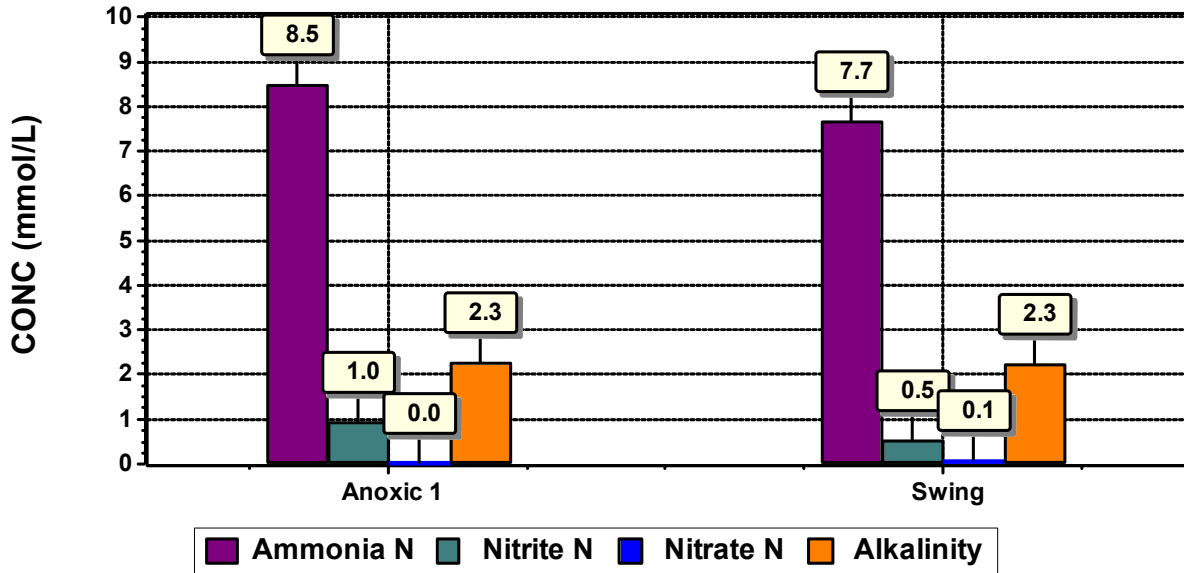
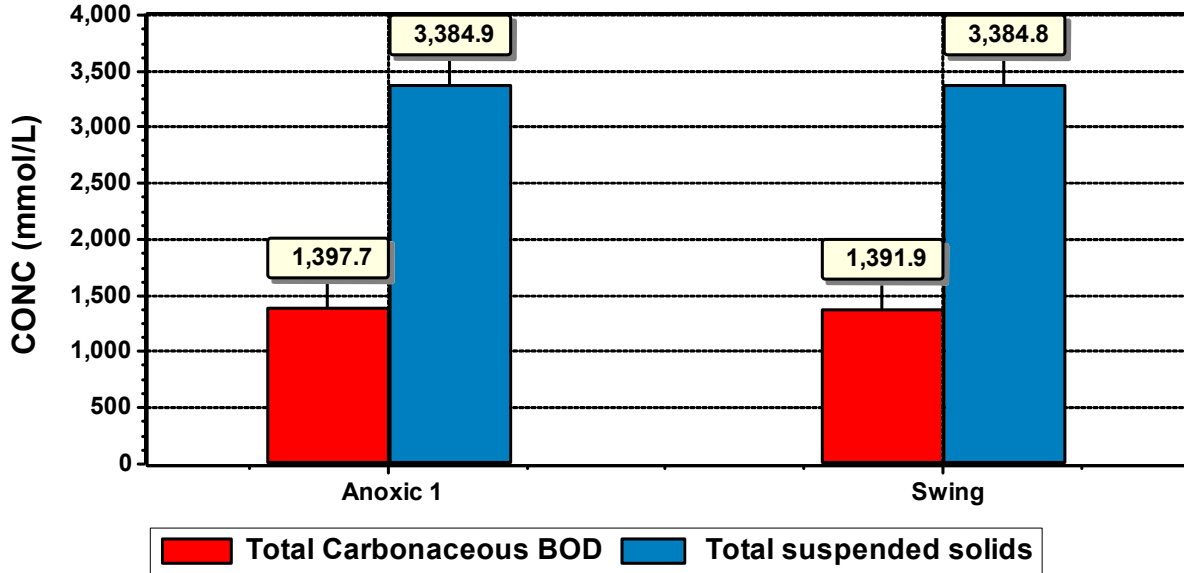


