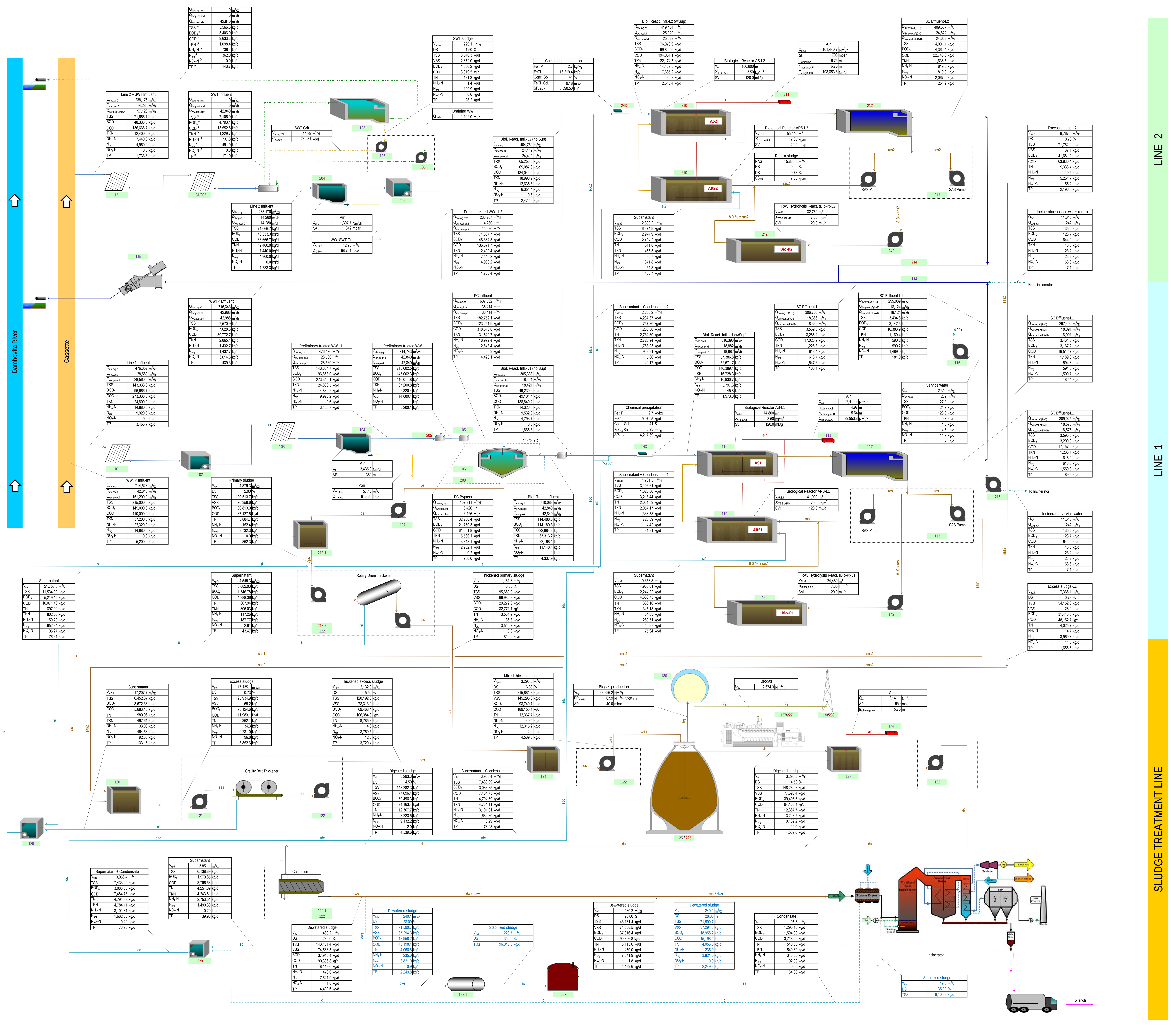
WASTEWATER TREATMENT PLANT of

BUCHAREST

FLOW DIAGRAM & MASS BALANCE

@ 14 °C



(SWT, wet weather)

$Q_{dw.avg.stwt}$	0	m^3/zi
$Q_{dw.peak.stwt}$	0	m^3/h
$Q_{ww.peak.stwt}$	42,840	m^3/h
TSS (a	3,566.6	kg/d
BOD_5 (a	3,406.9	kg/d
COD (a	9,633.3	kg/d
TKN (a	1,098.4	kg/d
NH_4-N (a	736.4	kg/d
N_{org} (a	362.0	kg/d
NO_3-N (a	0.0	kg/d
TP (a	143.7	kg/d

