	0.015	8.3	1.398
P total	mg/l	0.06	0.180	0.110	0.020	0.4	0.960	1.160	0.370	0.235	0.445	0.598	0.097	4	0.06	1.16	0.341
Ca	mg/l	0.09	92.0	140.0	120.0	0.8	457.0	400.0	312.0	0.308	216.3	246.2	178.0	4	0.09	457.00	160.202
Mg	mg/l		23.0	15.0	29.0		38.0	24.0	84.0		32.3	19.5	48.5	3	15.0	84.0	33.433
Na	mg/l	40.0	10.0	5.5	9.2	44.0	35.0	104.8	19.4	41.6	23.2	41.7	13.9	4	5.5	104.8	30.100
K	mg/l	14.0	3.3	4.1	3.9	14.0	12.0	11.1	9.2	14.0	7.8	6.5	6.5	4	3.3	14	8.700
Si	mg/l	3.2	3.5	1.0	2.0	4.1	6.5	4.0	7.0	3.6	5.5	2.3	4.5	4	1.0	7.0	3.975
HCO_3	mg/l		262	244	211		317	286	272		289	259	240	3	211	317	262.667
SO_4	mg/l		108	70	100		154	140	180		129	106	149	3	70.0	180.0	128.000
Cl	mg/l	725	21.0	21.0	30.0	725	53.0	190.0	61.0	725	35.6	60.6	41.0	4	30	725	215.800
Mineralization	mg/l	32.0	572.7	565.1	583.6	71.0	965.0	848.9	870.8	45.3	733.2	741.6	676.6	4	32.0	965.0	549.175
Total hardness	mgekv/l	7.4	6.9	8.2	9.3	15	27.0	22.0	17.0	10.6	12.3	12.8	11.4	4	6.9	27.0	11.775
Fe	mg/l	0.10	0.37	0.10	0.10	0.29	0.97	0.30	0.20	0.15	0.57	0.16	0.17	4	0.1	0.97	0.263
Mn	mg/l	0.03	0.058	0.02	0.029	0.030	0.174	0.15	0.035	0.030	0.123	0.06	0.032	4	0.02	0.174	0.062
Cu	micro g/l	4.96	3.10	1.42	0.93	10.03	3.80	2.53	1.07	7.49	3.41	1.86	1.00	4	0.93	10.03	3.440
Zn	micro g/l	5.12	3.29	6.85	3.94	11.72	9.64	12.30	5.65	8.42	6.31	10.13	4.79	4	3.29	11.72	7.413
Cr	micro g/l	2.02	0.45	0.68	0.27	8.04	5.93	10.66	0.33	5.03	3.89	6.52	0.30	4	0.27	10.66	3.935
Ni	micro g/l	0.71	1.56	1.21	0.21	1.99	2.63	1.69	0.41	1.35	2.04	1.44	0.31	4	0.21	2.63	1.285
Pb	micro g/l	0.40	0.40	0.70	0.40	2.30	0.70	1.90	0.42	1.35	0.53	1.45	0.41	4	0.4	2.3	0.938
Cd	micro g/l	0.03	0.02	0.05	0.05	0.42	0.07	0.20	0.08	0.22	0.04	0.14	0.06	4	0.02	0.42	0.115
Detergent	mg/l																
Oil prod.	mg/l				0.07				0.09				0.08	1	0.07	0.09	0.080
alfa HCH	micro g/l	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	4	0.000	0.000	0.000
beta HCH	micro g/l	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	4	0.000	0.000	0.000
gama HCH	micro g/l	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	4	0.000	0.000	0.000
DDE	micro g/l	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	4	0.00	0.00	0.000
DDT	micro g/l	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	4	0.00	0.00	0.000
PCHB	micro g/l			0.000	0.000			0.000	0.000			0.000	0.000	2	0.00	0.00	0.000
KI total	col/l	100000	1E+06	1000	1000	100000	1E+06	50000	4E+05	1E+05	1E+06	30333	143666	4	1000	400000	########
KI fresh	col/l	10000	10000	1000	1000	10000	10000	30000	80000	10000	10000	13666	37000	4	1000	80000	########
E	col/ml	1	1	1	1	1	1	10	60	1	1	4	20	4	1	60	6.500
HP	col/ml	96000	31000	8600	1900	96000	31000	14000	40350	96000	31000	12200	18516	4	1900	96000	########
HM	col/ml	600	9400	10	10	600	9400	970	970	600	9400	330	330	4	10	9400	665.000
3,4-dichlor benzaine	mg/l				0.000				0.000				0.000	1	0	0.000	0.000
penta chlor fenol	mg/l				0.000				0.000				0.000	1	0	0.000	0.000
2-chlor fenol	mg/l				0.000				0.000				0.000	1	0	0.000	0.000
2,4-dichlor fenol	mg/l				0.000				0.000				0.000	1	0	0.000	0.000
2,4,6 trichlor fenol	mg/l				0.000				0.000				0.000	1	0	0.000	0.000
2,3-dimetil fenol	mg/l																
3,4-dimetil fenol	mg/l				0.000				0.000				0.000	1	0	0.000	0.000
4-chlor 3-metil fenol	mg/l																

Table 2.16 Summary of River Water Quality Records, Tatula River (17.5km from the mouth)
(Annual maximum, minimum, and mean records)

Item	Unit	Minimum				Maximum				Mean				No. of Year	Mini.	Max.	Mean
		1994	1995	1996	1997	1994	1995	1996	1997	1994	1995	1996	1997				
Velocity	m/s	0.07	0.08	0.06	0.10	0.55	0.72	0.4	0.68	0.27	0.30	0.17	0.35	4	0.06	0.72	0.275
Discharge	cu m/s	0.270	0.260	0.15	0.260	3.860	7.000	2	4.300	1.705	1.838	0.565	1.390	4	0.15	7	1.375
Temperature	°C	2.0	4.0	4.0	4.0	25.0	23.0	19.0	22.0	10.6	10.2	10.8	11.3	4	2.0	25.0	10.725
Odour	-																
Transparancy	cm	9	8.0	9	11	19	20.0	19	20	16	17.0	16	16	4	8	20	16.250
Colour	-																
Suspended solid	mg/l		6.0	5.0	4.0		24.0	35.0	15.0		11.0	14.8	8.3	3	4.0	35.0	11.367
PH	-	3.0	7.10	7.2	7.10	14.0	8.20	8.0	8.10	9.0	7.74	7.6	7.67	4	3.0	14.0	8.003
O_2	mg/l	8.1	0.5	1.0	2.1	8.7	10.3	8.6	7.4	8.4	4.9	3.9	5.5	4	0.5	10.3	5.670
O_2	%	1.9	5.20	7.6	22.8	11.3	87.00	93.3	81.8	5.8	41.20	36.9	50.0	4	1.9	93.3	33.475
BOD_5	mgO_2/l	16.1	1.0			100.2	14.0			51.4	6.0			2	1	100.2	28.700
BOD_2	mgO_2/l	1.4		5.6	1.7	29.0		47	33.0	6.7		19	8.7	2	1.4	47.0	17.200
COD, Cr	mgO_2/l		36	26	17		103	164	46		63	87	31	3	17	164	60.333
COD, Mn	mgO_2/l		11.0	12.0	9.0		25.0	22.0	30.0		15.0	17.0	16.4	3	9.0	30.0	16.133
NH_4-N	mgN/l	5.0	0.50	1.80	0.60	16.0	12.20	16.50	14.00	11.8	3.95	7.19	4.76	4	0.5	16.5	6.925
NO_3-N	mgN/l	1.20	0.025	0.018	0.000	12.00	0.200	0.290	0.420	4.90	63.000	0.108	0.120	4	0.000	12.000	17.032
NO_2-N	mgN/l	0.020	0.00	0.25	0.00	0.100	6.20	5.20	8.50	0.059	2.30	1.54	3.27	4	0	8.5	1.792
Inorganic N	mgN/l	0.20	3.725	2.276	4.270	6.80	13.245	16.784	14.006	2.66	6.313	8.841	8.157	4	0.200	16.784	6.493
N total	mg/l	3.270	4.0	7.0	4.4	10.290	9.5	17.0	13	6.777	6.0	12.1	8.3	4	3.27	17	8.294
PO_4-P	mgP/l	2.6	0.060	0.140	0.070	13.0	2.200	2.600	3.800	8.3	0.785	1.195	0.891	4	0.07	13	2.793
P total	mg/l	0.120	0.060	0.230	0.100	4.200	2.820	2.700	2.000	1.061	1.111	1.472	0.735	4	0.06	4.2	1.095
Ca	mg/l	0.150	100.0	120.0	144.0	4.500	232.0	168.0	188.0	1.169	153.3	139.0	159.5	4	0.2	232.0	113.242
Mg	mg/l		25.0	17.0	17.0		36.0	29.0	89.0		32.0	21.0	45.5	3	17.0	89.0	32.833
Na	mg/l		27.0	9.2	10.0		39.0	54.5	41.0		31.2	25.2	26.9	3	9.2	54.5	27.767
K	mg/l	37.0	9.5	5.0	4.1	41.0	12.0	20.5	12.0	39.0	10.8	11.2	7.8	4	4.1	41	17.200
Si	mg/l	11.0	6.5	2.0	2.0	15.0	10.0	4.5	8.0	13.3	7.3	3.1	5.7	4	2.0	15.0	7.350
HCO_3	mg/l	1.3	295	262	226	2.8	314	314	317	2.0	304	288	270	4	1.3	317	216.000
SO_4	mg/l		31	35	100		69	113	140		44	68	125	3	31.0	140.0	79.000
Cl	mg/l	480	16.0	26.0	41.0	480	66.0	284.0	89.0	480	36.0	84.8	55.0	12	16	480	54.650
Mineralization	mg/l	25.0	532.0	542.0	634.1	63.0	739.1	818.0	725.7	41.0	618.9	636.8	686.9	4	25.0	818.0	495.900
Total hardness	mgekv/l	7.2	4.7	7.6	9.0	13.0	14.0	9.8	15.0	10.0	9.0	8.7	11.8	4	4.7	15.0	9.875
Fe	mg/l	0.00	0.36	0.18	0.20	0.20	0.75	0.6	0.50	0.10	0.51	0.34	0.30	4	0	0.75	0.313
Mn	mg/l																
Cu	micro g/l																
Zn	micro g/l																
Cr	micro g/l																
Ni	micro g/l																
Pb	micro g/l																
Cd	micro g/l																
Detergent	mg/l																
Oil prod	mg/l																
alfa HCH	micro g/l																
beta HCH	micro g/l																
gama HCH	micro g/l																
DDE	micro g/l																
DDT	micro g/l																
PCHB	micro g/l																
KI total	col/l	600000	1E+06	70000	50000	600000	1E+06	500000	700000	600000	1E+06	223333	4E+05	4	50000	1E+06	560000
KI fresh	col/l	10000	10000	30000	6000	10000	10000	500000	500000	10000	10000	210000	3E+05	4	6000	500000	124667
E	col/ml	10	24	10	2	10	24	30	150	10	24	16	83	4	2	150	33.75
HP	col/ml	14000	14300	14000	5800	14000	14300	28000	130700	14000	14300	19666	85333	4	5800	130700	33324.8
HM	col/ml	300	1500	60	30	300	1500	4200	9520	300	1500	1753	3426	4	30	9520	1744.75
3,4-dichlor benzaine	mg/l																
penta chlor fenol	mg/l																
2-chlor fenol	mg/l																
2,4-dichlor fenol	mg/l																
2,4,6 trichlor fenol	mg/l																
2,3 dimetil fenol	mg/l																
3,4-dimetil fenol	mg/l																
4-chlor 3-metil fenol	mg/l																

Table 2.17 Summary of River Water Quality Records, Tatula River (18.8km from the mouth)
(Annual maximum, minimum, and mean records)

Item	Unit	Minimum				Maximum				Mean				No. of Year	Min.	Max.	Mean
		1994	1995	1996	1997	1994	1995	1996	1997	1994	1995	1996	1997				
Velocity	m/s	0.06	0.06	0.06	0.09	0.5	0.55	0.33	0.65	0.23	0.26	0.14	0.33	4	0.06	0.65	0.24
Discharge	cu.m/s	0.2	0.18	0.095	0.17	2.63	4.80	1.40	3.00	1.14	1.20	0.38	0.96	4	0.095	4.8	0.919
Temperature	°C	5	4.0	4	4	25	23.0	19.0	22.0	11.7	10.1	11.2	10.4	4	4.0	23.0	10.85
Odour	--																
Transparancy	cm	9	9	9	14	20	20	20	20	19	18	19	18	4	9	20	18.5
Colour	--																
Suspended solid	mg/l	4.0	2.0	2	3	28.0	25.0	17.0	81.0	8.4	10.2	8.8	13.1	4	2.0	81.0	10.125
PH	--	7.90	7.40	7.4	7.3	8.80	8.10	8.20	8.2	8.35	7.81	7.81	7.8	4	7.3	8.8	7.9575
O_2	mg/l	40.9	3.7	1.2	5.9	102.0	12.1	9.7	10.4	69.0	6.3	6.5	8.0	4	1.2	102.0	22.45
O_2	%	4.3	28.2	9.1	61.3	11.5	102.2	100.9	84.1	7.5	55.1	60.1	70.7	4	4.3	102.2	48.35
BOD_5	mgO_2/l	1.1	1.0			4.0	2.9			1.9	1.7			2	1	4	1.8
BOD_7	mgO_2/l			1.4	1.2			47.0	7.2			7	2.4	2	1.2	47.0	4.7
COD, Cr	mgO_2/l		23	18	1.2		86	94	7.2		49	51	2.4	3	1	94	34.1333
COD, Mn	mgO_2/l	7.7	8.0	10	8	15.0	17.0	19.0	26.0	11.4	13.1	15	14.7	4	7.7	26.0	13.55
NH_4-N	mgN/l	0.10	0	0.2	0.12	4.00	1.6	8.75	1.000	0.98	0.45	1.36	0.540	4	0	8.75	0.8325
NO_2-N	mgN/l	0.010	0.000	0	0	0.040	0.055	0.170	0.064	0.016	0.018	0.03	0.023	4	0.000	0.170	0.02175
NO_3-N	mgN/l	0.10	0.00	0.15	0.3	6.00	6.00	5.20	8.50	2.54	2.02	1.7	3.32	4	0	8.5	2.395
Inorganic N	mgN/l	0.213	0.167	0.501	0.65	7.740	6.575	14.120	8.636	4.120	2.505	3.09	3.892	4	0.167	14.120	3.40275
N total	mg/l	0.6	0.8	0.9	0.7	8.5	4.5	15.0	11.00	4.4	2.7	5	4.60	4	0.6	15	4.175
PO_4-P	mgP/l	0.030	0.020	0.02	0.02	0.330	0.250	1.470	1.470	0.114	0.070	0.28	0.280	4	0.02	1.47	0.186
P total	mg/l	0.050	0.060	0.9	0.03	0.360	0.260	2.000	0.300	0.149	0.134	0.46	0.080	4	0.03	2	0.20525
Ca	mg/l		88.0	106	122		160.0	140.0	268.0		126.6	117	155.5	3	88.0	268.0	136.5
Mg	mg/l		25.0	12	24		34.0	29.0	49.0		29.3	17.8	37.2	3	12.0	49.0	28.1
Na	mg/l	26.0	11.0	6.9	7.1	30.0	18.0	16.2	16.7	27.6	14.7	10.2	12.9	4	6.9	30.0	16.35
K	mg/l	7.0	4.5	3.8	3.7	9.0	9.2	15.9	7.6	8.0	6.4	8.5	5.7	4	3.7	15.9	7.15
Si	mg/l	1.6	3.0	1	2	1.6	6.2	4.5	6.0	1.6	4.6	2.3	4.2	4	1.0	6.2	3.175
HCO_3	mg/l		207	229	211		274	302	259		247	258	241	3	211	302	248.667
SO_4	mg/l	260	21	32	80	260	57	12	160	260	33	70	115	4	21.0	260.0	119.5
Cl	mg/l	25	13.0	19	27	52	71.0	63.0	61.0	32.5	32.0	37.1	38.8	4	13	63	35.1
Mineralization	mg/l		459.0	444.7	538		486.7	598.1	752.1		479.2	512	613.9	3	444.7	752.1	534.933
Total hardness	mgekv/l	6.0	2.8	6.5	9.3	13.0	10.0	8.4	15.0	10.4	7.2	7.3	11.2	4	2.8	13.0	9.025
Fe	mg/l	0.00	0.28	0.1	0.1	0.20	0.66	0.30	0.20	0.10	0.39	0.19	0.15	4	0.1	0.66	0.2075
Mn	mg/l																
Cu	micro g/l																
Zn	micro g/l																
Cr	micro g/l																
Ni	micro g/l																
Pb	micro g/l																
Cd	micro g/l																
Detergent	mg/l				0.04				0.04				0.04	1	0.04	0.04	0.04
Oil prod.	mg/l																
alfa HCH	micro g/l																
beta HCH	micro g/l																
gama HCH	micro g/l																
DDE	micro g/l																
DDT	micro g/l																
PCHB	micro g/l																
KI total	col/l	4000	400000	1000	1000	4000	400000	80000	200000	4000	400000	29000	77000	4	1000	400000	127500
KI fresh	col/l	1000	10000	100	1000	1000	10000	80000	100000	1000	10000	27333	33666	4	100	100000	20199.8
E	col/ml	3000	1	600	1	3000	1	11100	110	3000	1	4633	37	4	1	3000	1917.75
HP	col/ml	40	11000	80	1700	40	11000	2660	19300	40	11000	913	9660	4	40	19300	5110.75
HM	col/ml		1200		17		1200		7500		1200		2599	2	17	7500	1899.5
3,4-dichlor benzaine	mg/l																
penta chlor fenol	mg/l																
2-chlor fenol	mg/l																
2,4-dichlor fenol	mg/l																
2,4,6 trichlor fenol	mg/l																
2,3-dimetil fenol	mg/l																
3,4-dimetil fenol	mg/l																
4-chlor 3-metil fenol	mg/l																