Chart



Album page - BOD_TSS

Chart



Chart

CONC (mg/L)

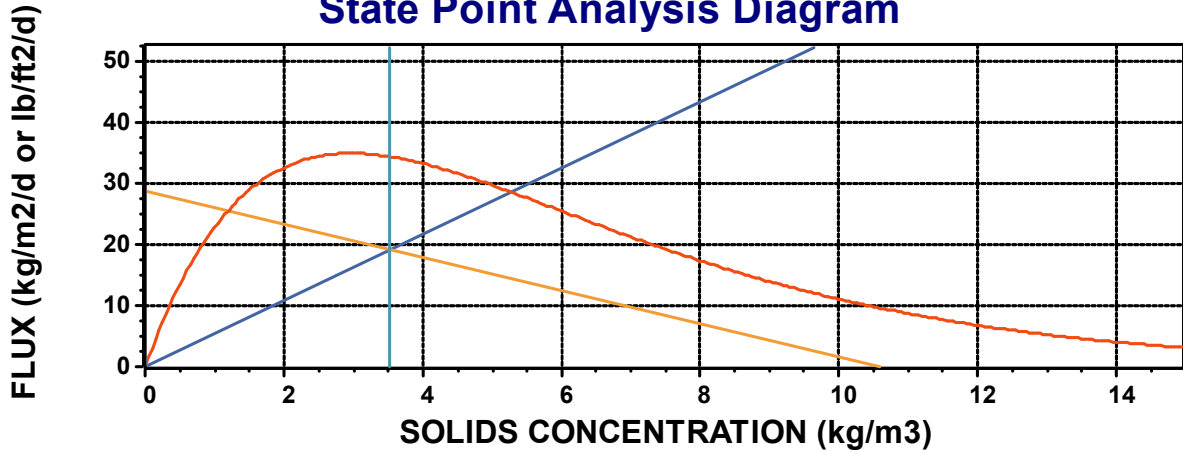


CONC (mg/L)