Line 2 + SWT Influent

$Q_{dw.avg.2}$	238,176	m^3/zi
$Q_{dw.peak.2}$	14,280	m^3/h
$Q_{ww.peak.2+stwt}$	57,120	m^3/h
TSS	71,666.7	kg/d
BOD_5	48,333.3	kg/d
COD	136,666.7	kg/d
TKN	12,400.0	kg/d
NH_4-N	7,440.0	kg/d
N_{org}	4,960.0	kg/d
NO_3-N	0.0	kg/d
TP	1,733.3	kg/d

SWT Influent

$Q_{dw.avg.stwt}$	0	m^3/zi
$Q_{dw.peak.stwt}$	0	m^3/h
$Q_{ww.peak.stwt}$	42,840	m^3/h
TSS (a	7,106.9	kg/d
BOD_5 (a	4,793.1	kg/d
COD (a	13,552.8	kg/d
TKN (a	1,229.7	kg/d
NH_4-N (a	737.8	kg/d
N_{org} (a	491.9	kg/d
NO_3-N (a	0.0	kg/d
TP (a	171.9	kg/d

SWT sludge

V_{npsw}	229.1	m^3/zi
DS	1.50	%
TSS	3,540.3	kg/d
VSS	2,372.0	kg/d
BOD_5	1,386.2	kg/d
COD	3,919.5	kg/d
TN	131.3	kg/d
NH_4-N	1.4	kg/d
N_{org}	129.9	kg/d
NO_3-N	0.0	kg/d
TP	28.2	kg/d

Draining WW

Q_{drain}	1,102.0	m^3/h

SWT Grit

$V_{n.sw,60\%}$	14.39	m^3/zi
$C_{n2,60\%}$	23,031	kg/d

Line 2 Influent

$Q_{dw.avg.2}$	238,176	m^3/zi
$Q_{dw.peak.2}$	14,280	m^3/h
$Q_{ww.peak.2}$	14,280	m^3/h
TSS	71,666.7	kg/d
BOD_5	48,333.3	kg/d
COD	136,666.7	kg/d
TKN	12,400.0	kg/d
NH_4-N	7,440.0	kg/d
N_{org}	4,960.0	kg/d
NO_3-N	0.0	kg/d
TP	1,733.3	kg/d

Air

$Q_{air.2}$	1,307.7	Nm^3/h
ΔP	342	mbar

WW+SWT Grit

$V_{n2,60\%}$	42.98	m^3/zi
$C_{n2,60\%}$	68,761	kg/d

Prelim. treated WW - L2

$Q_{dw.avg.pr.2}$	238,267	m^3/zi
$Q_{dw.peak.pr.2}$	14,280	m^3/h
$Q_{ww.peak.pr.2}$	14,280	m^3/h
TSS	71,667.7	kg/d
BOD_5	48,334.3	kg/d
COD	136,671.7	kg/d
TKN	12,400.4	kg/d
NH_4-N	7,440.2	kg/d
N_{org}	4,960.2	kg/d
NO_3-N	0.5	kg/d
TP	1,733.4	kg/d

Chemical precipitation

Fe : P	2.7	kg/kg
$FeCl_3$	13,219.4	kg/d
Conc. Sol.	41	%
$FeCl_3$ Sol.	9.18	m^3/zi
$SP_{d,P,c.2}$	5,590.50	kg/d

Biol. React. Infl.-L2 (w/Sup)

$Q_{dw.avg.b1}$	419,404	m^3/zi
$Q_{dw.peak.b1}$	25,029	m^3/h
$Q_{ww.peak.b1}$	25,029	m^3/h
TSS	76,070.9	kg/d
BOD_5	69,820.6	kg/d
COD	194,051.1	kg/d
TKN	22,174.7	kg/d
NH_4-N	14,489.5	kg/d
N_{org}	7,685.2	kg/d
NO_3-N	60.8	kg/d
TP	2,615.4	kg/d

Biological Reactor AS-L2

$V_{AS.2}$	100,800	m^3
$X_{TSS,AS}$	3.50	kg/m^3
SVI	120.0	mL/g

Air

$Q_{air.2}$	101,440.7	Nm^3/h
ΔP	700	mbar
$h_{submerg/AS}$	6.75	m
$h_{submerg/ARS}$	6.75	m
$Q_{air @ 20oC}$	103,853.3	Nm^3/h