Table 2.18 Water Quality Records in the Sirvenos Lake (Birzai)

Data source : Human Health Center in Birzai (MOH)

Date	Coliform Index		Date	Coliform Index	
	Central Beach	Near the Youth Park		Central Beach	Near the Youth Park
1993.5.13	13,000	〈 1,000	1996.5.20	70	2,400
5.18	〈 1,000	〈 1,000	6.03	1600	1,000
5.24	68,000	7,000	6.15	1000	〈 1,000
5.31	〈 1,000	〈 1,000	6.20	80	900
6.15	〈 1,000	〈 1,000	7.01	〉2,400	900
6.21	〈 1,000	20,000	7.15	〈 1,000	900
6.28	〈 1,000	103,000	7.29	350	140
7.07	2,000	〈 1,000	8.13	〉2,400	140
7.19	〈 1,000	〈 1,000	8.20	40	900
7.26	〈 10,000	〈 1,000	8.27	〈 1,000	〈 1,000
8.11	〈 1,000	2,000	9.02	350	920
8.18	1,000	1,000	1997.6.02	350	40
9.02	〈 1,000	〈 1,000	5.15	350	50
9.15	1,000	260,000	6.22	〉2,400	240
1994.5.18	1,000	1,000	7.08	400	〈 1,000
5.25	〈 1,000	〈 1,000	7.15	350	180
6.07	〈 1,000	〈 1,000	7.28	〉2,400	540
6.20	1,000	〈 1,000	8.04	〉2,400	1,600
6.28	〈 1,000	〈 1,000	8.15	1600	1,600
7.11	20,000	〈 1,000	8.25	240	140
7.18	6,000	100,000	1998.6.01	280	30
7.25	〈 1,000	〈 1,000	6.08	1600	180
8.03	〈 1,000	〈 1,000	6.22	〉2,400	1,600
8.09	〈 1,000	324,000	7.01	540	540
8.16	〈 1,000	〈 1,000	7.08	350	〉2,400
1995.6.01	140	140	7.20	540	130
6.12	140	20	7.28	220	240
6.19	1,000	〈 1,000	8.06	240	220
6.28	140	50	8.13	540	140
7.10	920	70			
7.17	160	80			
7.24	〉2,400	〉2,400			
8.10	10	540			
8.17	〈 1,000	〈 1,000			
8.27	〈 1,000	〈 1,000			

Note: No eutro-pathologic micro-flora was seen for the whole observation period.

Coli-index less than 10,000 is allowed by MOH.

Table 2 . 19 Water Quality Records of Ground Water in Birzai (Geo. Survey)

Posto pavadinimas Station' s name	Gręžinio numeris Well' s number	Geologinis indeksas Geological index	Mėginio paėmimo data Date of sapling	pH	Bendras kietumas mg-ekv/l Total hardness mg-eq/l	Permanganatinė oksidacija Total oxygen demand mgO_2/l	Pagrindiniai cheminiai komponentai, mg/l Main chemical components, mg/l										Bendra mineralizacija, g/l ir vandens chemine sudetis, % ekv/l TDS, g/litre and water chemical composition, % eq/l
							Cl^-	SO_4^{--}	HCO_3^-	NO_2^-	NO_3^-	Na^+	K^+	Ca^{++}	Mg^{++}	NH_4^+	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Karajuniškis (BIRŽAI)	1345	Dyll	04/05	7.25	27.17	0	22.36	1074	231.8	0.191	1.377	4.57	1.8	470	45.14	1.115	1.74 $\frac{SO_4 85}{Ca86}$
	1345	Dyll	06/08	7.02	26.67	1.6	24.85	917.49	408.7	0	0.487	7	2.18	460	45.14	0.267	1.67 $\frac{SO_4 72\ HCO_3 26}{Ca85}$
	1346	Dyll	04/05	7.62	5	0.8	10.29	51	256.2	1.36	7.409	2.04	1.3	78	13.42	1.364	0.29 $\frac{HCO_3 76}{Ca76\ Mg22}$
	1346	Dyll	06/08	7.35	6.99	1.6	11.36	63.69	323.3	0.059	15.983	2.9	1.68	126	8.54	0.166	0.39 $\frac{HCO_3 77}{Ca88}$
	1348	Dyll	04/05	6.64	18.76	0	14.55	831	79.3	0.03	0.089	11.65	6.78	376	0	2.985	1.29 $\frac{SO_4 91}{Ca97}$
	1348	Dyll	06/08	7.08	25.46	4.96	9.23	941.58	359.9	0	0.536	11.62	6.66	458	31.74	2.07	1.64 $\frac{SO_4 76\ HCO_3 23}{Ca87}$
	1348	Dyll	31/10	7.09	30.42	1.6	14.2	1283.85	286.7	0	0.536	11.85	3.77	522	53.18	2.39	2.03 $\frac{HCO_3 84}{Ca84}$
	1349	Dykpss	06/08	7.19	20.28	3.68	9.58	700.72	378.2	0.046	14.451	9.57	6.66	334	43.92	0.71	1.29 $\frac{SO_4 69\ HCO_3 30}{Ca80}$
	1349	Dykpss	31/10	7.25	20.77	3.04	10.56	711.13	384.3	0.046	14.451	8.88	5.1	374	25.62	0.678	1.32 $\frac{SO_4 69\ HCO_3 30}{Ca88}$
	1350	Dyšv	06/08	7.58	4.51	2.4	19.88	27.84	286.7	0.003	16.054	10	8.66	80	36.6	0.235	0.28 $\frac{HCO_3 81}{Mg58\ Ca29}$
	1350	Dyšv	31/10	7.66	5.59	0.96	22.72	11.58	292.8	0	0.961	9.75	7.75	46	40.02	0.177	0.28 $\frac{HCO_3 85}{Mg53\ Ca37}$
	1351	Dyll	06/08	6.94	27.96	2.08	4.97	1088.4	329.4	0.016	1.829	12.13	4.17	504	34.16	0.006	1.81 $\frac{SO_4 80}{Ca88}$
	1351	Dyll	31/10	7	29.56	1.12	17.75	1177.04	305	0.016	1.829	10.58	3.77	526	40.26	0.39	1.93 $\frac{SO_4 81}{Ca87}$
	1352	Dyll	04/05	7.11	11.79	0.64	23.43	360	207.4	0.02	0	3.05	1.8	200	21.96	0.746	0.71 $\frac{SO_4 64\ HCO_3 30}{Ca83}$
Karajuniškis (BIRŽAI)	1352	Dyll	06/08	7.19	25.07	2.4	30.17	957.95	268.4	0	1.67	5.47	2.68	420	50.02	0	1.61 $\frac{SO_4 79}{Ca83}$
	1352	Dyll	06/10	7.19	25.07	2.4	30.17	957.95	268.4	0.046	0.221	5.47	2.68	420	50.02	0	2.03 $\frac{SO_4 79}{Ca83}$

Table 2. 20 Water Quality Data at the Existing Sewage Treatment Plant (Birzai)

Date	BOD_7		SS		Total-N		NH_4		NO_2		NO_3		Total-P		Cl		Oil	
	Inf.	Eff.	Inf.	Eff.	Inf.	Eff.	Inf.	Eff.	Inf.	Eff.	Inf.	Eff.	Inf.	Eff.	Inf.	Eff.	Inf.	Eff.
10-Jul-96	228	192	69	23	12.6	34.4	11.0	24.8	-	-	-	-	0.9	2.1	115	144	-	-
8-Aug-96	245	360	114	212	50.4	13.4	29.6	7.6	-	-	-	-	5.5	3.6	253	181	-	-
11-Sep-96	490	285	392	58	49.2	42.5	31.0	26.0	-	-	4.0	3.5	4.2	6.0	325	289	-	-
9-Oct-96	350	186	398	94	51.5	54.8	28.6	31.0	-	-	0.5	0.5	6.0	6.4	287	325	-	-
22-Nov-96	3,360	348	513	66	91.8	58.2	48.0	31.0	-	-	10.5	4.5	7.9	5.6	402	363	-	-
16-Dec-96	310	120	69	63	14.5	44.8	12.6	34.0	0.2	-	1.7	0.5	4.9	4.4	153	230	-	-
21-Jan-97	312	177	271	68	44.5	18.9	33.0	12.4	0.2	-	2.0	1.5	5.6	1.4	249	287	0.8	0.6
19-Feb-97	580	72	445	36	76.6	33.1	65.0	15.0	-	-	2.0	0.5	6.0	4.0	325	211	1.05	0.85
12-Mar-97	293	160	214	19	42.3	33.2	38.0	28.6	0.3	-	0.5	0.5	9.2	3.8	191	191	1.7	0.9
25-Apr-97	96	126	125	45	47.8	35.1	13.2	11.0	0.2	-	1.3	0.5	4.0	2.8	211	172	0.7	-
13-May-97	410	188	209	32	47.8	25.5	20.0	12.0	-	-	2.0	0.5	5.8	2.4	172	172	-	-
12-Jun-97	190	190	55	29	26.6	38.9	12.0	30.0	0.4	-	6.0	0.5	2.4	2.8	191	197	-	0.9
16-Jul-97	220	174	298	65	43.6	25.5	32.0	17.0	-	-	5.0	2.0	5.2	5.6	263	188	-	-
13-Aug-97	1,200	186	188	35	38.2	42.5	15.0	12.0	-	-	1.0	3.5	9.0	4.5	478	207	-	-
22-Sep-97	1,020	630	1,037	236	152.0	66.5	55.0	32.0	-	-	-	-	12.0	9.0	249	287	1.8	0.8
21-Oct-97	150	170	78	48	14.1	21.8	5.0	14.0	3.0	-	0.5	-	1.8	3.8	210	211	1.2	0.7
25-Nov-97	870	162	401	20	47.0	22.0	22.0	14.0	-	-	0.5	0.5	4.8	2.4	191	172	0.8	0.7
22-Dec-97	480	162	121	79	22.0	24.6	16.0	22.0	0.4	-	0.5	0.5	1.8	5.0	230	153	-	-
27-Jan-98	336	110	144	45	35.0	28.0	26.0	10.0	-	-	3.0	1.5	6.0	5.0	172	131	-	0.6
12-Feb-98	210	70	161	26	21.0	8.0	16.0	6.0	-	-	1.0	0.5	3.0	2.9	191	172	1.3	0.8
12-Mar-98	81	123	79	46	19.0	26.0	10.0	16.0	0.6	-	1.0	-	1.6	2.6	134	172	0.9	0.8
9-Apr-98	320	186	43	38	49.0	29.0	22.0	21.0	-	-	1.0	2.0	4.4	3.6	134	153	1.2	1.0
5-May-98	155	130	82	49	24.0	26.0	11.0	18.0	0.3	-	2.0	0.5	2.4	1.2	134	115	-	-
9-Jul-98	330	150	248	49	32.0	24.0	22.0	13.0	-	-	2.5	1.0	4.4	3.4	195	177	-	-
Mean	509.8	194.0	239.8	61.7	43.9	32.4	24.8	19.1	0.6	-	2.3	1.3	5.0	3.9	227	204	1.1	0.8
Maximum	3,360	630	1,037	236	91.8	66.5	65.0	32.0	3.0	-	10.5	4.5	9.2	9.0	478	363	1.8	1.0
Minimum	81	70	43	19	12.6	13.4	5.0	7.6	0.2	-	0.5	0.5	0.9	1.2	115	115	0.7	0.6

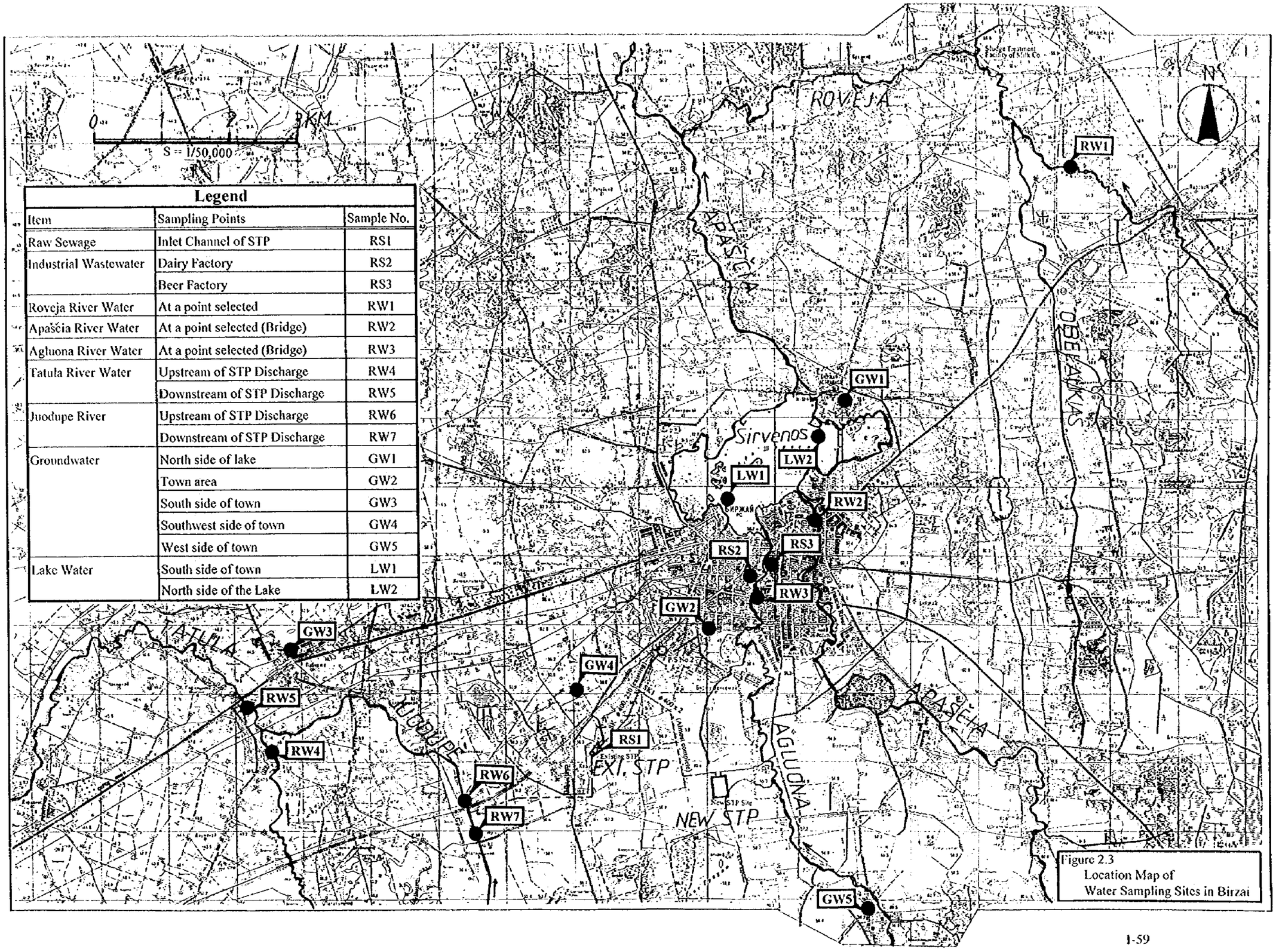
Unit : mg/l

Note) Inf. = Influet Quality
Eff. = Effluent Quality
Source : Birzai Water Company