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Album page - Page 5

State Point Analysis Diagram

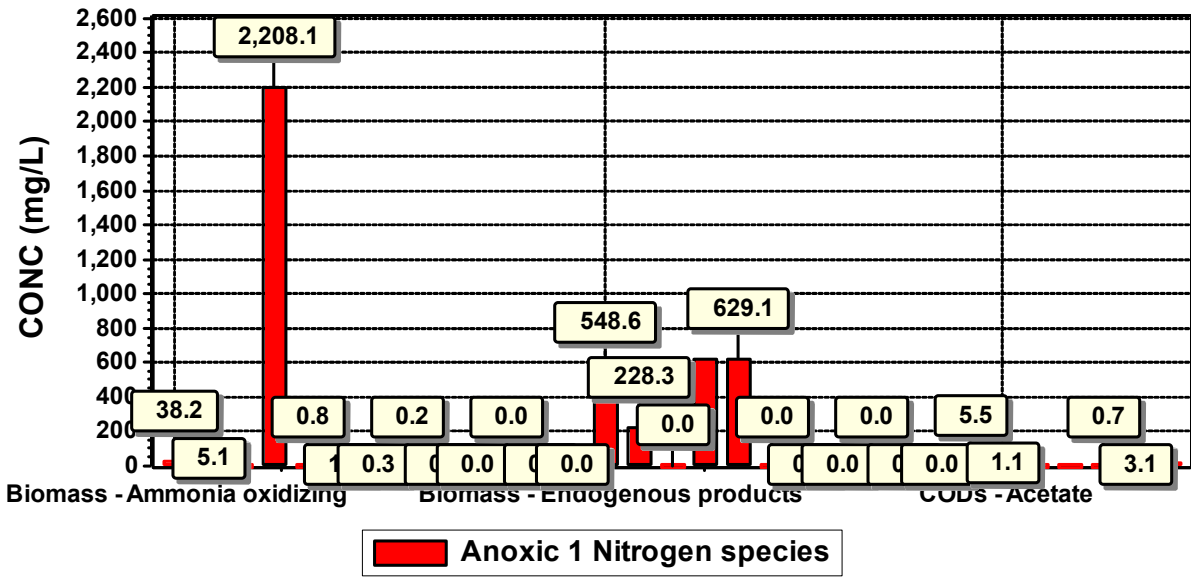


— Deleted - Ideal clarifier10 Overflow — Deleted - Ideal clarifier10 Underflow
— Deleted - Ideal clarifier10 Flux — Deleted - Ideal clarifier10 Feed