SC Effluent-L2

$Q_{dw.avg.eff(C+D)}$	409,637	m^3/zi
$Q_{dw.peak.eff(C+D)}$	24,622	m^3/h
$Q_{ww.peak.eff(C+D)}$	24,622	m^3/h
TSS	4,001.1	kg/d
BOD_5	4,362.4	kg/d
COD	22,743.8	kg/d
TKN	1,638.5	kg/d
NH_4-N	819.3	kg/d
N_{org}	819.3	kg/d
NO_3-N	2,067.0	kg/d
TP	251.2	kg/d

Biol. React. Infl.-L2 (no Sup)

$Q_{dw.avg.b1}$	404,750	m^3/zi
$Q_{dw.peak.b1}$	24,419	m^3/h
$Q_{ww.peak.b1}$	24,419	m^3/h
TSS	65,258.6	kg/d
BOD_5	65,087.9	kg/d
COD	184,044.0	kg/d
TKN	18,990.2	kg/d
NH_4-N	12,635.8	kg/d
N_{org}	6,354.4	kg/d
NO_3-N	0.6	kg/d
TP	2,472.6	kg/d

Biological Reactor ARS-L2

$V_{ARS.2}$	55,440	m^3
$X_{TSS,ARS}$	7.35	kg/m^3
SVI	120.0	mL/g

Return sludge

RAS	15,888.8	m^3/h
RS	90.9	%
DS	0.73	%
SS_{RS}	7.35	kg/m^3

RAS Hydrolysis React. (Bio-P)-L2

$V_{bio-P.2}$	32,760	m^3
$X_{TSS,Bio-P}$	7.35	kg/m^3
SVI	120.0	mL/g

Supernatant

$V_{sp.b2}$	12,399.2	m^3/zi
TSS	6,574.9	kg/d
BOD_5	2,974.9	kg/d
COD	5,740.7	kg/d
TN	511.8	kg/d
TKN	457.5	kg/d
NH_4-N	85.7	kg/d
N_{org}	371.8	kg/d
NO_3-N	54.3	kg/d
TP	100.7	kg/d

Excess sludge-L2

$V_{ne.2}$	9,767.0	m^3/zi
DS	0.73	%
TSS	71,782.9	kg/d
VSS	37.1	kg/d
BOD_5	41,681.0	kg/d
COD	63,830.4	kg/d
TN	5,336.4	kg/d
NH_4-N	19.5	kg/d
N_{org}	5,261.7	kg/d
NO_3-N	55.2	kg/d
TP	2,196.0	kg/d

Incinerator service water return

Q_{swi}	11,616	m^3/zi
$Q_{sw.peak}$	242	m^3/h
TSS	135.2	kg/d
BOD_5	123.7	kg/d
COD	644.9	kg/d
TKN	46.5	kg/d
NH_4-N	23.2	kg/d
N_{org}	23.2	kg/d
NO_3-N	58.6	kg/d
TP	7.1	kg/d

WWTP Effluent

$Q_{dw.avg.eff}$	716,343	m^3/zi
$Q_{dw.peak.eff}$	42,988	m^3/h
$Q_{ww.peak.eff}$	42,988	m^3/h
TSS	7,570.9	kg/d
BOD_5	7,628.6	kg/d
COD	39,772.7	kg/d
TKN	2,865.4	kg/d
NH_4-N	1,432.7	kg/d
N_{org}	1,432.7	kg/d
NO_3-N	3,614.6	kg/d
TP	439.3	kg/d

PC Influent

$Q_{dw.avg.pc}$	607,532	m^3/zi
$Q_{dw.peak.pc}$	36,414	m^3/h
$Q_{ww.peak.pc}$	36,414	m^3/h
TSS	182,752.1	kg/d
BOD_5	123,251.9	kg/d
COD	348,510.0	kg/d
TKN	31,620.7	kg/d
NH_4-N	18,972.4	kg/d
N_{org}	12,648.4	kg/d
NO_3-N	0.9	kg/d
TP	4,420.1	kg/d

Supernatant + Condensate -L2

$V_{sdc.b2}$	2,255.2	m^3/zi
TSS	4,237.37	kg/d
BOD_5	1,757.80	kg/d
COD	4,266.30	kg/d
TN	2,732.80	kg/d
TKN	2,726.94	kg/d
NH_4-N	1,768.03	kg/d
N_{org}	958.91	kg/d
NO_3-N	5.86	kg/d
TP	42.17	kg/d