Table 2.21 Water Quality Survey Results at Pollution Sources in Birzai

(Data Source : Birzai Vandeneys)

Location	Year	Water supply (m^3/s)	Sewer drainage (m^3/s)	BOD7 (mg/l)		S.S. (mg/l)	
				Mean	Max.	Mean	Max.
Brewery Factory (Birzu alus)	1997	28,400	28,400	985.0	3480.0	298.0	623.00
Canfood Factory	1997	(from well)	29,000	475.0	960.0	212.0	603.00
Dairy factory	1997	(from well)	99,700	702.0	1170.0	163.0	784.00



Legend

Item	Sampling Points	Sample No.
Raw Sewage	Inlet Channel of STP	RS1
Industrial Wastewater	Dairy Factory	RS2
	Beer Factory	RS3
Roveja River Water	At a point selected	RW1
Apaščia River Water	At a point selected (Bridge)	RW2
Aghuona River Water	At a point selected (Bridge)	RW3
Tatula River Water	Upstream of STP Discharge	RW4
	Downstream of STP Discharge	RW5
Juodupe River	Upstream of STP Discharge	RW6
	Downstream of STP Discharge	RW7
Groundwater	North side of lake	GW1
	Town area	GW2
	South side of town	GW3
	Southwest side of town	GW4
	West side of town	GW5
Lake Water	South side of town	LW1
	North side of the Lake	LW2

Figure 2.3
Location Map of
Water Sampling Sites in Birzai

Table 2.22 Summary of Quantity of Water Quality Tests (Actual)

		Incoming Raw Sewege					River /lake water				Ground water	Total
		Birzai	Birzai		Skuodas		Birzai			Skuodas	Birzai	
		Influent of STP	Dairy Factory	Brewery Factory	Influent Old Town	Influent New Town	River	River (Add.)	Lake	River		
No. of Location		1	1	1	1	1	5	2	2	3	5	22
Frequency of sampling		4	4	4	4	4	4	1	2	4	3	-
Sampling No. /time		13*	5*	5*	13*	13*	1	1	1	1	1	-
Test Frequency /Time**	Water Temperature	13	5	5	13	13	1	1	1	1	1	-
	Color	0	0	0	0	0	1	1	1	1	1	-
	Odor	0	0	0	0	0	1	1	1	1	1	-
	PH	13	5	5	13	13	1	1	1	1	1	-
	Transparancy	0	0	0	0	0	1	1	1	1	1	-
	EC	0	0	0	0	0	1	1	1	1	1	-
	SS	13	5	5	13	13	1	1	1	1	1	-
	BOD	13	5	5	13	13	1	1	1	1	1	-
	Soluble BOD	13	5	5	13	13	0	0	0	0	0	-
	COD	13	5	5	13	13	1	1	1	1	1	-
	TN	13	5	5	13	13	1	1	1	1	1	-
	TP	13	5	5	13	13	1	1	1	1	1	-
	PO4	13	5	5	13	13	1	1	1	1	1	-
	Discharge	13	5	5	13	13	1	1	1	1	0	-
	NH_4-N	0 or 4	0 or 4	0 or 4	0 or 4	0 or 4	1	1	1	1	1	-
	NO_2-N	0 or 4	0 or 4	0 or 4	0 or 4	0 or 4	1	1	1	1	1	-
	NO_3-N	0 or 4	0 or 4	0 or 4	0 or 4	0 or 4	1	1	1	1	1	-
	Cl-	0 or 4	0 or 4	0 or 4	0 or 4	0 or 4	1	1	1	1	1	-
	ABS	0 or 4	0 or 4	0 or 4	0 or 4	0 or 4	1	1	1	1	1	-
	DO	0 or 4	0 or 4	0 or 4	0 or 4	0 or 4	1	1	1	1	1	-
	Oil	0 or 4	0 or 4	0 or 4	0 or 4	0 or 4	1	1	1	1	1	-
	Total coliform	0 or 4	0 or 4	0 or 4	0 or 4	0 or 4	1	1	1	1	1	-
	Alkalinity(as $CaCO_3$)	0 or 4	0 or 4	0 or 4	0 or 4	0 or 4	0	0	0	0	1	-
Total Frequency of Test	Water Temperature	52	20	20	52	52	20	2	4	12	15	249
	Color	0	0	0	0	0	20	2	4	12	15	53
	Odor	0	0	0	0	0	20	2	4	12	15	53
	PH	52	20	20	52	52	20	2	4	12	15	249
	Transparancy	0	0	0	0	0	20	2	4	12	15	53
	EC	0	0	0	0	0	20	2	4	12	15	53
	SS	52	20	20	52	52	20	2	4	12	15	249
	BOD	52	20	20	52	52	20	2	4	12	15	249
	Soluble BOD	52	20	20	52	52	0	0	0	0	0	196
	COD	52	20	20	52	52	20	2	4	12	15	249
	TN	52	20	20	52	52	20	2	4	12	15	249
	TP	52	20	20	52	52	20	2	4	12	15	249
	PO4	52	20	20	52	52	20	2	4	12	15	249
	Discharge	52	20	20	52	52	20	2	4	12	0	234
	NH_4-N	4	4	4	4	4	20	2	4	12	15	73
	NO_2-N	4	4	4	4	4	20	2	4	12	15	73
	NO_3-N	4	4	4	4	4	20	2	4	12	15	73
	Cl-	4	4	4	4	4	20	2	4	12	15	73
	ABS	4	4	4	4	4	20	2	4	12	15	73
	DO	4	4	4	4	4	20	2	4	12	15	73
	Oil	4	4	4	4	4	20	2	4	12	15	73
	Total coliform	4	4	4	4	4	20	2	4	12	15	73
	Alkalinity(as $CaCO_3$)	4	4	4	4	4	0	0	0	0	15	35

*: The maximum number of sampling frequency. (No sampling in case of no flow.)

**: The maximum number of testing frequency. (the same as the sampling frequency.)
The sampling date/time is selected for the items with "0 or 4".

Note: Water quality tests for the supernatant in two STP ponds (Birzai, Skuodas) are not included in the list.

Table 2. 23 Water Sampling Date (Birzai)

Item	Sampling Points	Sample No.	Sampling Date (1998)				Remarks
Industrial Wastewater	Beer Factory	B-RS1	20,July	28 Aug	6 AUG	13 AUG	5 samples/dayx4days
	Dairy Factory	B-RS2	20,July	28 Aug	6 Aug	13 Aug	5 samples/dayx4days
Raw Sewage	Inlet Channel of STP	B-RS3	28/29 July	6/7 Aug	13/14Aug	20/21Aug	13 samples/dayx4days
Roveja River Water	At a point selected	B-RW1	20 July	28 AUG	6 Aug	13Aug	1 sample/dayx4days
Apascia River Water	At a point selected (Bridge)	B-RW2	20 July	28 Aug	6 Aug	13 Aug	1 sample/dayx4days
Agluona River Water	At a point selected (Bridge)	B-RW3	20 July	28 Aug	6 Aug	13 Aug	1 sample/dayx4days
Tatula River Water	Upstream of STP Discharge	B-RW4	20 July	28 Aug	6 Aug	13 Aug	1 samples/dayx4days
	Downstream of STP Discharge	B-RW5	20 July	28 Aug	6 Aug	13 Aug	1 sample/dayx4days
Juodupe River water	Upstrem of STP	B-RW-6	13 Aug				1 sample
	Dawnstream of STP	B-RW 7	13 Aug				1 sample
Groundwater	North side of lake	B-GW1	21 July	28 Aug	6 Aug		1 sample/dayx3days
	Town area	B-GW2	21 July	28 Aug	6 Aug		1 sample/dayx3days
	South side of town	B-GW3	21 July	28 Aug	6 Aug		1 sample/dayx3days
	Southwest side of town	B-GW4	21 July	28 Aug	6 Aug		1 sample/dayx3days
	West side of town	B-GW5	21 July	28 Aug	6 Aug		1 sample/dayx3days
Lake Water	South side of town	B-LW1	28 July	20 Aug			1 sample/dayx2days
	North side of the Lake	B-LW2	28 July	20 Aug			1 sample/dayx2days

Table 2.24 Results of Water Quality Test,Raw Sewege
(Biržai, Influent of STP 1 of 4 times sampling)

Sample No. : B-RSI-1

0		Unit	Test/Observation Results															
Sampling /Test NO.			1	2	3	4	5	6	7	8	9	10	11	12	13	Max.	Min.	Mean
			07 28	07 28	07 28	07 28	07 28	07 28	07 28	07 29	07 29	07 29	07 29	07 29	07 29			
Time			10:00	12:00	14:00	16:00	18:00	20:00	22:00	00:00	02:00	04:00	06:00	08:00	10:00			
Climate			cloudy	cloudy	cloudy	rainy	rainy	rainy	rainy	rainy	rainy	rainy	rainy	cloudy	cloudy			
Test Item	Water Temperature	°C	14.5	16	16	16.5	16	17	17	17	16	15	15	15	15.5	17	14.5	15.9
	Color	N.A.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Odor	N.A.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	PH	N.A.	8.11	7.81	7.62	7.76	7.84	7.73	7.64	8.64	7.77	7.85	7.95	8.27	8.25	8.64	7.62	7.94
	Transparancy	N.A.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	EC	umhos/cm	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	SS	mg/l	125	271	305	162	267	392	336	517	97	117	365	78	168	517	78	246
	BOD	mg/l	92.8	323.9	277.6	281.4	420.7	163.7	350.7	293	39	45.2	148.7	68.1	81.9	420.7	39	199
	Soluble BOD	mg/l	78.5	260.2	171.7	141.8	239.1	38.9	43.6	31.5	21	11.5	12.5	17	19.5	260.2	11.5	83.6
	COD	mg/l	240	608	608	528	736	464	384	576	144	224	400	160	192	736	144	405
	TN	mg/l	21.7	24.6	33.6	20.2	28	20.1	17.8	13.4	34.7	10.1	27.8	26.7	16.8	34.7	10.1	22.7
	TP	mg/l	5.8	12.8	12	13.1	13.2	6.6	6.6	4	2.6	2.6	2.6	2.6	3.6	13.2	2.6	6.8
	PO4	mg/l	3.2	6.6	6.5	5.8	5	3.7	2.3	1.8	1.6	1.1	1.2	1.1	2	6.6	1.1	3.1
	Discharge	Cu.m/s	0.042	0.06	0.046	0.048	0.047	0.04	0.046	0.064	0.059	0.055	0.057	0.064	0.048	0.064	0.04	0.052
	NH_4-N	mg/l												21		21	21	21
	NO_2-N	mg/l												0.5		0.5	0.5	0.5
	NO_3-N	mg/l												3.5		3.5	3.5	3.5
	Cl-	mg/l												51		51	51	51
	ABS	mg/l												0.186		0.186	0.186	0.186
	DO	mg/l												0		0	0	0
	Oil	mg/l												0.7		0.7	0.7	0.7
	Total coliform	no./100ml												37E 06		37E 06	37E 06	37E 06
	Alkalinity(as $CaCO_3$	mg/l												425		425	425	425

Table 2.25 Results of Water Quality Test, Raw Sewege
(Biržai, Influent of STP ___2___ of 4 times sampling)
Sample No. : B-RS1-2

0		Unit	Test/Observation Results															
Sampling /Test No.			1	2	3	4	5	6	7	8	9	10	11	12	13	Max.	Min.	Mean
Date			08 06	08 06	08 06	08 06	08 06	08 06	08 06	08 06	08 07	08 07	08 07	08 07	08 07			
Time			09:00	11:00	13:00	15:00	17:00	19:00	21:00	23:00	01:00	03:00	05:00	07:00	09:00			
Climate			cloudy	cloudy	cloudy	rainy	cloudy	rainy	cloudy	cloudy	cloudy	cloudy	cloudy	cloudy	cloudy			
Test Item	Water Temperature	°C	15	15	15.5	16	16	15	12	13	15	13	13	13	15	16	12	14.3
	Color	N.A.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Odor	N.A.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	PH	N.A.	8.44	8.45	8.1	8.48	7.76	8.6	7.93	8.4	8.46	8.35	8.64	8.05	8.02	8.64	7.76	8.28
	Transparancy	N.A.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	EC	umhos/cm	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	SS	mg/l	25	187	88	286	144	325	88	221	268	114	93	65	95	325	25	154
	BOD	mg/l	24.2	184.3	96.7	490.2	508.6	175.7	214.8	271.7	377.5	104.4	109.6	76.8	220	508.6	24.2	219.6
	Soluble BOD	mg/l	8.5	87.7	80.8	293.3	258.5	35.4	92.3	109.5	162.2	10.9	38	53.8	144.9	293.3	8.5	105.8
	COD	mg/l	160	448	336	944	800	480	432	672	752	240	256	160	432	944	160	470
	TN	mg/l	24.3	38.1	37.2	39.4	42.6	40.1	32.2	75.2	29.1	34.3	21.3	22.3	20.9	75.2	20.9	35.2
	TP	mg/l	1.2	5.1	4.7	7.9	8.1	7.4	4.1	6.1	6.7	5.7	3	2.1	2.1	8.1	1.2	4.9
	PO4	mg/l	0.7	2.3	3.1	5.7	7.9	3.7	2.4	3.5	3	2.1	1.7	1.1	0.5	7.9	0.5	2.9
	Discharge	Cu.m/s	0.05	0.047	0.041	0.044	0.048	0.049	0.046	0.048	0.067	0.057	0.057	0.041	0.043	0.067	0.041	0.049
	NH_4-N	mg/l	19		35.5		32		26							35.5	19	28.1
	NO_2-N	mg/l	0		0		0		0							0	0	0
	NO_3-N	mg/l	0		0		0		0							0	0	0
	Cl-	mg/l	51		45		83		64							83	45	60.6
	ABS	mg/l	0.35		1.14		1.28		0.72							1.28	0.35	0.87
	DO	mg/l	1.37		0		0.15		0							1.37	0	0.38
	Oil	mg/l	0.25		0.2		0.4		1							1	0.2	0.46
	Total coliform	no./100ml	94E 06		15E 07		15E 07		15E 07							15E 07	94E 06	14E 07
	Alkalinity(as $CaCO_3$	mg/l	495		625		585		475							625	475	545

Table 2.26 Results of Water Quality Test, Raw Sewege
(Birźai, Influent of STP ___3___ of 4 times sampling)

Sample No. : B-RS1-3

D		Unit	Test/Observation Results															
Sampling /Test No.			1	2	3	4	5	6	7	8	9	10	11	12	13	Max.	Min.	Mean
Date			08 13	08 13	08 13	08 13	08 13	08 13	08 13	08 13	08 14	08 14	08 14	08 14	08 14			
Time			08:30	10:30	12:30	14:30	16:30	18:30	20:30	22:30	00:30	02:30	04:30	06:30	08:30			
Climate			cloudy	cloudy	cloudy	cloudy	cloudy	cloudy	cloudy	rainy	rainy	rainy	rainy	rainy	rainy			
Test Item	Water Temperature	°D	15	16	16.5	15.5	15.5	15	16.5	16	15	15	15	15	15.5	16.5	15	15.5
	Color	N.A.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Odor	N.A.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	PH	N.A.	7.94	8.65	7.75	7.56	7.6	7.76	9.95	9.81	7.96	8.26	7.94	8.2	8.05	9.95	7.6	8.26
	Transparancy	N.A.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	EC	umhos/cm	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	SS	mg/l	46.8	271	270	397	223	421	511	315	118	230	298	255	85	511	46.8	265
	BOD	mg/l	18.2	208	539	912	425	602	459	274	261	137	172	142	60.5	912	18.2	324
	Soluble BOD	mg/l	12.1	182.6	343	150.5	288.2	217.4	163.7	93	117	58	63	70	35.7	343	12.1	137.6
	COD	mg/l	89	419	1,038	1,600	768	947	652	691	647	368	470	382	142	1,600	89	632
	TN	mg/l	12.3	41.4	40.3	65	42.6	33.6	24.6	26.9	23.5	20.2	12.3	11.2	15.7	65	12.3	28.4
	TP	mg/l	1.7	5.8	15.8	19	17.5	7.3	6.1	5.4	5.5	3.6	3.6	3.1	1.7	19	1.7	7.4
	PO4	mg/l	1	2.3	13.5	15.2	11.8	5.2	1.8	1.7	3.6	1.8	1.9	1.5	1	15.2	1	4.8
	Discharge	Cu.m/s	0.046	0.068	0.032	0.041	0.065	0.101	0.025	0.057	0.058	0.045	0.061	0.048	0.076	0.101	0.025	0.055
	NH_4-N	mg/l																
	NO_2-N	mg/l																
	NO_3-N	mg/l																
	Cl-	mg/l																
	ABS	mg/l																
	DO	mg/l																
	Oil	mg/l																
	Total coliform	no./100ml																
	Alkalinity(as $CaCO_3$	mg/l																