K = 0.3362 m3/kg
 Vo = 511.2 ft/d

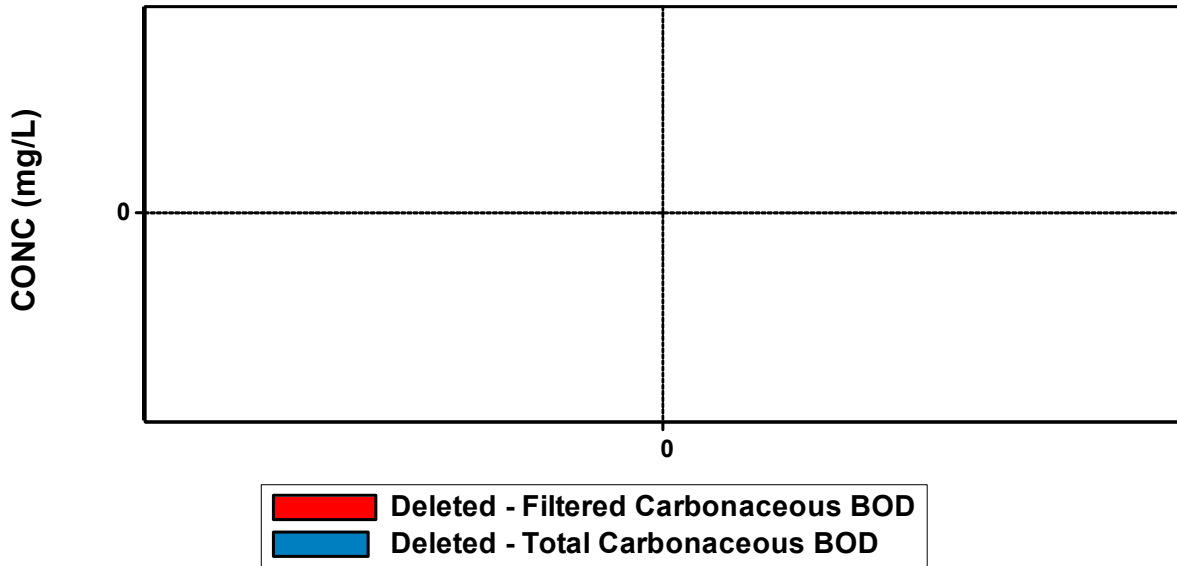
Album page - Page 6

Chart



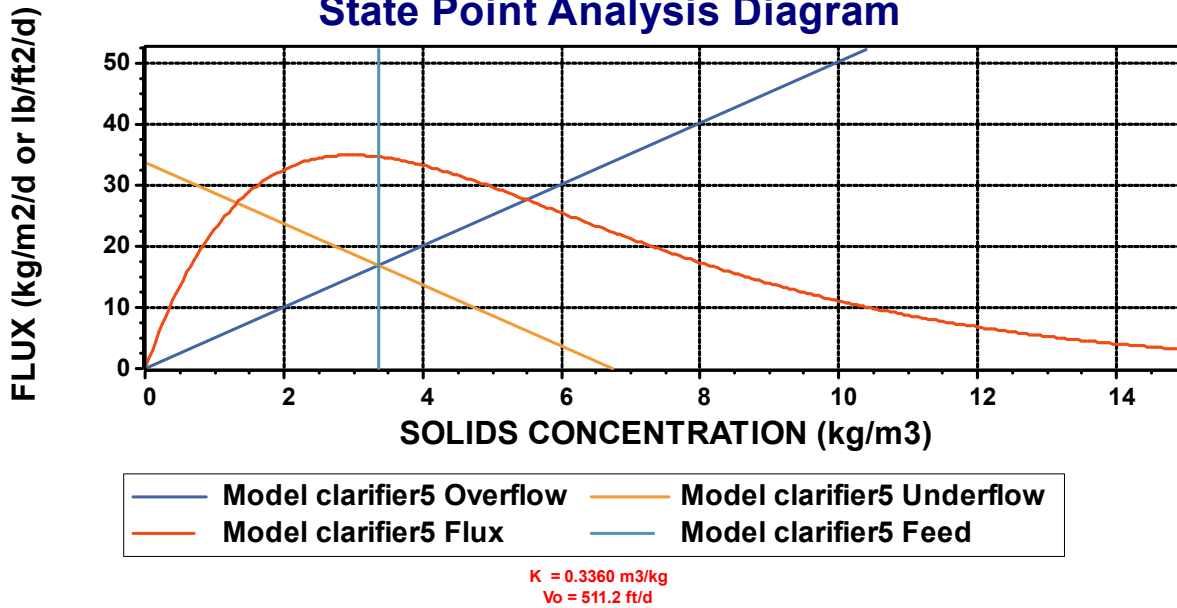
Album page - Page 7

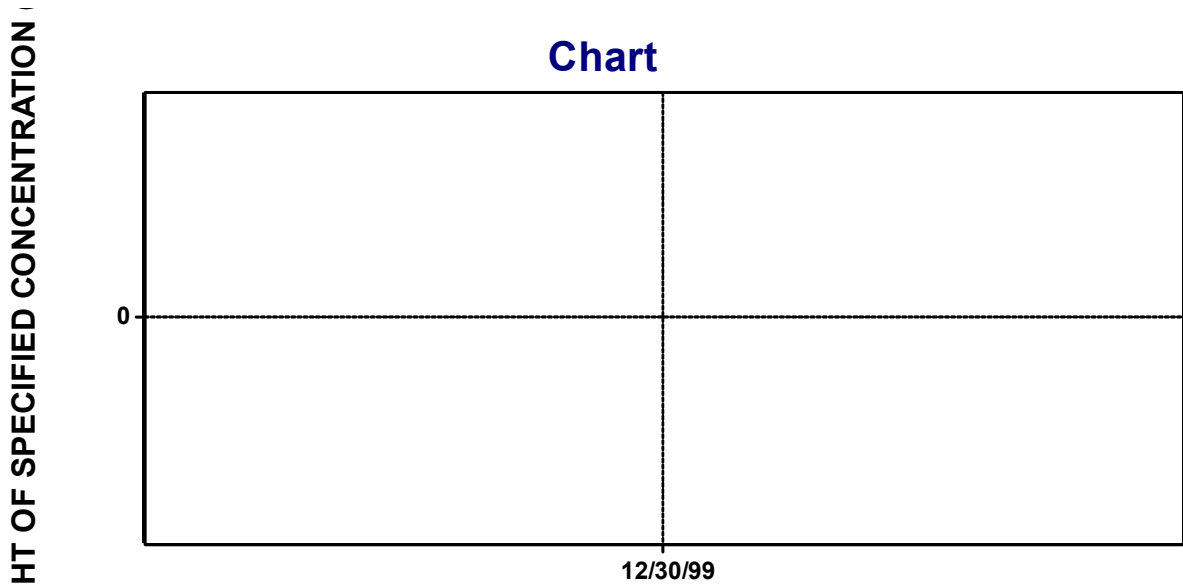
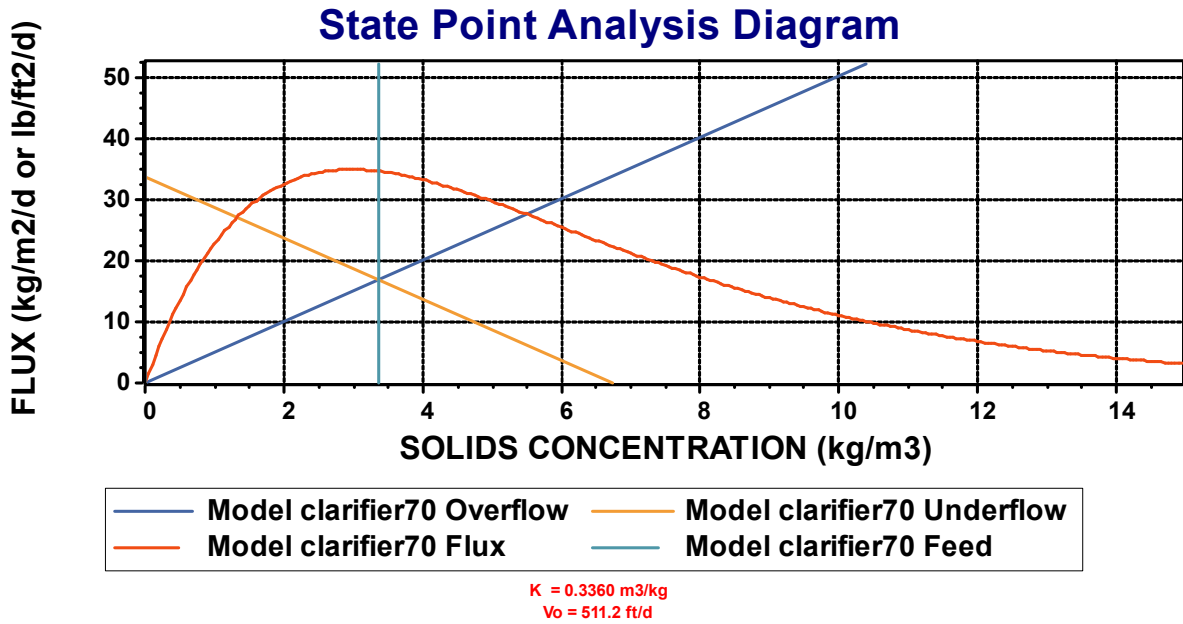
Chart