SC Effluent-L1

$Q_{dw.avg.eff(A+B)}$	306,705	m^3/zi
$Q_{dw.peak.eff(A+B)}$	18,366	m^3/h
$Q_{ww.peak.eff(A+B)}$	18,366	m^3/h
TSS	3,569.8	kg/d
BOD_5	3,266.2	kg/d
COD	17,028.9	kg/d
TKN	1,226.8	kg/d
NH_4-N	613.4	kg/d
N_{org}	613.4	kg/d
NO_3-N	1,547.6	kg/d
TP	188.1	kg/d

SC Effluent-L1

$Q_{dw.avg.eff(A+B)}$	295,089	m^3/zi
$Q_{dw.peak.eff(A+B)}$	18,124	m^3/h
$Q_{ww.peak.eff(A+B)}$	18,124	m^3/h
TSS	3,434.6	kg/d
BOD_5	3,142.5	kg/d
COD	16,383.9	kg/d
TKN	1,180.4	kg/d
NH_4-N	590.2	kg/d
N_{org}	590.2	kg/d
NO_3-N	1,489.0	kg/d
TP	181.0	kg/d

SC Effluent-L1

$Q_{dw.avg.eff(A+B)}$	297,409	m^3/zi
$Q_{dw.peak.eff(A+B)}$	18,091	m^3/h
$Q_{ww.peak.eff(A+B)}$	18,091	m^3/h
TSS	3,461.6	kg/d
BOD_5	3,167.2	kg/d
COD	16,512.7	kg/d
TKN	1,189.6	kg/d
NH_4-N	594.8	kg/d
N_{org}	594.8	kg/d
NO_3-N	1,500.7	kg/d
TP	182.4	kg/d

Preliminary treated WW - L1

$Q_{dw.avg.pr.1}$	476,476	m^3/zi
$Q_{dw.peak.pr.1}$	28,560	m^3/h
$Q_{ww.peak.pr.1}$	28,560	m^3/h
TSS	143,334.7	kg/d
BOD_5	96,668.0	kg/d
COD	273,340.1	kg/d
TKN	24,800.5	kg/d
NH_4-N	14,880.2	kg/d
N_{org}	9,920.2	kg/d
NO_3-N	0.6	kg/d
TP	3,466.7	kg/d

Preliminary treated WW

$Q_{dw.avg.p}$	714,743	m^3/zi
$Q_{dw.peak.p}$	42,840	m^3/h
$Q_{ww.peak.p}$	42,840	m^3/h
TSS	215,002.5	kg/d
BOD_5	145,002.3	kg/d
COD	410,011.8	kg/d
TKN	37,200.8	kg/d
NH_4-N	22,320.4	kg/d
N_{org}	14,880.4	kg/d
NO_3-N	1.1	kg/d
TP	5,200.1	kg/d

Line 1 Influent

$Q_{dw.avg.1}$	476,352	m^3/zi
$Q_{dw.peak.1}$	28,560	m^3/h
$Q_{ww.peak.1}$	28,560.0	m^3/h
TSS	143,333.3	kg/d
BOD_5	96,666.7	kg/d
COD	273,333.3	kg/d
TKN	24,800.0	kg/d
NH_4-N	14,880.0	kg/d
N_{org}	9,920.0	kg/d
NO_3-N	0.0	kg/d
TP	3,466.7	kg/d

Biol. React. Infl.-L1 (w/Sup)

$Q_{dw.avg.b1}$	316,393	m^3/zi
$Q_{dw.peak.b1}$	18,882	m^3/h
$Q_{ww.peak.b1}$	18,882	m^3/h
TSS	57,386.8	kg/d
BOD_5	52,671.7	kg/d
COD	146,389.4	kg/d
TKN	16,728.3	kg/d
NH_4-N	10,930.7	kg/d
N_{org}	5,797.6	kg/d
NO_3-N	45.8	kg/d
TP	1,973.0	kg/d

Biol. React. Infl.-L1 (no Sup)

$Q_{dw.avg.b1}$	305,338	m^3/zi
$Q_{dw.peak.b1}$	18,421	m^3/h
$Q_{ww.peak.b1}$	18,421	m^3/h
TSS	49,230.2	kg/d
BOD_5	49,101.4	kg/d
COD	138,840.2	kg/d
TKN	14,326.0	kg/d
NH_4-N	9,532.3	kg/d
N_{org}	4,793.7	kg/d
NO_3-N	0.5	kg/d
TP	1,865.3	kg/d