Table 2.27 Results of Water Quality Test , Raw Sewege
(Biržai, Influent of STP 4 of 4 times sampling)
Sample No. : B-RS1-4

0		Unit	Test/Observation Results															
			1	2	3	4	5	6	7	8	9	10	11	12	13	Max.	Min.	Mean
Sampling /Test No.			08 20	08 20	08 20	08 20	08 20	08 20	08 20	08 20	08 21	08 21	08 21	08 21	08 21			
Date			09:00	11:00	13:00	15:00	17:00	19:00	21:00	23:00	01:00	03:00	05:00	07:00	09:00			
Time			sunny	sunny	sunny	sunny	sunny	sunny	sunny	sunny	cloudy	cloudy	Cloudy	sunny	sunny			
Climate																		
Test Item	Water Temperature	°C	13	14	14.5	15	15.5	14	14	13	13.5	13.5	13	13	13	15.5	13	13.8
	Color	N.A.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Odor	N.A.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	PH	N.A.	7.98	8.1	7.8	7.46	7.7	7.68	9.18	7.9	7.9	7.9	7.92	8.3	8.4	9.18	7.68	8.02
	Transparancy	N.A.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	EC	umhos/cm	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	SS	mg/l	70.3	421	218	357	192	273	342	156	192	153	85	55	94	421	55	201
	BOD	mg/l	49.7	566	381	531	415	495	389	97.4	270	235	119	43.5	47.8	566	43.5	280
	Soluble BOD	mg/l	4.6	168	248	301	283	323	155	37.2	106	122	47.1	12.4	13.4	323	4.6	140
	COD	mg/l	74	973	755	1,088	717	768	740	420	680	636	451	244	362	1,088	74	608
	TN	mg/l	15.1	38.7	29.7	54.3	28.9	30.4	28.2	36.4	39.8	35.2	29.4	20.6	24.1	54.3	15.1	31.6
	TP	mg/l	3.8	7.4	6.6	10.6	6.6	6.6	4.1	5.4	5.9	5.1	3.2	1.9	1.9	10.6	1.9	5.3
	PO4	mg/l	1.3	5	4.6	8.3	3.7	3.4	1.5	3.7	4.1	4.1	2.9	1.5	1.6	8.3	1.3	3.5
	Discharge	Cu.m/s	0.025	0.024	0.03	0.043	0.036	0.037	0.036	0.03	0.032	0.03	0.033	0.02	0.027	0.043	0.02	0.031
	NH_4-N	mg/l																
	NO_2-N	mg/l																
	NO_3-N	mg/l																
	Cl-	mg/l																
	ABS	mg/l																
	DO	mg/l																
	Oil	mg/l																
	Total coliform	no./100ml																
	Alkalinity(as $CaCO_3$)	mg/l																

Table 2.28 Results of Water Quality Test, Raw Sewege
(Biržai, Dairy Factory, No. 1 of 4 times sampling)
Sample No. : B-RS2-1

□		Unit	Test/Observation Results							
Sampling /Test No.			1	2	3	4	5	Max.	Min.	Mean
Date			07 21	07 21	07 21	07 21	07 21			
Time			08:30	10:30	12:30	14:30	16:30			
Climate			sunny	sunny	sunny	sunny	sunny			
Test Item	Water Temperature	°C	27	25	29	24.5	22	29	22	25.5
	Color	N.A.	-	-	-	-	-	-	-	-
	Odor	N.A.	-	-	-	-	-	-	-	-
	PH	N.A.	10.26	9.72	7.75	8.73	10.26	10.26	7.75	9.34
	Transparancy	N.A.	-	-	-	-	-	-	-	-
	EC	umhos/cm	-	-	-	-	-	-	-	-
	SS	mg/l	404	186	448	93.3	3,139	3,139	93.3	854.1
	BOD	mg/l	1,007	464.2	1,935	282.5	2,737	2,737	282.5	1,285
	Soluble BOD	mg/l	795.7	375.7	1,482	168.9	1,998	1,998	168.9	964.1
	COD	mg/l	3,200	2,080	4,480	880	7,680	7,680	880	3,664
	TN	mg/l	7.84	34.7	33.6	2.24	32.5	34.7	2.24	22.18
	TP	mg/l	16	4.45	25.2	3.3	18.1	25.2	3.3	13.4
	PO4	mg/l	2.66	2.52	20.1	1.38	1.8	20.1	1.38	5.69
	Discharge	Cu.m/s								
	NH_4-N	mg/l					19.5	19.5	19.5	19.5
	NO_2-N	mg/l					0	0	0	0
	NO_3-N	mg/l					0	0	0	0
	Cl-	mg/l					2.15	2.15	2.15	2.15
	ABS	mg/l					0.16	0.16	0.16	0.16
	DO	mg/l					0	0	0	0
	Oil	mg/l					0.9	0.9	0.9	0.9
	Total coliform	no./100ml					890,000	890,000	890,000	890,000
	Alkalinity(as $CaCO_3$)	mg/l					2,820	2,820	2,820	2,820

Table 2.29 Results of Water Quality Test, Raw Sewage
(Biržai, Dairy Factory, No. 2 of 4 times sampling)
Sample No. : B-RS2-2

C		Unit	Test/Observation Results							
Sampling /Test No.			1	2	3	4	5	Max.	Min.	Mean
Date			07 28	07 28	07 28	07 28	07 28			
Time			09:30	11:30	13:30	15:30	17:30			
Climate			rainy	rainy	rainy	rainy	rainy			
Test Item	Water Temperature	°C	28	25.5	18.5	17.5	17	25.5	17	21.3
	Color	N.A.	-	-	-	-	-	-	-	-
	Odor	N.A.	-	-	-	-	-	-	-	-
	PH	N.A.	6.66	4.28	7.41	10.24	9	10.24	4.28	7.52
	Transparancy	N.A.	-	-	-	-	-	-	-	-
	EC	umhos/cm	-	-	-	-	-	-	-	-
	SS	mg/l	135.5	285	284	534	77.5	534	77.5	263.2
	BOD	mg/l	590	1,560	795	928	194	928	194	813.5
	Soluble BOD	mg/l	581	1,213	396	317	127	1,213	127	526.7
	COD	mg/l	880	4,480	2,480	1,440	272	4,480	272	1,910
	TN	mg/l	36.7	39	17.9	17.8	6.72	39	6.72	23.6
	TP	mg/l	7.5	16.8	4.8	4.4	2.23	16.8	2.25	7.14
	PO4	mg/l	7.2	14.3	2.95	1.58	1.28	14.3	1.28	5.46
	Discharge	Cu.m/s								
	NH_4-N	mg/l				14		14	14	14
	NO_2-N	mg/l				0		0	0	0
	NO_3-N	mg/l				1.18		1.18	1.18	1.18
	Cl-	mg/l				44.7		44.7	44.7	44.7
	ABS	mg/l				0.03		0.03	0.03	0.03
	DO	mg/l				6.23		6.23	6.23	6.23
	Oil	mg/l				0.3		0.3	0.3	0.3
	Total coliform	no./100ml				17,300,000		17,300,000	17,300,000	17,300,000
	Alkalinity(as $CaCO_3$)	mg/l				590		590	590	590

Table 2.30 Results of Water Quality Test, Raw Sewege
(Biržai, Dairy Factory, No. 3 of 4 times sampling)
Sample No. : B-RS2-3

C		Unit	Test/Observation Results							
Sampling /Test No.			1	2	3	4	5	Max.	Min.	Mean
Date			08 06	08 06	08 06	08 06	08 06			
Time			08:30	10:30	12:30	14:30	16:30			
Climate			cloudy	cloudy	cloudy	cloudy	rainy			
Test Item	Water Temperature	°C	23	24	21	20	22	24	20	22
	Color	N.A.	-	-	-	-	-	-	-	-
	Odor	N.A.	-	-	-	-	-	-	-	-
	O	N.A.	7.63	7.92	7.56	9.56	7.56	9.56	7.56	8.05
	Transparancy	N.A.	-	-	-	-	-	-	-	-
	EC	umhos/cm	-	-	-	-	-	-	-	-
	SS	mg/l	74.4	346	121	217	275	346	74.4	206.7
	BOD	mg/l	141	945	315	184	956	956	141	508.2
	Soluble BOD	mg/l	79.1	464	154	89.2	455	464	79.1	248.2
	COD	mg/l	480	1,600	720	480	1,280	1,600	480	912
	TN	mg/l	13.4	32	10.8	12.2	18.9	32	10.8	17.46
	TP	mg/l	1.5	6.4	1.9	1.9	2.96	6.4	1.5	2.93
	PO4	mg/l	1.1	2.3	0.7	0.36	0.46	2.3	0.46	0.98
	Discharge	Cu.m/s								
	NH_4-N	mg/l	5		5	3.5	6.5	6.5	3.5	5
	NO_2-N	mg/l	0		0	0.06	0	0.06	0	0.015
	NO_3-N	mg/l	0		0	5.13	0	5.13	0	1.28
	Cl-	mg/l	6.38		6.38	12.76	6.38	12.76	6.38	7.98
	ABS	mg/l	0.11		0.03	0.03	0	0.11	0	0.04
	DO	mg/l	5.47		5.47	6.08	3.5	6.08	3.5	5.13
	Oil	mg/l	0.45		0.72	0.65	0.95	0.95	0.45	0.69
	Total coliform	no./100ml	150,000,000		130,000,000	0	120,000,000	150,000,000	0	100,000,000
	Alkalinity(as $CaCO_3$)	mg/l	380		325	850	500	850	325	513

Table 2.31 Results of Water Quality Test, Raw Sewege
(Biržai, Dairy Factory, No. 4 of 4 times sampling)
Sample No. : B-RS2-4

C		Unit	Test/Observation Results							
			1	2	3	4	5	Max.	Min.	Mean
Sampling /Test No.										
Date			08 13	08 13	08 13	08 13	08 13			
Time			08:15	10:15	12:15	14:15	16:15			
Climate			cloudy	cloudy	cloudy	cloudy	cloudy			
Test Item	Water Temperature	°C	23	15	22	28	20	28	15	21.6
	Color	N.A.	-	-	-	-	-	-	-	-
	Odor	N.A.	-	-	-	-	-	-	-	-
	PH	N.A.	8.27	10.68	7.2	9.76	9.58	10.68	7.2	9.1
	Transparancy	N.A.	-	-	-	-	-	-	-	-
	EC	umhos/cm	-	-	-	-	-	-	-	-
	SS	mg/l	184.5	334.5	367	162.2	214.5	367	162.2	252.5
	BOD	mg/l	595	478	1,594	3,801	283	3,801	283	1,350
	Soluble BOD	mg/l	505	274	841	1,901	60.6	1,901	60.6	716.3
	COD	mg/l	901	2,040	4,578	6,784	882	6,784	882	3037
	TN	mg/l	24.48	18.1	41.2	53.5	12.24	53.5	12.24	29.9
	TP	mg/l	7.75	3.62	10.8	18.6	1.22	18.6	1.22	8.4
	PO4	mg/l	4.68	0.42	7.16	11.7	0.22	11.7	0.22	4.84
	Discharge	Cu.m/s								
	NH_4-N	mg/l								
	NO_2-N	mg/l								
	NO_3-N	mg/l								
	Cl-	mg/l								
	ABS	mg/l								
	DO	mg/l								
	Oil	mg/l								
	Total coliform	no./100ml								
	Alkalinity(as $CaCO_3$)	mg/l								

Table 2.32 Results of Water Quality Test, Raw Sewege
(Biržai, Brewery Factory, No.1 of 4 times sampling)

Sample No. : B-RS3-1

C		Unit	Test/Observation Results							
Sampling /Test No.			1	2	3	4	5	Max.	Min.	Mean
Date			07 21	07 21	07 21	07 21	07 21	-	-	-
Time			08:00	10:00	12:00	14:00	16:00	-	-	-
Climate			sunny	sunny	sunny	sunny	sunny	-	-	-
Test Item	Water Temperature	°C	23	18.5	21.5	18.5	20	23	18.5	20.3
	Color	N.A.	-	-	-	-	-	-	-	-
	Odor	N.A.	-	-	-	-	-	-	-	-
	PH	N.A.	7.13	4.56	6.93	5.22	8.32	8.32	4.56	6.43
	Transparancy	N.A.	-	-	-	-	-	-	-	-
	EC	umhos/cm	-	-	-	-	-	-	-	-
	SS	mg/l	224	1,154	738	1,587	239	1,587	224	788.4
	BOD	mg/l	591	4,738	1,348	3,280	264.7	4,738	264.7	2,044
	Soluble BOD	mg/l	410	4,150	848	2,693	177.8	4,150	177.8	1,656
	COD	mg/l	32,000	16,000	11,200	16,000	2,880	32,000	2,880	15,616
	TN	mg/l	5.6	31.4	24.6	43.7	17.8	43.7	5.6	24.6
	TP	mg/l	4.1	20.9	10.9	32	4.1	32	4.1	14.4
	PO4	mg/l	0.9	14.3	0.495	9.7	1.04	14.3	0.495	5.29
	Discharge	Cu.m/s								
	NH_4-N	mg/l					15.5	15.5	15.5	15.5
	NO_2-N	mg/l					0	0	0	0
	NO_3-N	mg/l					0	0	0	0
	Cl-	mg/l					67.6	67.6	67.6	67.6
	ABS	mg/l					0.48	0.48	0.48	0.48
	DO	mg/l					5.21	5.21	5.21	5.21
	Oil	mg/l					0.45	0.45	0.45	0.45
	Total coliform	no./100ml					580,000	580,000	580,000	580,000
	Alkalinity(as $CaCO_3$)	mg/l					540	540	540	540

Table 2.33 Results of Water Quality Test, Raw Sewege
(Biržai, Brewery Factory, No.2 of 4 times sampling)

Sample No. : B-RS3-2

		Unit	Test/Observation Results							
Sampling /Test No.			1	2	3	4	5	Max.	Min.	Mean
Date			07 28	07 28	07 28	07 28	07 28	-	-	-
Time			08:00	10:00	12:00	14:00	16:00	-	-	-
Climate			rainy	rainy	rainy	rainy	rainy	-	-	-
Test Item	Water Temperature		20	16	17	17.8	20	20	16	18.2
	Color	N.A.	-	-	-	-	-	-	-	-
	Odor	N.A.	-	-	-	-	-	-	-	-
	PH	N.A.	4.3	7.74	4.52	4.65	4.96	7.74	4.3	5.23
	Transparancy	N.A.	-	-	-	-	-	-	-	-
	EC	umhos/cm	-	-	-	-	-	-	-	-
	SS	mg/l	1,834	387	1,174	1,183	852	1,834	387	1,086
	BOD	mg/l	6,795	873	4,363	9,289	1,756	9,289	873	4,625
	Soluble BOD	mg/l	5,300	641	3,394	7,179	1,268	7,179	641	3,557
	COD	mg/l	10,240	3,840	8,320	13,840	3,520	13,840	3,520	7,952
	TN	mg/l	93	16.8	107.5	111	23.5	111	16.8	70.3
	TP	mg/l	18	4.12	15.8	20.6	10.3	20.6	4.12	13.76
	PO4	mg/l	15.7	0.78	11.7	14.8	8.4	15.7	0.78	10.28
	Discharge	Cu.m/s								
	NH_4-N	mg/l			25.5			25.5	25.5	25.5
	NO_2-N	mg/l			2.5			2.5	2.5	2.5
	NO_3-N	mg/l			1.23			1.23	1.23	1.23
	Cl-	mg/l			102			102	102	102
	ABS	mg/l			0.03			0.03	0.03	0.03
	DO	mg/l			0			0	0	0
	Oil	mg/l			0.7			0.7	0.7	0.7
	Total coliform	no./100ml			28,000,000			28,000,000	28,000,000	28,000,000
	Alkalinity(as $CaCO_3$)	mg/l			285			285	285	285