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State Point Analysis Diagram





— Deleted - Ideal primary settling tank57 Height of specified concentration

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Album page - Page 12

Elements	Liquid volume [Mil. Gal]
Anoxic 1	0.04
Anoxic 2	0.04
Swing	0.04
Aerobic 1	0.26
Anoxic 1B	0.04
Anoxic 2B	0.04
Swing B	0.04
Aerobic 1B	0.26

Album page - Page 13

Elements	Air flow rate [ft3/min (20C, 1 atm)]
Anoxic 1	0
Anoxic 2	0
Swing	212.15
Aerobic 1	835.26
Anoxic 1B	0
Anoxic 2B	0
Swing B	212.15
Aerobic 1B	835.26

Album page - Existing Plant Summary

Elements	Flow [mgd]	Temperature [deg. C]	BO D - Total Ca rbou s [mg/L]	BO D - Filt ere Ca rbou s [mg/L]	C O D - Total [mg/L]	C O D - Filt ere [mg/L]	Total suspended solids [mg/L]	Volatil esu spen ded solids [mg/L]	pH []	Alkalinity [mg/L]	N - Total Kjeldahl Nitrogen [mg/L]	N - Ammonia [mg/L]	N - Nitrite [mg/L]	N - Nitrate [mg/L]	Air flow rate [ft3 /min (20 C, 1 atm)]	OT R [lb/hr]	O UR - Total [mgO /L/hr]	SO TR [lb/hr]	Alph a []	Element HR T [hours]
Influent - BO D49	2.76	11.00	178.9	54.53	37.2	10.1	20.0	18.0	7.10	2.00	31.00	22.79	0	0	----	----	----	----	----	----
Anoxic 1	5.52	11.00	1397.72	6.68	43.25	34.95	33.84	30.27	6.88	2.29	25.77	8.51	0.97	0.04	0	0	0	0	0.50	0.16
Anoxic 2	5.52	11.00	1395.68	3.21	43.23	30.39	33.86	30.29	6.90	2.37	25.77	8.69	0.02	0.00	0	0	0	0	0.50	0.16
Swing	5.52	11.00	1391.95	1.85	43.16	27.51	33.84	30.27	6.74	2.26	25.71	7.70	0.55	0.09	21.5	18.71	47.28	76.82	0.36	0.16
Aerobic 1	5.52	11.00	1371.71	1.26	42.85	26.14	33.64	30.05	6.50	1.70	25.33	3.20	3.44	0.72	83.6	84.89	39.52	32.16	0.39	1.12
Model clarifier5	1.38	11.00	6.96	1.26	43.84	26.14	13.98	12.49	6.50	1.70	5.43	3.20	3.44	0.72	----	----	----	----	----	2.24
Model clarifier5 (U)	1.38	11.00	27.35	1.26	85.24	26.14	67.13	59.97	6.50	1.70	50.11	3.20	3.44	0.72	----	----	----	----	----	----
Model clarifier70	1.38	11.00	6.96	1.26	43.84	26.14	13.98	12.49	6.50	1.70	5.43	3.20	3.44	0.72	----	----	----	----	----	2.24
Model clarifier7	1.38	11.00	27.35	1.26	85.24	26.14	67.13	59.97	6.50	1.70	50.11	3.20	3.44	0.72	----	----	----	----	----	----