Chemical precipitation

Fe : P	2.7	kg/kg
$FeCl_3$	9,972.5	kg/d
Conc. Sol.	41	%
$FeCl_3$ Sol.	6.93	m^3/zi
$SP_{d,P,c}$	4,217.39	kg/d

Biological Reactor AS-L1

$V_{AS.1}$	74,800	m^3
$X_{TSS,AS}$	3.50	kg/m^3
SVI	120.0	mL/g

Air

$Q_{air.1}$	97,411.4	Nm^3/h
$h_{submerg/AS}$	4.97	m
$h_{submerg/ARS}$	5.64	m
$Q_{air @ 20oC}$	99,953.8	Nm^3/h

Service water

Q_{sw}	2,319	m^3/zi
$Q_{sw.peak}$	209	m^3/h
TSS	27.0	kg/d
BOD_5	24.7	kg/d
COD	128.8	kg/d
TKN	9.3	kg/d
NH_4-N	4.6	kg/d
N_{org}	4.6	kg/d
NO_3-N	11.7	kg/d
TP	1.4	kg/d

SC Effluent-L1

$Q_{dw.avg.eff(A+B)}$	309,025	m^3/zi
$Q_{dw.peak.eff(A+B)}$	18,575	m^3/h
$Q_{ww.peak.eff(A+B)}$	18,575	m^3/h
TSS	3,596.8	kg/d
BOD_5	3,290.9	kg/d
COD	17,157.6	kg/d
TKN	1,236.1	kg/d
NH_4-N	618.0	kg/d
N_{org}	618.0	kg/d
NO_3-N	1,559.3	kg/d
TP	189.5	kg/d

Air

$Q_{air.1}$	3,435.0	Nm^3/h
ΔP	380	mbar

Grit

$V_{n1,60\%}$	57.16	m^3/zi
$C_{n1,60\%}$	91,460	kg/d

Supernatant + Condensate -L1

$V_{sdc.b1}$	1,701.3	m^3/zi
TSS	3,196.61	kg/d
BOD_5	1,326.06	kg/d
COD	3,218.44	kg/d
TN	2,061.59	kg/d
TKN	2,057.17	kg/d
NH_4-N	1,333.78	kg/d
N_{org}	723.39	kg/d
NO_3-N	4.42	kg/d
TP	31.81	kg/d

WWTP Influent

$Q_{dw.avg}$	714,528	m^3/zi
$Q_{dw.peak}$	42,840	m^3/h
$Q_{ww.peak.T}$	151,200.0	m^3/h
TSS	215,000.0	kg/d
BOD_5	145,000.0	kg/d
COD	410,000.0	kg/d
TKN	37,200.0	kg/d
NH_4-N	22,320.0	kg/d
N_{org}	14,880.0	kg/d
NO_3-N	0.0	kg/d
TP	5,200.0	kg/d

Primary sludge

V_{np}	4,879.3	m^3/zi
DS	2.00	%
TSS	100,513.7	kg/d
VSS	70,359.6	kg/d
BOD_5	30,813.0	kg/d
COD	87,127.5	kg/d
TN	3,884.7	kg/d
NH_4-N	152.4	kg/d
N_{org}	3,732.3	kg/d
NO_3-N	0.0	kg/d
TP	862.3	kg/d

PC Bypass

$Q_{dw.avg.byp}$	107,211	m^3/zi
$Q_{dw.peak.byp}$	6,426	m^3/h
$Q_{ww.peak.byp}$	6,426	m^3/h
TSS	32,250.4	kg/d
BOD_5	21,750.3	kg/d
COD	61,501.8	kg/d
TKN	5,580.1	kg/d
NH_4-N	3,348.1	kg/d
N_{org}	2,232.1	kg/d
NO_3-N	0.2	kg/d
TP	780.0	kg/d

Biol. Treat. Influent

$Q_{dw.avg.b}$	710,088	m^3/zi
$Q_{dw.peak.b}$	42,840	m^3/h
$Q_{ww.peak.b}$	42,840	m^3/h
TSS	114,488.8	kg/d
BOD_5	114,189.3	kg/d
COD	322,884.3	kg/d
TKN	33,316.2	kg/d
NH_4-N	22,168.1	kg/d
N_{org}	11,148.1	kg/d
NO_3-N	1.1	kg/d
TP	4,337.9	kg/d