Table 2.34 Results of Water Quality Test, Raw Sewege
(Biržai, Brewery Factory, No.3 of 4 times sampling)

Sample No. : B-RS3-3

Item		Unit	Test/Observation Results							
Sampling /Test No.			1	2	3	4	5	Max.	Min.	Mean
Date			08 06	08 06	08 06	08 06	08 06	-	-	-
Time			08:00	10:00	12:00	14:00	16:00	-	-	-
Climate			cloudy	cloudy	cloudy	cloudy	rainy	-	-	-
Test Item	Water Temperature	°C	25	20.5	19.5	17	23	25	17	21
	Color	N.A.	-	-	-	-	-	-	-	-
	Odor	N.A.	-	-	-	-	-	-	-	-
	PH	N.A.	4.14	7.75	5.9	4.78	7.88	7.88	4.14	6.09
	Transparancy	N.A.	-	-	-	-	-	-	-	-
	EC	umhos/cm	-	-	-	-	-	-	-	-
	SS	mg/l	518	287	542	155	193	542	155	339
	BOD	mg/l	3,157	525	2,102	4,376	333	4,376	333	2,099
	Soluble BOD	mg/l	1,533	319.5	1,751	3,545	127	3,545	127	1,455
	COD	mg/l	7,040	1,760	5,440	8,160	692	8,160	692	4,628
	OC	mg/l	39.2	11.2	33.6	104.2	19.6	104.2	11.2	41.6
	TP	mg/l	11.7	3.1	7.3	21.3	0.72	21.3	0.72	8.82
	PO4	mg/l	11.5	0.3	1.85	13.7	0.4	13.7	0.3	5.6
	Discharge	Cu.m/s								
	NH_4-N	mg/l	6.5		13.5	19.5	8	19.5	6.5	11.9
	NO_2-N	mg/l	0		0	0	0	0	0	0
	NO_3-N	mg/l	0		0	0	0.9	0.9	0	0.225
	Cl-	mg/l	19.1		25.5	6.38	19.1	25.5	6.38	17.5
	ABS	mg/l	0.75		0.6	0.55	0.6	0.75	0.55	0.63
	DO	mg/l	3.5		1.52	0.61	4.56	4.56	0.69	2.55
	Oil	mg/l	0.015		0.015	0.024	0.015	0.024	0.015	0.017
	Total coliform	no./100ml	113,000,000		143,000,000	124,000,000	138,000,000	143,000,000	113,000,000	129,500,000
	Alkalinity(as $CaCO_3$)	mg/l	450		375	240	325	450	240	347.5

Table 2.35 Results of Water Quality Test, Raw Sewege
(Biržai, Brewery Factory, No.4of 4 times sampling)

Sample No. : B-RS3-4

C		Unit	Test/Observation Results							
			1	2	3	4	5	Max.	Min.	Mean
Sampling /Test No.								-	-	-
Date			08 13	08 13	08 13	08 13	08 13	-	-	-
Time			08:00	10:00	12:00	14:00	16:00	-	-	-
Climate			cloudy	cloudy	cloudy	cloudy	cloudy			
Test Item	Water Temperature	℃	19	16	16	15.5	17	19	15.5	16.7
	Color	N.A.	-	-	-	-	-	-	-	-
	Odor	N.A.	-	-	-	-	-	-	-	-
	PH	N.A.	4.58	5.96	6.56	4.68	7.85	7.85	4.58	5.93
	Transparancy	N.A.	-	-	-	-	-	-	-	-
	EC	umhos/cm	-	-	-	-	-	-	-	-
	SS	mg/l	1,293	690	1,037	1,752	572	1,752	572	1,069
	BOD	mg/l	4,589	1,547	2,171	5,474	788	5,474	788	2,914
	Soluble BOD	mg/l	3,365	1,462	1,479	4,956	381	4,956	381	2,329
	COD	mg/l	7,936	3,101	3,072	16,736	2,464	16,736	3,101	6,662
	TN	mg/l	34.7	29	33.6	40.3	23.4	40.3	23.4	32.2
	TP	mg/l	11.5	5.6	9.9	22.4	3.6	22.4	3.6	10.6
	PO4	mg/l	8.4	3.92	4.76	17.2	1.02	17.2	1.02	7.06
	Discharge	Cu.m/s								
	NH_4-N	mg/l								
	NO_2-N	mg/l								
	NO_3-N	mg/l								
	Cl-	mg/l								
	ABS	mg/l								
	DO	mg/l								
	Oil	mg/l								
	Total colliform	no./100ml								
	Alkalinity(as $CaCO_3$)	mg/l								

Table 2.36 Results of Water Quality Test, River Water

(Biržai, Roveja River)

Sample No. : B-RW1

0		Unit	Test/Observation Results						
Sampling /Test No.			1	2	3	4	Max.	Min.	Mean
Date			07 20	07 28	08 06	08 13			
Time			10:50	16:40	15:20	17:00			
Climate			sunny	rainy	rainy	rainy			
Test Item	Water Temperature	°D	16	17.5	18	16	18	16	16.9
	Color	N.A.	light brown(231)	light brown(210)	light brown(210)	light brown(168)	lightbrown(231)	light brown(168)	light brown(205)
	Odor	N.A.	no odor	no odor	no odor	no odor	no odor	no odor	no odor
	PH	N.A.	8	8.07	8.41	8.4	8.41	8	8.22
	Transparancy	N.A.	30	30	30	30	30	30	30
	EC	umhos/cm	0.453	0.714	1.128	1.214	1.214	0.453	0.877
	SS	mg/l	10.5	8.4	4.8	2.5	10.5	2.5	6.55
	BOD	mg/l	2.43	2.63	1.22	1.08	2.63	1.08	1.84
	Soluble BOD	mg/l	-	-	-	-	-	-	-
	COD	mg/l	72	40	56	43.5	72	43.5	52.9
	TN	mg/l	1.53	6.73	4.7	2.24	6.73	1.53	3.8
	TP	mg/l	0.096	0.09	0.06	0.056	0.096	0.056	0.076
	PO4	mg/l	0.005	0.03	0	0.03	0.03	0	0.02
	Discharge	Cu.m/s		0.628	0.305	0.297	0.628	0.297	0.42
	NH_4-N	mg/l	0.4	4	3.3	0.5	4	0.4	2.05
	NO_2-N	mg/l	0.009	0.01	0.014	0	0.014	0	0.008
	NO_3-N	mg/l	1.13	0.65	0.63	0.65	1.13	0.63	0.765
	Cl-	mg/l	10.9	12.12	14.04	14.7	14.7	10.9	12.94
	ABS	mg/l	0.008	0.056	0.015	0	0.056	0	0.02
	DO	mg/l	5.21	6.54	6.99	6.78	6.99	5.21	6.38
	Oil	mg/l	0.55	0	0	0	0.55	0	0.14
	Total coliform	no./100ml	12,000	32,000	18,000	38,000	38,000	18,000	25,000
	Alkalinity(as $CaCO_3$)	mg/l	-	-	-	-	-	-	-

Table 2.37 Results of Water Quality Test, River Water
(Biržai, Apascia River)

Sample No. : B-RW2

Item		Unit	Test/Observation Results						
Sampling /Test No.			1	2	3	4	Max.	Min.	Mean
Date			07 20	07 28	08 06	08 13			
Time			11:15	17:20	09:45	17:30			
Climate			sunny	rainy	cloudy	cloudy			
Test Item	Water Temperature	°C	18	18.5	18	18	18.5	18	18.13
	Color	N.A.	yellow(262)	yellow(270)	yellowy(140)	yellow(199.5)	yellow(270)	yellowy(140)	yellow(217.9)
	Odor	N.A.	no odor	no odor	no odor	no odor	no odor	no odor	no odor
	PH	N.A.	8.07	8.04	8.32	8.37	8.37	8.04	8.2
	Transparancy	N.A.	29	30	30	30	30	29	30
	EC	umhos/cm	0.606	0.502	1.271	1.322	1.322	0.502	0.925
	SS	mg/l	3.9	11.9	1.4	5.4	11.9	1.4	5.65
	BOD	mg/l	2.03	5.82	3.2	1.54	5.82	1.54	3.15
	Soluble BOD	mg/l	-	-	-	-	-	-	-
	COD	mg/l	88	56	56	17.4	88	17.4	54.4
	TN	mg/l	4.14	2.03	2.08	1.96	4.14	1.96	2.55
	TP	mg/l	0.11	0.11	0.07	0.06	0.11	0.06	0.09
	PO4	mg/l	0.02	0.07	0	0.01	0.07	0.03	0.03
	Discharge	Cu.m/s		1.656	0.835	2.352	2.352	0.835	1.614
	NH_4-N	mg/l	0.71	0.64	0.56	0.4	0.71	0.4	0.58
	NO_2-N	mg/l	0.027	0.025	0.021	0.015	0.027	0.015	0.022
	NO_3-N	mg/l	2.4	0.8	0.9	1.28	2.4	0.8	1.35
	Cl-	mg/l	10.8	10.8	15.3	14.7	15.3	10.8	12.9
	ABS	mg/l	0.024	0.025	0.24	0	0.24	0	0.072
	DO	mg/l	7.43	5.78	6.08	8.32	8.32	5.78	6.9
	Oil	mg/l	0.3	0.1	0.15	0.1	0.3	0.1	0.16
	Total coliform	no./100ml	220,000	230,000	1,000	200	230,000	200	112,800
	Alkalinity(as $CaCO_3$)	mg/l	-	-	-	-	-	-	-

Table 2.38 Results of Water Quality Test, River Water
(Biržai, Agluona River)

Sample No. : B-RW3

D		Unit	Test/Observation Results						
Sampling /Test No.			1	2	3	4	Max.	Min.	Mean
Date			07 20	07 28	08 06	08 13			
Time			11:30	16:15	09:30	18:30			
Climate			sunny	rainy	cloudy	cloudy			
Test Item	Water Temperature		16.5	16.8	17	16.5	17	16.5	16.7
	Color	N.A.	yellow(179)	yellow(280)	yellowish(88)	yellowish(98)	yellow(280)	yellowish(88)	yellow(161)
	Odor	N.A.	no odor	no odor	no odor	no odor	no odor	no odor	no odor
	PH	N.A.	7.95	7.98	8.28	8.27	8.28	7.95	8.12
	Transparancy	N.A.	30	30	30	30	30	30	45
	EC	umhos/cm	0.765	1.53	1.675	1.627	1.675	0.765	1.399
	SS	mg/l	5.2	10.4	3.5	4.7	10.4	3.5	5.95
	BOD	mg/l	1.99	3.46	2.14	1.23	3.46	1.23	2.21
	Soluble BOD	mg/l	-	-	-	-	-	-	-
	COD	mg/l	56	32	30	13.7	56	13.7	32.9
	TN	mg/l	3.53	3.8	4.53	3.24	4.53	3.24	3.78
	TP	mg/l	0.11	0.16	0.08	0.04	0.16	0.04	0.098
	PO4	mg/l	0.02	0.02	0	0.04	0.04	0	0.02
	Discharge	Cu.m/s		0.495	0.379	0.518	0.518	0.379	0.464
	NH_4-N	mg/l	0.56	0.38	0.53	0.36	0.56	0.36	0.46
	NO_2-N	mg/l	0.09	0.03	0.04	0.02	0.09	0.02	0.05
	NO_3-N	mg/l	2.88	1.75	1.38	2.7	2.88	1.38	2.18
	Cl-	mg/l	15.3	19.8	22.3	20.4	22.3	15.3	19.5
	ABS	mg/l	0.008	0.015	0	0	0.015	0	0.006
	DO	mg/l	4.58	4.1	4.1	6.93	6.93	4.1	4.93
	Oil	mg/l	0.65	0.15	0.1	0.35	0.65	0.1	0.31
	Total coliform	no./100ml	120,000	140,000	380,000	600	380,000	600	160,150
	Alkalinity(as $CaCO_3$)	mg/l	-	-	-	-	-	-	-

Table 2.39 Results of Water Quality Test, River Water
(Birżai, Tatula River, Upstream side of STP discharge)
Sample No. : B-RW4

0		Unit	Test/Observation Results						
			1	2	3	4	Max.	Min.	Mean
Sampling /Test No.			07 20	07 29	08 06	08 13			
Date			12:10	12:30	17:40	15:00			
Time			sunny	cloudy	cloudy	cloudy			
Climate			17	17.5	18	17	18	17	17.4
Test Item	Water Temperature	°0	yellow(262)	yellow(189)	yellow(154)	yellow(178.5)	yellow(262)	yellow(154)	yellow(195.9)
	Color	N.A.	no odor	no odor	no odor	no odor	no odor	no odor	no odor
	Odor	N.A.	8.1	8.14	8.37	8.25	8.37	8.1	8.22
	PH	N.A.	29	30	30	30	30	29	30
	Transparancy	N.A.	1.198	1.274	1.603	1.544	1.603	1.198	1.405
	EC	umhos/cm	7.2	5.6	3.6	6.15	7.2	3.6	5.64
	SS	mg/l	2.25	2.11	2.84	1.08	2.84	1.08	2.07
	BOD	mg/l	-	-	-	-	-	-	-
	Soluble BOD	mg/l	80	64	80	29.7	80	29.7	63.4
	COD	mg/l	5.53	6.13	4.65	8.2	8.2	4.65	6.13
	TN	mg/l	0.138	0.22	0.06	0.04	0.138	0.04	0.115
	TP	mg/l	0.024	0.064	0.001	0.03	0.64	0.001	0.03
	PO4	mg/l		2.03	1.94	2.48	2.48	1.94	2.15
	Discharge	Cu.m/s	0.29	0.53	0.05	0.43	0.53	0.05	0.33
	NH_4-N	mg/l	0.01	0.02	0.023	0.01	0.023	0.01	0.015
	NO_2-N	mg/l	3.85	4.25	4.3	3.15	4.3	3.15	3.09
	NO_3-N	mg/l	15.3	14.7	17.9	15.3	17.9	14.7	15.8
	Cl-	mg/l	0	0	0	0	0	0	0
	ABS	mg/l	6.16	6.54	6.99	8.01	8.01	6.16	6.93
	DO	mg/l	0.45	0.05	0	0.45	0.45	0	0.32
	Oil	mg/l	60,000	80,000	3,600	35,000	80,000	3,600	44,650
	Total coliform	no./100ml	-	-	-	-	-	-	-
	Alkalinity(as $CaCO_3$)	mg/l							

Table 2.40 Results of Water Quality Test, River Water

(Biržai, Tatula River, Downstream side of STP discharge)

Sample No. : B-RW5

0		Unit	Test/Observation Results						
Sampling /Test No.			1	2	3	4	Max.	Min.	Mean
Date			07 20	07 29	08 06	08 13			
Time			11:50	12:50	18:00	16:00			
Climate			sunny	cloudy	cloudy	cloudy			
Test Item	Water Temperature	°C	16.5	17	17	17	17	16.5	16.9
	Color	N.A.	yellow(189)	yellow(169.5)	yellow(154)	yellow(168)	yellow(189)	yellow(154)	yellow(170.1)
	Odor	N.A.	no odor	no odor	no odor	no odor	no odor	no odor	no odor
	PH	N.A.	8	8.01	8.4	8.25	8.4	8	8.17
	Transparancy	N.A.	30	30	30	30	30	30	30
	EC	umhos/cm	0.987	1.725	1.696	1.628	1.725	0.987	1.509
	SS	mg/l	4.8	19.1	6.7	11.4	19.1	4.8	10.5
	BOD	mg/l	2.95	5.9	6.95	1.08	6.95	1.08	4.22
	Soluble BOD	mg/l	-	-	-	-	-	-	-
	COD	mg/l	104	40	80	39.9	104	39.9	65.98
	TN	mg/l	4.85	5.58	5.19	6.13	6.13	4.85	5.44
	TP	mg/l	0.132	0.85	0.15	0.09	0.85	0.09	0.31
	PO4	mg/l	0.07	0.62	0.12	0.07	0.62	0.07	0.22
	Discharge	Cu.m/s		3.11	2.76	5.64	5.64	2.76	3.84
	NH_4-N	mg/l	0.74	1.55	1	0.5	1.55	0.5	0.95
	NO_2-N	mg/l	0.04	0.1	0.11	0.08	0.11	0.04	0.83
	NO_3-N	mg/l	3.25	2.25	3.8	4.15	4.15	2.25	3.36
	Cl-	mg/l	16.6	19.1	21.1	17.8	21.1	16.6	18.7
	ABS	mg/l	0.015	0.015	0.015	0.024	0.024	0.015	0.017
	DO	mg/l	6	5.02	4.54	6.93	6.93	4.54	5.62
	Oil	mg/l	0.5	0.1	0.05	0.55	0.55	0.05	0.3
	Total coliform	no./100ml	70,000	220,000	25,000	65,000	220,000	25,000	95,000
	Alkalinity(as $CaCO_3$)	mg/l	-	-	-	-	-	-	-