Biological Reactor ARS-L1

$V_{ARS.1}$	41,000	m^3
$X_{TSS,ARS}$	7.35	kg/m^3
SVI	120.0	mL/g

Incinerator service water

Q_{swi}	11,616	m^3/zi
$Q_{sw.peak}$	242	m^3/h
TSS	135.2	kg/d
BOD_5	123.7	kg/d
COD	644.9	kg/d
TKN	46.5	kg/d
NH_4-N	23.2	kg/d
N_{org}	23.2	kg/d
NO_3-N	58.6	kg/d
TP	7.1	kg/d

Supernatant

V_{sp}	21,753.0	m^3/zi
TSS	11,534.90	kg/d
BOD_5	5,219.12	kg/d
COD	10,071.46	kg/d
TN	897.90	kg/d
TKN	802.63	kg/d
NH_4-N	150.29	kg/d
N_{org}	652.34	kg/d
NO_3-N	95.27	kg/d
TP	176.61	kg/d

Supernatant

$V_{sp2.t}$	4,545.3	m^3/zi
TSS	5,082.03	kg/d
BOD_5	1,546.78	kg/d
COD	4,388.36	kg/d
TN	307.94	kg/d
TKN	305.03	kg/d
NH_4-N	117.26	kg/d
N_{org}	187.77	kg/d
NO_3-N	2.91	kg/d
TP	43.47	kg/d

Thickened primary sludge

V_{npc}	1,161.3	m^3/zi
DS	8.00	%
TSS	95,689.0	kg/d
VSS	66,982.3	kg/d
BOD_5	29,272.3	kg/d
COD	82,771.1	kg/d
TN	3,581.9	kg/d
NH_4-N	36.3	kg/d
N_{org}	3,545.7	kg/d
NO_3-N	0.0	kg/d
TP	819.2	kg/d

Supernatant

$V_{sp.b1}$	9,353.8	m^3/zi
TSS	4,960.01	kg/d
BOD_5	2,244.22	kg/d
COD	4,330.73	kg/d
TN	386.10	kg/d
TKN	345.13	kg/d
NH_4-N	64.63	kg/d
N_{org}	280.51	kg/d
NO_3-N	40.97	kg/d
TP	75.94	kg/d

RAS Hydrolysis React. (Bio-P)-L1

$V_{Bio-P.1}$	24,480	m^3
$X_{TSS,ARS}$	7.35	kg/m^3
SVI	120.0	mL/g

Excess sludge-L1

$V_{ne.1}$	7,368.1	m^3/zi
DS	0.73	%
TSS	54,152.0	kg/d
VSS	28.0	kg/d
BOD_5	31,443.6	kg/d
COD	48,152.7	kg/d
TN	4,025.7	kg/d
NH_4-N	14.7	kg/d
N_{org}	3,969.3	kg/d
NO_3-N	41.6	kg/d
TP	1,656.6	kg/d

Supernatant

$V_{sp3.t}$	17,207.7	m^3/zi
TSS	6,452.87	kg/d
BOD_5	3,672.33	kg/d
COD	5,683.10	kg/d
TN	589.96	kg/d
TKN	497.61	kg/d
NH_4-N	33.03	kg/d
N_{org}	464.58	kg/d
NO_3-N	92.36	kg/d
TP	133.15	kg/d

Excess sludge

V_{ne}	17,135.1	m^3/zi
DS	0.73	%
TSS	125,934.9	kg/d
VSS	65.2	kg/d
BOD_5	73,124.6	kg/d
COD	111,983.1	kg/d
TN	9,362.1	kg/d
NH_4-N	34.3	kg/d
N_{org}	9,231.0	kg/d
NO_3-N	96.8	kg/d
TP	3,852.6	kg/d

Thickened excess sludge

V_{nec1}	2,132.0	m^3/zi
DS	5.50	%
TSS	120,192.3	kg/d
VSS	78,313.0	kg/d
BOD_5	69,468.4	kg/d
COD	106,384.0	kg/d
TN	8,785.8	kg/d
NH_4-N	4.3	kg/d
N_{org}	8,769.5	kg/d
NO_3-N	12.0	kg/d
TP	3,720.4	kg/d

Mixed thickened sludge

V_{npec}	3,293.3	m^3/zi
DS	6.38	%
TSS	215,881.3	kg/d
VSS	145,295.3	kg/d
BOD_5	98,740.7	kg/d
COD	189,155.1	kg/d
TN	12,367.7	kg/d
NH_4-N	40.5	kg/d
N_{org}	12,315.2	kg/d
NO_3-N	12.0	kg/d
TP	4,539.6	kg/d

Biogas production

V_{bg}	63,296.2	Nm^3/zi
$BP_{specific}$	0.99	Nm^3/kgVSS-red
ΔP	40.0	mbar

Biogas

Q_{bg}	2,674.3	Nm^3/h

Air

Q_{air}	2,141.1	Nm^3/h
ΔP	650	mbar
$h_{submergence}$	5.75	m

Digested sludge

V_{nf}	3,293.3	m^3/zi
DS	4.50	%
TSS	148,282.3	kg/d
VSS	77,696.4	kg/d
BOD_5	39,496.3	kg/d
COD	94,163.4	kg/d
TN	12,367.7	kg/d
NH_4-N	3,223.5	kg/d
N_{org}	9,132.2	kg/d
NO_3-N	12.0	kg/d
TP	4,539.6	kg/d

Supernatant + Condensate

V_{dsc}	3,956.4	m^3/zi
TSS	7,433.99	kg/d
BOD_5	3,083.85	kg/d
COD	7,484.73	kg/d
TN	4,794.39	kg/d
TKN	4,784.11	kg/d
NH_4-N	3,101.81	kg/d
N_{org}	1,682.30	kg/d
NO_3-N	10.29	kg/d
TP	73.98	kg/d

Digested sludge

V_{nf}	3,293.3	m^3/zi
DS	4.50	%
TSS	148,282.3	kg/d
VSS	77,696.4	kg/d
BOD_5	39,496.3	kg/d
COD	94,163.4	kg/d
TN	12,367.7	kg/d
NH_4-N	3,223.5	kg/d
N_{org}	9,132.2	kg/d
NO_3-N	12.0	kg/d
TP	4,539.6	kg/d

Supernatant + Condensate

V_{dsc}	3,956.4	m^3/zi
TSS	7,433.99	kg/d
BOD_5	3,083.85	kg/d
COD	7,484.73	kg/d
TN	4,794.39	kg/d
TKN	4,784.11	kg/d
NH_4-N	3,101.81	kg/d
N_{org}	1,682.30	kg/d
NO_3-N	10.29	kg/d
TP	73.98	kg/d

Supernatant

$V_{sp5.t}$	3,851.1	m^3/zi
TSS	6,138.89	kg/d
BOD_5	1,579.85	kg/d
COD	3,766.53	kg/d
TN	4,254.09	kg/d
TKN	4,243.81	kg/d
NH_4-N	2,753.51	kg/d
N_{org}	1,490.30	kg/d
NO_3-N	10.29	kg/d
TP	39.98	kg/d

Dewatered sludge

V_{nd}	480.2	m^3/zi
DS	28.00	%
TSS	143,181.4	kg/d
VSS	74,588.5	kg/d
BOD_5	37,916.4	kg/d
COD	90,396.8	kg/d
TN	8,113.6	kg/d
NH_4-N	470.0	kg/d
N_{org}	7,641.9	kg/d
NO_3-N	1.8	kg/d
TP	4,499.6	kg/d

Dewatered sludge

$V_{nd.2}$	240.1	m^3/zi
DS	28.00	%
TSS	71,590.7	kg/d
VSS	37,294.3	kg/d
BOD_5	18,958.2	kg/d
COD	45,198.4	kg/d
TN	4,056.8	kg/d
NH_4-N	235.0	kg/d
N_{org}	3,821.0	kg/d
NO_3-N	0.9	kg/d
TP	2,249.8	kg/d

Stabilized sludge

V_{nst}	228.7	m^3/zi
DS	35.00	%
TSS	96,046.3	kg/d

Dewatered sludge

V_{nd}	480.2	m^3/zi
DS	28.00	%
TSS	143,181.4	kg/d
VSS	74,588.5	kg/d
BOD_5	37,916.4	kg/d
COD	90,396.8	kg/d
TN	8,113.6	kg/d
NH_4-N	470.0	kg/d
N_{org}	7,641.9	kg/d
NO_3-N	1.8	kg/d
TP	4,499.6	kg/d

Dewatered sludge

$V_{nd.1}$	240.1	m^3/zi
DS	28.00	%
TSS	71,590.7	kg/d
VSS	37,294.3	kg/d
BOD_5	18,958.2	kg/d
COD	45,198.4	kg/d
TN	4,056.8	kg/d
NH_4-N	235.0	kg/d
N_{org}	3,821.0	kg/d
NO_3-N	0.9	kg/d
TP	2,249.8	kg/d