Table 2.41 Results of Water Quality Test, River Water
(Biržai, Juodupe Upstream of STP)

Sample No. : B-RW6

Item		Unit	Test/Observation Results			
			1	Max.	Min.	Mean
Sampling /Test No.			8.13			
Date			11:00			
Time			sunny			
Climate			12	12	12	12
Test Item	Water Temperature	°C	yellowish(66.5)	yellowish(66.5)	yellowish(66.5)	yellowish(66.5)
	Color	N.A.	no odor	no odor	no odor	no odor
	Odor	N.A.	8.18	8.18	8.18	8.18
	PH	N.A.	30	30	30	30
	Transparancy	N.A.	1.593	1.593	1.593	1.593
	EC	umhos/cm	3.3	3.3	3.3	3.3
	SS	mg/l	0.62	0.62	0.62	0.62
	BOD	mg/l	-	-	-	-
	Soluble BOD	mg/l	38.4	38.4	38.4	38.4
	COD	mg/l	9.4	9.4	9.4	9.4
	TN	mg/l	0.06	0.06	0.06	0.06
	TP	mg/l	0.05	0.05	0.05	0.05
	PO4	mg/l	0.003	0.003	0.003	0.003
	Discharge	Cu.m/s	0.16	0.16	0.16	0.16
	NH_4-N	mg/l	0.01	0.01	0.01	0.01
	NO_2-N	mg/l	7.25	7.25	7.25	7.25
	NO_3-N	mg/l	29	29	29	29
	Cl-	mg/l	0	0	0	0
	ABS	mg/l	7.39	7.39	7.39	7.39
	DO	mg/l	0	0	0	0
	Oil	mg/l	600	600	600	600
	Total coliform	no./100ml	-	-	-	-
	Alkalinity(as $CaCO_3$)	mg/l				

Table 2.42 Results of Water Quality Test.Riwer Water

(Biržai,Juodupe Dawnstream of STP)

Sample No. : B-RW7

□		Unit	Test/Observation Results			
Sampling /Test No.			1	Max.	Min.	Mean
Date			08 13			
Time			11:30			
Climate			sunny			
Test Item	Water Temperature	°□	15	15	15	15
	Color	N.A.	yellowish(70)	yellowish(70)	yellowish(70)	yellowish(70)
	Odor	N.A.	no odor	no odor	no odor	no odor
	PH	N.A.	7.98	7.98	7.98	7.98
	Transparancy	N.A.	12	12	12	12
	EC	umhos/cm	2.19	2.19	2.19	2.19
	SS	mg/l	16.8	16.8	16.8	16.8
	BOD	mg/l	8.5	8.5	8.5	8.5
	Soluble BOD	mg/l	-	-	-	-
	COD	mg/l	89.6	89.6	89.6	89.6
	TN	mg/l	36.2	36.2	36.2	36.2
	TP	mg/l	2.4	2.4	2.4	2.4
	PO4	mg/l	0.29	0.29	0.29	0.29
	Discharge	Cu.m/s	0.21	0.21	0.21	0.21
	NH_4-N	mg/l	26	26	26	26
	NO_2-N	mg/l	0.01	0.01	0.01	0.01
	NO_3-N	mg/l	6.38	6.38	6.38	6.38
	Cl-	mg/l	32	32	32	32
	ABS	mg/l	0.47	0.47	0.47	0.47
	DO	mg/l	1.08	1.08	1.08	1.08
	Oil	mg/l	0.4	0.4	0.4	0.4
	Total coliform	no./100ml	48.000	48.000	48.000	48.000
	Alkalinity(as $CaCO_3$)	mg/l	-	-	-	-

Table 2.43 Results of Water Quality Test, Ground Water

(Biržai, North side of lake)

Sample No. : B-GW1

D		Unit	Test/Observation Results					
			1	2	3	Max.	Min.	Mean
Sampling No.								
Date			07 21	07 28	08 06			
Time			14:00	15:30	16:00			
Climate			sunny	rainy	cloudy			
Test Item	Water Temperature		13	12	13	13	12	12.7
	Color	N.A.	no color(42.5)	no color(27.5)	no color(21)	no color(42.5)	no color(21)	no color(30.3)
	odor	N.A.	no odor	no odor	no odor	no odor	no odor	no odor
	PH	N.A.	7.96	7.93	8.1	8.1	7.93	7.99
	Transparancy	N.A.	10.5	30	30	30	10.5	23.5
	EC	umhos/cm	0.888	1.109	1.626	1.626	0.888	1.208
	SS	mg/l	3.7	12.7	0	12.7	0	5.47
	BOD	mg/l	0.22	1.07	0.91	1.07	0.22	0.73
	Soluble BOD	mg/l	-	-	-	-	-	-
	COD	mg/l	16	4	8	16	4	9.33
	TN	mg/l	0.99	2.02	1.15	2.02	0.99	1.39
	TP	mg/l	0.07	0.19	0.03	0.19	0.03	0.096
	PO4	mg/l	0	0.11	0	0.11	0	0.037
	Discharge	Cu.m/s	-	-	-	-	-	-
	NH_4-N	mg/l	0.13	0.78	0.32	0.78	0.13	0.41
	NO_2-N	mg/l	0	0.004	0	0.004	0	0.001
	NO_3-N	mg/l	0.85	0.3	0.43	0.85	0.3	0.53
	Cl-	mg/l	49.8	49.1	20.4	49.8	20.4	39.8
	ABS	mg/l	0	0	0	0	0	0
	DO	mg/l	1.74	0.61	0.46	1.74	0.46	0.94
	Oil	mg/l	0	0	0	0	0	0
	Total coliform	no./100ml	400	1,300	9	1,300	9	570
	Alkalinity(as $CaCO_3$)	mg/l	250	315	295	315	250	296.5

Table 2.44 Results of Water Quality Test, Ground Water
(Biržai, Town area)

Sample No. : B-GW2

0		Unit	Test/Observation Results					
Sampling No.			1	2	3	Max.	Min.	Mean
Date			07 21	07 28	08 06			
Time			11:30	16:30	15:45			
Climate			sunny	rainy	cloudy			
Test Item	Water Temperature	°C	13	14	16	16	13	14.3
	Color	N.A.	no color(21)	no color(35)	no color(10.1)	no color(35)	no color(10.1)	no color(22)
	Odor	N.A.	no odor	no odor	no odor	no odor	no odor	no odor
	PH	N.A.	7.74	7.83	8.29	8.29	7.74	7.95
	Transparancy	N.A.	9.5	7	7	9.5	7	7.83
	EC	umhos/cm	2.73	4.17	1.13	4.17	1.13	2.68
	SS	mg/l	21.6	24.8	16	24.8	16	20.8
	BOD	mg/l	1.24	0.76	2.28	2.28	0.76	1.43
	Soluble BOD	mg/l	-	-	-	-	-	-
	COD	mg/l	56	8	32	56	8	32
	TN	mg/l	1.04	2.45	1.84	2.45	1.04	1.78
	TP	mg/l	0.08	0.07	0.04	0.08	0.04	0.06
	PO4	mg/l	0	0.05	0	0.05	0	0.015
	Discharge	Cu.m/s	-	-	-	-	-	-
	NH_4-N	mg/l	0.33	2	1.1	2	0.33	1.14
	NO_2-N	mg/l	0.006	0.003	0	0.006	0	0.003
	NO_3-N	mg/l	0.7	0.3	0.5	0.7	0.3	0.5
	Cl^-	mg/l	11.5	13.4	15.95	15.95	11.5	13.62
	ABS	mg/l	0	0	0	0	0	0
	DO	mg/l	5.21	1.06	0.15	5.21	0.15	2.14
	Oil	mg/l	0	0	0	0	0	0
	Total coliform	no./100ml	5,900	800	2	5,900	2	2,234
	Alkalinity(as $CaCO_3$)	mg/l	235	265	260	265	235	253

Table 2.45 Results of Water Quality Test, Ground Water

(Biržai, South side of town)

Sample No. : B-GW3

0		Unit	Test/Observation Results					
Sampling No.			1	2	3	Max.	Min.	Mean
Date			07 21	07 29	08 06			
Time			13:40	12:10	17:30			
Climate			sunny	cloudy	cloudy			
Test Item	Water Temperature	°C	12	16	15.5	16	12	14.5
	Color	N.A.	no color(10.5)	no color(17.2)	no color(24.5)	no color(24.5)	no color(10.5)	no color(17.4
	Odor	N.A.	no odor	no odor	no odor	no odor	no odor	no odor
	PH	N.A.	7.93	7.86	8.24	8.24	7.86	8.01
	Transparancy	N.A.	30	30	30	30	30	30
	EC	umhos/cm	0.656	0.848	1.627	1.627	0.656	1.04
	SS	mg/l	3.3	7.9	0	7.9	0	3.73
	BOD	mg/l	0.7	0.76	0.46	0.76	0.46	0.64
	Soluble BOD	mg/l	-	-	-	-	-	-
	COD	mg/l	24	4	2.6	24	2.6	10.2
	TN	mg/l	2.43	1.44	1.23	2.43	1.23	1.7
	TP	mg/l	0.088	0.071	0.062	0.088	0.062	0.074
	PO4	mg/l	0	0.024	0	0.024	0	0.008
	Discharge	Cu.m/s	-	-	-	-	-	-
	NH_4-N	mg/l	0.48	0.4	0.53	0.53	0.4	0.47
	NO_2-N	mg/l	0	0.004	0	0.004	0	0.001
	NO_3-N	mg/l	1.95	0.45	0.4	1.95	0.4	0.93
	Cl-	mg/l	19.1	19.14	51.05	51.05	19.1	29.76
	ABS	mg/l	0	0	0	0	0	0
	DO	mg/l	0.95	0.61	1.22	1.22	0.61	0.93
	Oil	mg/l	0	0	0	0	0	0
	Total coliform	no./100ml	540	50,000	2000	50,000	540	17,513
	Alkalinity(as $CaCO_3$)	mg/l	320	280	335	335	280	206

Table 2.46 Results of Water Quality Test, Ground Water

(Biržai, Southwest side of town)

Sample No. : B-GW4

0		Unit	Test/Observation Results					
Sampling No.			1	2	3	Max.	Min.	Mean
Date			07 21	07 28	08 06			
Time			12:00	18:00	17:00			
Climate			sunny	rainy	cloudy			
Test Item	Water Temperature	°C	12	10	12	12	10	11.3
	Color	N.A.	no color(14.5)	no color(17)	no color(14.5)	no color(17)	no color(14.5)	no color(15.3)
	Odor	N.A.	no odor	no odor	no odor	no odor	no odor	no odor
	PH	N.A.	7.71	7.5	8.02	8.02	7.5	7.74
	Transparancy	N.A.	30	17.5	27.5	30	17.5	25
	EC	umhos/cm	3.53	4.15	4.28	4.28	3.53	3.99
	SS	mg/l	23.2	25.4	7.4	25.4	7.4	18.7
	BOD	mg/l	0.62	1.34	1.07	1.34	0.62	1.01
	Soluble BOD	mg/l	-	-	-	-	-	-
	COD	mg/l	16	4	4.1	16	4	8.03
	TN	mg/l	1.79	0.95	0.89	1.79	0.89	1.21
	TP	mg/l	0.102	0.15	0.034	0.15	0.034	0.095
	PO4	mg/l	0.014	0.102	0.01	0.102	0.01	0.042
	Discharge	Cu.m/s	-	-	-	-	-	-
	NH_4-N	mg/l	0.48	0	0	0.48	0	0.16
	NO_2-N	mg/l	0.013	0.006	0.015	0.015	0.006	0.011
	NO_3-N	mg/l	1.23	0.55	1.5	1.5	0.55	1.09
	Cl-	mg/l	35.1	26.8	40.8	40.8	26.8	34.23
	ABS	mg/l	0	0	0	0	0	0
	DO	mg/l	3.63	3.19	1.06	3.63	1.06	2.69
	Oil	mg/l	0	0	0	0	0	0
	Total coliform	no./100ml	6,800	280	140	6,800	140	2,407
	Alkalinity(as $CaCO_3$)	mg/l	287	310	310	310	287	301.5

Table 2.47 Results of Water Quality Test. Ground Water

(Biržai, West side of town)

Sample No. : B-GW5

□		Unit	Test/Observation Results					
			1	2	3	Max.	Min.	Mean
Sampling No.								
Date			07 21	07 28	08 06			
Time			11:15	16:45	16:20			
Climate			sunny	rainy	rainy			
Test Item	Water Temperature	°□	13	11.5	13	13	11.5	12.5
	Color	N.A.	no color(24.5)	no color(24.7)	no color(14.5)	no color(24.7)	no color(14.5)	no color(21.2)
	Odor	N.A.	no odor	no odor	no odor	no odor	no odor	no odor
	PH	N.A.	7.74	7.75	8.28	8.28	7.74	7.92
	Transparancy	N.A.	30	30	30	30	30	30
	EC	umhos/cm	1.579	1.831	1.8	1.831	1.579	1.737
	SS	mg/l	5.1	8.2	0	8.2	0	6.66
	BOD	mg/l	0.78	1.79	1.22	1.79	0.78	1.27
	Soluble BOD	mg/l	-	-	-	-	-	-
	COD	mg/l	56	8	16	56	8	26.7
	TN	mg/l	21.3	18.4	19.5	21.3	18.4	19.7
	TP	mg/l	0.224	0.07	0.042	0.224	0.042	0.112
	PO4	mg/l	0.01	0.05	0.01	0.05	0.01	0.02
	Discharge	Cu.m/s	-	-	-	-	-	-
	NH_4-N	mg/l	0	0.39	0.11	0.39	0	0.17
	NO_2-N	mg/l	0.015	0.01	0.015	0.015	0.01	0.013
	NO_3-N	mg/l	21.3	11	19	21.3	11	17.1
	Cl-	mg/l	74.7	68.9	77.2	77.2	68.9	71.93
	ABS	mg/l	0	0	0	0	0	0
	DO	mg/l	5.69	3.8	5.47	5.69	3.8	4.99
	Oil	mg/l	0	0	0	0	0	0
	Total coliform	no./100ml	300	8,000	1,800	8,000	300	3,367
	Alkalinity(as $CaCO_3$)	mg/l	325	315	290	325	290	310

Table 2.48 Results of Water Quality Test, Lake Water
(Biržai, Lake ,South side)
Sample No. : B-LW1

3		Unit	Test/Observation Results				
Sampling /Test No.			1	2	Max.	Min.	Mean
Date			07 28	08 20			
Time			16:20	16:30			
Climate			rainy	sunny			
Test Item	Water Temperature	°C	19.5	20	20	19.5	19.8
	Color	N.A.	light brown(210)	light brown(146)	light brown(210)	light brown(146)	light brown(178)
	Odor	N.A.	no odor	no odor	no odor	no odor	no odor
	PH	N.A.	8.06	8.37	8.37	8.06	8.22
	Transparancy	N.A.	30	30	30	30	30
	EC	umhos/cm	0.639	1.139	1.139	0.639	0.889
	SS	mg/l	9.2	0.6	9.2	0.6	4.9
	BOD	mg/l	5.3	2.14	5.3	2.14	3.72
	Soluble BOD	mg/l	-	-	-	-	-
	COD	mg/l	5.6	7.2	7.2	5.6	6.4
	TN	mg/l	1.83	1.18	1.83	1.18	1.51
	TP	mg/l	0.18	0.006	0.18	0.006	0.12
	PO4	mg/l	0.1	0	0.1	0	0.05
	Discharge	Cu.m/s					
	NH_4-N	mg/l	0.56	0.37	0.56	0.37	0.47
	NO_2-N	mg/l	0.03	0.04	0.03	0.04	0.04
	NO_3-N	mg/l	0.65	0.63	0.65	0.63	0.64
	Cl-	mg/l	12.1	19.8	19.8	12.1	16
	ABS	mg/l	0.048	0.032	0.048	0.031	0.04
	DO	mg/l	5.62	7.6	7.6	5.62	6.61
	Oil	mg/l	0.2	0.1	0.2	0.1	0.15
	Total coliform	no./100ml	120,000	20,000	120,000	20,000	70,000
	Alkalinity(as $CaCO_3$)	mg/l	-	-	-		-

Table 2.49 Results of Water Quality Test, Lake Water
(Biržai, Lake ,North side)
Sample No. : B-LW2

Item		Unit	Test/Observation Results				
			1	2	Max.	Min.	Mean
Sampling /Test No.			07 28	08 20			
Date			17:00	16:00			
Time			rainy	sunny			
Climate							
Test Item	Water Temperature	°D	19.5	19	19.5	19	19.3
	Color	N.A.	light brown(189)	light brown(189)	light brown(189)	light brown(189)	light brown(189)
	Odor	N.A.	no odor	no odor	no odor	no odor	no odor
	PH	N.A.	7.94	8.43	8.43	7.94	8.19
	Transparancy	N.A.	30	30	30	30	30
	EC	umhos/cm	0.566	1.178	1.178	0.566	0.872
	SS	mg/l	12.1	0.8	12.1	0.8	6.5
	BOD	mg/l	3.47	3.34	3.47	3.34	3.41
	Soluble BOD	mg/l	-	-	-	-	-
	COD	mg/l	48	57	57	48	53
	TN	mg/l	2.25	2.04	2.25	2.04	2.1
	TP	mg/l	0.08	0.06	0.08	0.06	0.07
	PO4	mg/l	0.02	0	0.02	0	0.01
	Discharge	Cu.m/s					
	NH_4-N	mg/l	0.46	0.48	0.48	0.46	0.47
	NO_2-N	mg/l	0.02	0.03	0.03	0.02	0.03
	NO_3-N	mg/l	0.76	0.75	0.76	0.75	0.76
	Cl-	mg/l	13.4	16	16	13.4	14.7
	ABS	mg/l	0.015	0.031	0.031	0.015	0.023
	DO	mg/l	3.19	6.84	6.84	3.19	5.02
	Oil	mg/l	0.4	0.2	0.4	0.2	0.3
	Total coliform	no./100ml	860,000	800	860,000	800	430,400
	Alkalinity(as $CaCO_3$)	mg/l	-	-	-	-	-

Table 2.50 Summary of Water Quality Test, STP Influent, Birzai

(Mean of 4 times sampling)

Sample No. : B-RS1

Sampling /Test No.		Unit	Mean				
			1	2	3	4	Mean
Date							
Time							
Climate							
Test Item	Water Temperature	·C	15.9	14.3	15.5	13.8	14.875
	Color	N.A.	-	-	-	-	
	Odor	N.A.	-	-	-	-	
	PH	N.A.	7.94	8.28	8.26	8.02	8.125
	Transparancy	N.A.	-	-	-	-	
	EC	umhos/cm	-	-	-	-	
	SS	mg/l	246	154	265	201	216.5
	BOD	mg/l	199.0	219.6	324	280	255.65
	Soluble BOD	mg/l	83.6	105.8	137.6	140	116.75
	COD	mg/l	405.0	470	632	608	528.75
	TN	mg/l	22.7	35.2	28.4	31.6	29.475
	TP	mg/l	6.8	4.9	7.4	5.3	6.1
	PO4	mg/l	3.1	2.9	4.8	3.5	3.575
	Discharge	Cu.m/s	0.052	0.049	0.055	0.03	0.04675
	NH_4-N	mg/l		28.1			28.1
	NO_2-N	mg/l		0			0
	NO_3-N	mg/l		0			0
	Cl-	mg/l		60.6			60.6
	ABS	mg/l		0.87			0.87
	DO	mg/l		0.38			0.38
	Oil	mg/l		0.46			0.46
	Total coliform	no./100ml		1.40E+08			140,000,000
	Alkalinity(as $CaCO_3$)	mg/l		545			136.25

Table 2.51 Summary of Water Quality Test, Dairy Factory, Birzai

(Mean of 4 times sampling)

Sample No. : B-RS2

		Unit	Mean				
Sampling /Test No.			1	2	3	4	Mean
Date							
Time							
Climate							
Test Item	Water Temperature	·C	25.5	21.3	22	21.6	22.6
	Color	N.A.	-	-	-	-	
	Odor	N.A.	-	-	-	-	
	PH	N.A.	9.34	7.52	8.05	9.1	8.5025
	Transparancy	N.A.	-	-	-	-	
	EC	umhos/cm	-	-	-	-	
	SS	mg/l	854.1	263.2	206.7	252.5	394.125
	BOD	mg/l	1,285	813.5	508.2	1,350	989.175
	Soluble BOD	mg/l	964.1	526.7	248.2	716.3	613.825
	COD	mg/l	3,664	1,910	912	3037	2380.75
	TN	mg/l	22.18	23.6	17.46	29.9	23.285
	TP	mg/l	13.4	7.14	2.93	8.4	7.9675
	PO4	mg/l	5.69	5.46	0.98	4.84	4.2425
	Discharge	Cu.m/s					0
	NH_4-N	mg/l	19.5	14	5		38.5
	NO_2-N	mg/l	0	0	0.015		0.015
	NO_3-N	mg/l	0	1.18	1.28		2.46
	Cl-	mg/l	2.15	44.7	7.98		54.83
	ABS	mg/l	0.16	0.03	0.04		0.23
	DO	mg/l	0	6.23	5.13		11.36
	Oil	mg/l	0.9	0.3	0.69		1.89
	Total coliform	no./100ml	890,000	17,300,000	100,000,000		118,190,000
	Alkalinity(as $CaCO_3$)	mg/l	2,820	590	513		980.75

Table 2.52 Summary of Water Quality Test, Brewery Factory, Birzai

(Mean of 4 times sampling)

Sample No. : B-RS3

		Unit	Mean				
Sampling /Test No.			1	2	3	4	Mean
Date			-	-	-	-	
Time			-	-	-	-	
Climate			-	-	-		
Test Item	Water Temperature	·C	20.3	18.2	21	16.7	19.05
	Color	N.A.	-	-	-	-	
	Odor	N.A.	-	-	-	-	
	PH	N.A.	6.43	5.23	6.09	5.93	5.92
	Transparancy	N.A.	-	-	-	-	
	EC	umhos/cm	-	-	-	-	
	SS	mg/l	788.4	1,086	339	1,069	820.6
	BOD	mg/l	2,044	4,615	2,099	2,914	2918
	Soluble BOD	mg/l	1,656	3,557	1,455	2,329	2249.25
	COD	mg/l	15,616	7,952	4,618	6,662	8712
	TN	mg/l	24.6	70.3	41.6	32.2	42.175
	TP	mg/l	14.4	13.76	8.82	10.6	11.895
	PO4	mg/l	5.29	10.28	5.6	7.06	7.0575
	Discharge	Cu.m/s					0
	NH_4-N	mg/l	15.5	25.5	11.9		52.9
	NO_2-N	mg/l	0	2.5	0		2.5
	NO_3-N	mg/l	0	1.23	0.225		1.455
	Cl-	mg/l	67.6	102	17.5		187.1
	ABS	mg/l	0.48	0.03	0.63		1.14
	DO	mg/l	5.21	0	2.55		7.76
	Oil	mg/l	0.45	0.7	0.017		1.167
	Total coliform	no./100ml	580,000	28,000,000	129,500,000		158,080,000
	Alkalinity(as $CaCO_3$)	mg/l	540	285	347.5		293.125

Table 2.53 Summary of Water Quality Test, River, Birzai

(Five Rivers and Seven Locations)

Sample No. : B-RW

		Unit	River (Mean)							Mean(Refernce)
			Roveja	Apascia	Agluona	Tatula Up.	Tatula Down	Juodupe Up.	Juodupe Down	
Sampling /Test No.										
Date										
Time										
Climate										
Test Item	Water Temperature	·C	16.9	18.13	0	17.4	16.9	12	15	8.74
	Color	N.A.	light brown(205)	yellow(217.9)	yellow(161)	yellow(195.9)	yellow(170.1)	yellow(170.2)	yellow(170.3)	
	Odor	N.A.	no odor	no odor	no odor	no odor	no odor	no odor	no odor	
	PH	N.A.	8.22	8.2	0	8.22	8.17	8.18	7.98	4.11
	Transparancy	N.A.	30	30	15	30	30	30	12	17.50
	EC	umhos/cm	0.877	0.925	1.399	1.405	1.509	1.593	2.19	0.77
	SS	mg/l	6.55	5.65	5.95	5.64	10.5	3.30	16.80	3.97
	BOD	mg/l	1.84	3.15	2.21	2.07	4.22	0.62	8.50	1.55
	Soluble BOD	mg/l	-	-	-	-	-	-	-	
	COD	mg/l	52.9	54.4	32.9	63.4	65.98	38.4	89.6	33.93
	TN	mg/l	3.8	2.55	3.78	6.13	5.44	9.4	36.2	2.71
	TP	mg/l	0.076	0.09	0.098	0.115	0.31	0.06	2.4	0.06
	PO4	mg/l	0.02	0.03	0.02	0.03	0.22	0.05	0.29	0.02
	Discharge	Cu.m/s	0.41	1.614	0.464	2.15	3.84	0.003	0.21	0.77
	NH_4-N	mg/l	2.05	0.58	0.46	0.33	0.95	0.16	26	0.57
	NO_2-N	mg/l	0.008	0.022	0.05	0.015	0.83	0.01	0.01	0.02
	NO_3-N	mg/l	0.765	1.35	2.18	3.09	3.36	7.25	6.38	1.23
	Cl-	mg/l	12.94	12.9	19.5	15.8	18.7	29	32	10.19
	ABS	mg/l	0.02	0.072	0.006	0	0.017	0	0.47	0.02
	DO	mg/l	6.38	6.9	4.93	6.93	5.62	7.39	1.08	4.19
	Oil	mg/l	0.14	0.16	0.31	0.32	0.3	0	0.4	0.16
	Total coliform	no./100ml	25,000	112,800	160,150	44,650	95,000	600	48000	57,100.00
	Alkalinity(as $CaCO_3$)	mg/l	-	-	-	-	-	-	-	

Table 2 . 54 Summary of Water Quality Test, Groudwater , Birzai

(Five Locations)

Sample No. : B-GW

		Unit	Groundwater					Mean (Referece)
			GW1	GW2	GW3	GW4	GW5	
Sampling /Test No.								
Date								
Time								
Climate								
Test Item	Water Temperature	·C	12.7	14.3	14.5	11.3	12.5	10.56
	Color	N.A.	no color(30.3)	no color(22)	no color(17.4	no color(15.3)	no color(21.2)	
	Odor	N.A.	no odor	no odor	no odor	no odor	no odor	
	PH	N.A.	7.99	7.95	8.01	7.74	7.92	6.34
	Transparancy	N.A.	23.5	7.63	30	25	30	17.27
	EC	umhos/cm	1.208	2.68	1.04	3.99	1.737	1.78
	SS	mg/l	5.47	20.8	3.73	18.7	6.66	9.74
	BOD	mg/l	0.73	1.43	0.64	1.01	1.27	0.76
	Soluble BOD	mg/l	-	-	-	-	-	
	COD	mg/l	9.33	32	10.2	8.03	26.7	11.91
	TN	mg/l	1.39	1.78	1.7	1.21	19.7	1.22
	TP	mg/l	0.096	0.06	0.074	0.095	0.112	0.07
	PO4	mg/l	0.037	0.015	0.008	0.042	0.02	0.02
	Discharge	Cu.m/s	-	-	-	-	-	
	NH_4-N	mg/l	0.41	1.14	0.47	0.16	0.17	0.44
	NO_2-N	mg/l	0.001	0.003	0.001	0.011	0.013	0.00
	NO_3-N	mg/l	0.53	0.5	0.93	1.09	17.1	0.61
	Cl-	mg/l	39.8	13.62	29.76	34.23	71.93	23.48
	ABS	mg/l	0	0	0	0	0	0.00
	DO	mg/l	0.94	2.14	0.93	2.69	4.99	1.34
	Oil	mg/l	0	0	0	0	0	0.00
	Total coliform	no./100ml	570	2,234	17,513	2,407	3,367	4,544.80
	Alkalinity(as $CaCO_3$)	mg/l	296.5	253	206	301.5	310	

Table 2.55 Results of Water Quality Test, Lake
(Sirvenos Lake, Two Locations)

No. B-LW

		Unit	Sirvenos Lake (Mean)		
Sampling /Test No.			B-LW1	B-LW2	Mean (Reference)
Date					--
Time					-
Climate					-
Test Item	Water Temperature	°C	19.8	19.3	19.55
	Color	N.A.	light brown(178)	light brown(189)	
	Odor	N.A.	no odor	no odor	
	PH	N.A.	8.22	8.19	8.205
	Transparancy	N.A.	30	30	30
	EC	umhos/cm	0.889	0.872	0.8805
	SS	mg/l	4.9	6.5	5.7
	BOD	mg/l	3.72	3.41	3.565
	Soluble BOD	mg/l	-	-	
	COD	mg/l	6.4	53	29.7
	TN	mg/l	1.51	2.1	1.805
	TP	mg/l	0.12	0.07	0.095
	PO4	mg/l	0.05	0.01	0.03
	Discharge	Cu.m/s			0
	NH_4-N	mg/l	0.47	0.47	0.47
	NO_2-N	mg/l	0.04	0.03	0.035
	NO_3-N	mg/l	0.64	0.76	0.7
	Cl-	mg/l	16	14.7	15.35
	ABS	mg/l	0.04	0.023	0.0315
	DO	mg/l	6.61	5.02	5.815
	Oil	mg/l	0.15	0.3	0.225
	Total coliform	no./100ml	70,000	430,400	250,200
	Alkalinity(as $CaCO_3$)	mg/l	-	-	

Table 2.56 Results of Water Quality(Supernatant)
(Birzai, Influent of STP)

D		Unit	Test/Observation Results						
Sampling /Test NO.			1	2	3	4	Max.	Min.	Mean
Date			08:06	11 08:06	11 08:06	11 08:06			
Time			09:00	13:00	17:00	21:00			
Test Item	PH	N.A.	8.44	8.1	7.76	7.93	8.44	7.76	8.06
	SS	mg/l	24.5	87.5	144	87.8	144	24.5	86
	BOD	mg/l	24.2	96.7	508	214	508	24.2	210.7
	Soluble COD	mg/l	96	109	326	148	326	96	170
	COD	mg/l	160	336	800	432	800	160	432
	TN	mg/l	24.3	37.2	42.6	32.2	42.6	24.3	34.1
	TP	mg/l	1.2	4.7	8.1	4.1	8.1	1.2	4.5
	Alkalinity(as CaCO3)	mg/l	495	625	585	475	625	475	475
	Add Al(100mg/l)pH7								
	T-COD	mg/l	126	89	678	294	678	89	297
	Soluble COD	mg/l	24.8	64.6	403.2	51.2	403	24.8	135.9
	TP	mg/l	0.04	0.06	0.06	0.04	0.06	0.04	0.05

2. Existing Pump Station Check List

Existing Pump Station Check List

Birzai

Pump Station No.1

Item	Contents	Remark
Year constructed	March 1973	
Type of structure	A. Circular/with upper housing	in the Water Company's premise
Equipment 1) Screen Type Bar spacing Quantity	 manual 30 mm 1	
2) Pump Type Capacity Quantity	 horizontal shaft, centrifugal pump 140 m^3/hour x 11 kW 2 units (base for 3 units)	
3) Others	 hoist crane floor drain pump ventilation system	
Stand-by Generator	no	
Operation		
Disposal of screenings Method Frequency Amount	 by container every day little	
Pump Operation Automatic on-off No. of unit operated Flow measurement	 automatic by water level in the pump well 2 units (1 unit on at all time) none	
Discharge amount/flow	no record due to lack of flow meter	
Operator	circulating for inspection	
Existing problems	 Equipment is very old. Leaks in walls at pipe penetration No monitoring link exists.	
Improvement in the Project	 No need to replace the pump units immediately. Motor should be replaced with new one, preferably equipped with an inverter. Repair of cracks and leaks should be included in the project scope. Connection to the existing central monitoring system should be included in the project scope.	