Condensate

V_c	105.3	m^3/zi
TSS	1,295.10	kg/d
BOD_5	1,504.00	kg/d
COD	3,718.20	kg/d
TN	540.30	kg/d
TKN	540.30	kg/d
NH_4-N	348.30	kg/d
N_{org}	192.00	kg/d
NO_3-N	0.00	kg/d
TP	34.00	kg/d

Stabilized sludge

V_{nst}	19.3	m^3/zi
DS	35.00	%
TSS	8,100.3	kg/d

LEGEND 1:

Stage 1

- 101 Coarse Screens
- 102 Inlet Pumping Station
- 103 Fine Screens
- 104 Grit and Grease Removal Chamber
- 105 Primary Clarifiers Distribution Chamber
- 106 Primary Clarifiers
- 107 Primary Sludge Pumping Station
- 110 Biological Reactors
- 111 Blowers Station
- 112 Secondary Clarifiers
- 113 RAS & SAS Pumping Station
- 114 Discharge Channel and Flow Measurement System
- 115 Power Recovery
- 116 Service Water Pumping Station
- 117 Water Tower and Booster Pumping Station
- 119 Thickened Primary Sludge Pumping Station
- 120 SAS Buffer Tank
- 121 SAS Buffer Tank Pumping Station
- 122 Sludge Treatment Building (thickening, dewatering-belt filter presses)
- 122.1 Sludge Treatment Building (dewatering-centrifuges and liming)
- 124 Thickened Primary and Excess Sludge Mixing Tank
- 125 Digesters
- 127 CHP Units
- 128 Digested and Emergency Sludge Buffer Tanks
- 129 Supernatant Pumping Station
- 130 Gas Holders, Desulfurization Unit, Flare
- 131 Storm Water Screening Station
- 133 Storm Tanks
- 135 Storm Water Pumping Station & Drainage Storm Water Puming Station
- 142 Bio-P Tanks and Pumping Station
- 143 Chemical Plant (FeCl3)
- 144 Blowers Station for Area 128

Stage 2

- 201 Coarse Screens
- 202 Intermediate Pumping Station
- 203 Fine Screens
- 204 Grit and Grease Removal Chamber
- 205 Combiner-Distributor Chamber for Primary Clarifiers
- 208 Bypass primary clarifiers
- 210 Biological Reactors
- 211 Blowers Station
- 212 Secondary Clarifiers
- 213 RAS & SAS Pumping Station
- 214 Discharge Channel and Flow Measurement System
- 216 Incinerator service Water Pumping Station
- 218.1 Primary sludge buffer tank
- 218.2 Primary sludge thickening
- 223 Dewatered sludge storage
- 225 Digesters
- 227 CHP Units
- 229 Dewatering Supernatant and Condensate Pumping Station
- 230 Desulfurization Unit, Flare
- 242 Bio-P Tanks and Pumping Station
- 243 Chemical Plant (FeCl3)
- 264 Dewatering supernatant and condensate treatment unit
- 265 Treated supernatant and condensate pumping station

LEGEND 2:

- ras = Return Activated Sludge
- sas = Surplus Activated Sludge
- ps = Primary Sludge
- tps = Thickened Primary Sludge
- tes = Thickened Excess Sludge
- tpes = Thickened Primary and Excess Sludge
- ds = Digested Sludge
- dws = Dewatered Sludge
- ss = Stabilized Sludge
- si = Thickening supernatant
- bg = Biogas
- c = Condensate
- sd = Dewatering supernatant
- sdc = Dewatering supernatant + Condensate

- Wastewater
- Treated Wastewater
- Bypass Wastewater
- Supernatant
- Sludge
- Sludge (One non-operational incinerator line scenario)
- Air
- Grit
- Grit and sludge
- Ash
- Storm Water
- Storm water dainage
- Biogas
- Condensate
- Service water

ABBREVIATIONS:

- SWT = Storm Water Tank
- PC = Primary Clarifier
- SC = Secondary Clarifier
- AS = Activated Sludge Tank
- ARS = Activated Return Sludge Tank
- Bio-P = RAS Hydrolysis Reactor
- FeCl3 = Ferric Chloride
- NAR = Return Activated Sludge
- NAE = Surplus Activated Sludge

NOTES:

a) - Values on wet weather only
b) - Red color signifies new or modified process unit in Stage 2
c) - Values in blue corresponds to one non-operational incinerator line operation scenario