Existing Pump Station Check List

Birzai

Pump Station No.2

Item	Contents	Remark
Year constructed	March 1973	
Type of structure	A. Circular/with upper housing	
Equipment 1) Screen Type Bar spacing Quantity	 manual 20 mm 1	
2) Pump Type Capacity Quantity	 vertical shaft, centrifugal pump 200 m^3/hour x H 32 m x 38 kW 3 units	 installed in 1994
3) Others	emergency storage pond (12 hours volume) hoist crane floor drain pump ventilation system	
Stand-by Generator	no	
Operation		
Disposal of screenings Method Frequency Amount	 by container every day little	
Pump Operation Automatic on-off No. of unit operated Flow measurement	 automatic by water level in the pump well 2 units (1 unit on at all time) none	
Discharge amount/flow	no record due to lack of flow meter	
Operator	Circulating for inspection Pump operation is monitored in the operation room in the Water Company.	
Existing problems	 Equipment is old. Leaks in walls at pipe penetration	
Improvement in the Project	 Repair of cracks and leaks should be included in the project scope.	

Existing Pump Station Check List

Birzai

Pump Station No.3

Item	Contents	Remark
Year constructed	November 1989	
Type of structure	A. Circular/with upper housing	
Equipment		
1) Screen		
Type	manual	
Bar spacing	40 mm	
Quantity	1	
2) Pump		
Type	horizontal shaft, centrifugal pump	
Capacity	140 m^3/hour x H10.5 m x 11 kW	
Quantity	2 units	
3) Others	hoist crane floor drain pump ventilation system	
Stand-by Generator	no	
Operation		
Disposal of screenings		
Method	by container	
Frequency	every day	
Amount	little	
Pump Operation		
Automatic on-off	automatic by water level in the pump well	
No. of unit operated	2 units (1 unit on at all time)	
Flow measurement	none	
Discharge amount/flow	no record due to lack of flow meter	
Operator	Circulating for inspection	
Existing problems	Equipment is very old. Leaks in walls at pipe penetration Ventilation is very old and not functioning. No monitoring link exists.	
Improvement in the Project	Ventilation system should be replaced with new one. No need to replace the pump units immediately. Motor should be replaced with new one, preferably equipped with an inverter. Repair of cracks and leaks should be included in the project scope. Connection to the existing central monitoring system should be included in the project scope.	

Existing Pump Station Check List

Birzai

Pump Station No.4

Item	Contents	Remark
Year constructed	August 1976	
Type of structure	A. Circular/with upper housing	
Equipment		
1) Screen		
Type	manual	
Bar spacing	15 mm	
Quantity	1	
2) Pump		
Type	horizontal shaft, centrifugal pump	
Capacity	140 m^3/hour x H10.5 m x 11 kW	
Quantity	2 units	
3) Others	emergency storage pond (12 hours volume) hoist crane floor drain pump ventilation system	
Stand-by Generator	no	
Operation		
Disposal of screenings		
Method	by container	
Frequency	every day	
Amount	little	
Pump Operation		
Automatic on-off	automatic by water level in the pump well	
No. of unit operated	2 units (1 unit on at all time)	
Flow measurement	none	
Discharge amount/flow	no record due to lack of flow meter	
Operator	Circulating for inspection Pump operation is monitored in the operation room in the Water Company.	
Existing problems	Equipment is very old. Leaks in walls at pipe penetration Ventilation is very old and not functioning. No monitoring link exists. Steel stairs are corroded and at a risk of corruption.	
Improvement in the Project	No need to replace the pump units immediately. Motor should be replaced with new one, preferably equipped with an inverter. Repair of cracks and leaks should be included in the project scope. Steel stairs should be replaced with new one.	

3. Comparison of Treatment Plant Alternatives

Appendix 3 Comparison of Treatment Plant Alternatives (Birzai)

Item	Case-1 Anaerobic - Anoxic - Aerobic System	Case-2 Oxidation Ditch System	Remarks

1. Design Criteria

1) Design Flow

Daily average : $Q_1 = 4{,}200\ m^3/day$

Daily maximum : $Q_2 = 5{,}000\ m^3/day$

Hourly maximum : $Q_3 = 6{,}930\ m^3/day$

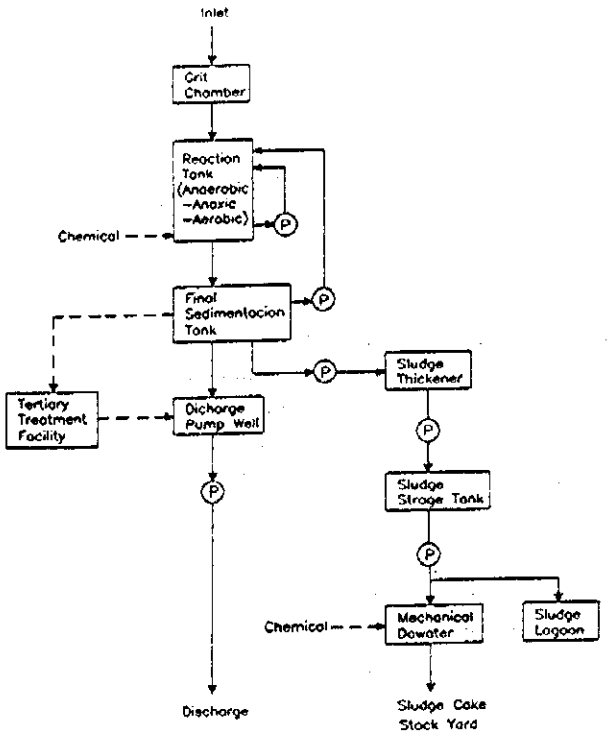
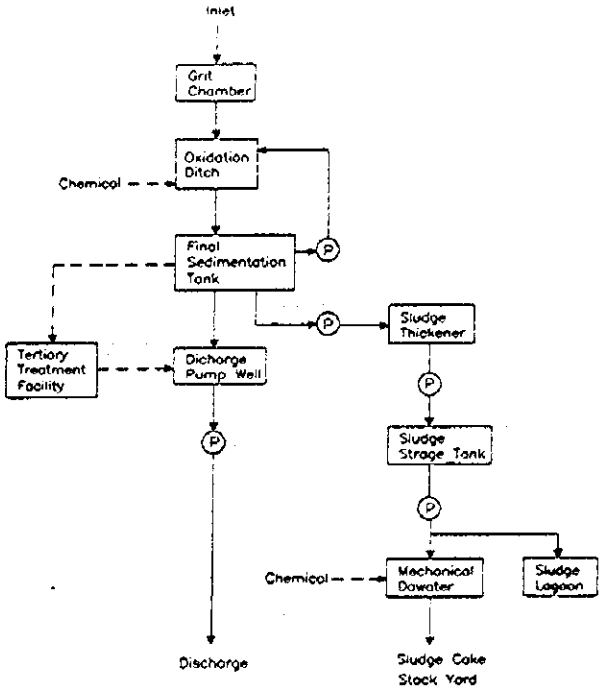
2) Design Sewage Quality

	Influent Quality (mg/l)	S.T.F. R.R. (%)	S.T.F. E.Q. (mg/l)	T.T.F. R.R. (%)	T.T.F. E.Q. (mg/l)	Discharge Standard Average (mg/l)	Discharge Standard Maximum (mg/l)
BOD_7	260	95	13	75	3.3	4	8
BOD_5	230	95	12	75	3	3.5	7
SS	260	90	26	65	9	30	45
COD	500	85	75	60	30	75	120
T-N	40	70	12	35	8	8	14
T-P	10	*85	*1.5	35	*1.0	*1.0	1.5

Note) S.T.F. : Secndary Treatment Facility
R.R. : Removal Rate
E.Q. : Effluent Quality
T.T.F. : Tertiary Treatment Facility
* : with Coagulant Treatment

3) Design Temperature

7 degree C. at winter

Item	Case-1 Anaerobic - Anoxic - Aerobic System	Case-2 Oxidation Ditch System	Remarks
2. Flow Chart			
3. Sludge (Q_{dmax})			
Excess Sludge	1,083 kg DS/day, 195 m^3/day, 99.4 % wt		
Thickened Sludge	866 kg DS/day, 58 m^3/day, 98.5 % wt	Same as Case-1	
Dewatered Sludge	823 kg DS/day, 5.5 m^3/day, 95 % wt		

Item	Case-1 Anaerobic - Anoxic - Aerobic System	Case-2 Oxidation Ditch System	Remarks
4. Major Facility	1) Grit Chamber Gravity Type W 1.0 m x L 4.0 m x D 0.4 m x 1 unit Water Surface Load : 1,800 m^3/m^2 day Average Velocity : 0.2 m/sec 2) Flow Measuremen Parshall Flume Type W = 0.457 m x 1 unit 3) Reaction Tank Plug Flow Type Anaerobic - Anoxic - Aerobic System W 5.8 m x L 89.4 m x D 5.77 m x 3 units MLSS : 3,000 mg/l HRT : 37.4 hrs BOD-SS Load : 0.05 kg BOD/kg SS/day Maximum Recycle Ratio : 150 % of Q_2 Recycle Pump : 1.8 m3/min x 3.7 kw x 3 (1) units 4) Aeration Equipment Blower : 18 m^3/min x 37 kw x 3 (1) units Diffuser : Membrane Disc Aerator Submersible Mixer : 1.1 kw x 3 units : 2.4 kw x 9 units	1) Grit Chamber Same as Case-1 2) Flow Measuremen Same as Case-1 3) Reaction Tank Oxidation Ditch W 5.5 m x L 234.2 m x D 3.0 m x 2 units MLSS : 4,000 mg/l HRT : 36 hrs BOD-SS Load : 005 kg BOD/kg SS/day 4) Aeration Equipment Blower : 21 m^3/min x 37 kw x 3 (1) units Diffuser : Membrane Disc Aerator Submersible Mixer : 2.4 kw x 8 units	

Item	Case-1 Anaerobic - Anoxic - Aerobic System	Case-2 Oxidation Ditch System	Remarks
	5) Final Sedimentation Tank Circular Tank with Center driven Sludge Collector Dia. 20 m x D 3.5 m x 2 units Surface Load : 8 m^3/m^2/day Retention Time : 10.6 hrs	5) Final Sedimentation Tank Same as Case-1	
	6) Sludge Pump Return Sludge Pump : Max. Ratio 100 % 0.9 m^3/min x 2.2 kw x 4 units Excess Sludge Pump : 6.5 m^3/hr x 2.2 kw x 2 units	6) Sludge Pump Return Sludge Pump : Max. Ratio 200 % 1.8 m^3/min x 3.7 kw x 4 units Excess Sludge Pump : 6.5 m^3/hr x 2.2 kw x 2 units	
	7) Sludge Thickener Circular Tank with Center driven Sludge Collector Dia. 7.0 m x D 4.0 m x 1 unit Dry Solid Surface Load : 30 kg DS/m^2 day Retention Time : 19 hrs	7) Sludge Thickener Same as Case-1	
	8) Sludge Storage Tank Rectangular Tank W 4.5 m x L 7.0 m x D 4.0 m x 1 unit Retention Time : 2.2 days	8) Sludge Storage Tank Same as Case-1	

Item	Case-1 Anaerobic - Anoxic - Aerobic System	Case-2 Oxidation Ditch System	Remarks
	9) Sludge Dewatering Machine Centrifugal Dewatering Machine 12 m^3/hr x 44.5 kw x 1 unit	9) Sludge Dewatering Machine Same as Case-1	
	10) Sludge Stock Yard Stockpiling Yard W 12.0 m x L 24.0 m x 1 line Storage Period : 1 month	10) Sludge Stock Yard Same as Case-1	
	11) Sludge Lagoon Open cut W (top) 32 m - (bottom) 26 m x L (top) 44 m - (bottom) 38 m x D 1.5 m x 1 unit Storage Period : 1 month	11) Sludge Lagoon Same as Case-1	
	12) Chemical Feeding Facility Alum-oxic Caustic So Polymer T	12) Chemical Feeding Facility Same as C	
	13) Discharge Pump Centrifugal Pump 4.8 m^3/min x 22 kw x 2 (1) units	13) Discharge Pump Submersible Nonclog Pump 4.8 m^3/min x 22 kw x 2 (1) units	

Item	Case-1 Anaerobic - Anoxic - Aerobic System	Case-2 Oxidation Ditch System	Remarks
	14) Tertiary Treatment Facility Biological Membrane Filter W 2.5m x L 3.5 m x 3 units Filtration Rate : 200 m/day 15) Transformer 300 KVA x I unit 16) Auxiliary Facilities Administration Building Sludge Building Equipment Room	14) Tertiary Treatment Facility Same as Case-1 15) Transformer 300 KVA x I unit 16) Auxiliary Facilities Administration Building Sludge Building Equipment Room Sludge Pump Room Discharge Pump Pit	
5. Total Motor Power	Secondary Treatment 193 kw Discharge Pump 22 kw Tertiary Treatment 68 kw Total 283 kw	Secondary Treatment 182 kw Discharge Pump 22 kw Tertiary Treatment 68 kw Total 272 kw	

Item	Case-1 Anaerobic - Anoxic - Aerobic System	Case-2 Oxidation Ditch System	Remarks
6. Construction Cost	- Seondary Treatment and Discharge Pump Civil/Architect 3,108,000 Mechanic/Electric 4,550,000 Sub-Total 7,658,000 Lts - Tertiary Treatment Civil/Architect 280,000 Mechanic/Electric 1,020,000 Sub-Total 1,300,000 Lts Total 8,958,000 Lts	- Seondary Treatment and Discharge Pump Civil/Architect 5,371,000 Mechanic/Electric 4,182,000 Sub-Total 9,553,000 Lts - Tertiary Treatment Civil/Architect 280,000 Mechanic/Electric 1,020,000 Sub-Total 1,300,000 Lts Total 10,853,000 Lts	
7. Operation and Maintenance Cost 1) Power Consumption	- Demand Secondary Treatment 418,000 Discharge Pump 84,000 Tertiary Treatment 106,000 608,000 kwH/year - Electricity Charge 608,000 x 0.204 = 124,000 Lts/year	- Demand Secondary Treatment 374,000 Discharge Pump 84,000 Tertiary Treatment 106,000 564,000 kwH/year - Electricity Charge 564,000 x 0.204 = 115,000 Lts/year	Unit price 0.204 Lts/kwH (Aug. 1998)

Item	Case-1 Anaerobic - Anoxic - Aerobic System	Case-2 Oxidation Ditch System	Remarks
2) Chemical Consumption	- Alum Oxichloride : 17,400 kg/year 17,400 x 0.424 = 7,378 Lts/year Transportation 17.4 x 1/11 = 1.6 ..... 2 times 140 km x 2 x 1.3 = 364 Lts/year - Polymer : 2,500 kg/year 2,500 x 25 = 62,500 Lts/year Total 71,000 Lts/year	- Alum Oxichloride : 86,900 kg/year 86,900 x 0.424 = 36,846 Lts/year Transportation 86.9 x 1/11 = 7.9 ..... 8 times 140 km x 8 x 1.3 = 1,456 Lts/year - Polymer : 2,500 kg/year 2,500 x 25 = 62,500 Lts/year Total 101,000 Lts/year	For annual average consumption Alum-Oxichloride 0.424 Lts/kg Transportation 11 ton, 1.3 Lts/km (Aug. 1998) Polymer 25 Lts/kg, including transportation (Aug. 1998)
3) Fuel	- 100 Lts/wk x 52 = 5,000 Lts/year	- 100 Lts/wk x 52 = 5,000 Lts/year	
4) Consumable Parts and Repairing	- Secondary/Discharge Pump 4,550,000 x 0.015 = 68,250 Lts/year - Tertiary Treatment 1,020,000 x 0.015 = 15,300 Lts/year Total 84,000 Lts/year	- Secondary/Discharge Pump 4,182,000 x 0.015 = 62,730 Lts/year - Tertiary Treatment 1,020,000 x 0.015 = 15,300 Lts/year Total 78,000 Lts/year	1.5 %/year of M/E construction cost
5) Total	284,000 Lts/year	299,000 Lts/year	