0 (U)																				
Effluent29	2.76	11.00	6.96	1.26	43.84	26.14	13.98	12.49	6.50	1.70	5.43	3.20	3.44	0.72	----	----	----	----	----	----
Donut Hole	0.05	11.00	20.69	0.57	75.67	25.16	59.81	53.24	5.37	0.17	45.76	16.70	17.59	23.04	18.28	20.60	27.43	61.24	0.50	40.81
Rising	0.05	11.00	12.94	0.53	64.66	25.19	51.17	45.49	5.21	0.13	41.37	49.57	16.99	59.41	19.45	23.53	15.66	69.94	0.50	81.62

Album page - New Plant Summary

Elements	BOD - Total Carbonaceous [mg/L]	COD - Filtered [mg/L]	Total suspended solids [mg/L]	Volatile suspended solids [mg/L]	pH []	Alkalinity [mmo/L]	N - Total Kjeldahl Nitrogen [mgN/L]	N - Ammonia [mgN/L]	N - Nitrite [mgN/L]	N - Nitrate [mgN/L]	Air flow rate [ft3/min (20C, 1 atm)]	OTR [lb/hr]	OUR - Total [mgO/L/hr]	SOTR [lb/hr]
Influent - BOD49	178.98	106.91	203.00	188.00	7.10	2.00	31.00	22.79	0	0	----	----	----	----
Anoxic 1B	1397.72	34.95	3384.94	3027.53	6.88	2.29	257.75	8.51	0.97	0.04	0	0	0	0
Anoxic 2B	1395.68	30.39	3386.95	3029.49	6.90	2.37	257.75	8.69	0.02	0.00	0	0	0	0
Swing B	1391.95	27.51	3384.81	3027.03	6.74	2.26	257.10	7.70	0.55	0.09	212.15	18.71	47.28	76.82
Aerobic 1B	1371.71	26.14	3364.89	3005.79	6.50	1.70	253.35	3.20	3.44	0.72	835.26	84.89	39.52	321.68
Model clarifier5	6.96	26.14	13.98	12.49	6.50	1.70	5.43	3.20	3.44	0.72	----	----	----	----
Model clarifier5 (U)	2735.69	26.14	6713.92	5997.41	6.50	1.70	501.13	3.20	3.44	0.72	----	----	----	----
Model	6.96	26.14	13.98	12.49	6.50	1.70	5.43	3.20	3.44	0.72	----	----	----	----

clarifier70														
Mode	2735.69	26.14	6713.92	5997.41	6.50	1.70	501.13	3.20	3.44	0.72	----	----	----	----
clarifier70 (U)														
Effluent29	6.96	26.14	13.98	12.49	6.50	1.70	5.43	3.20	3.44	0.72	----	----	----	----

Global Parameters

Common

Name	Default	Value	
Hydrolysis rate [1/d]	2.1000	2.1000	1.0290
Hydrolysis half sat. [-]	0.0600	0.0600	1.0000
External organics hydrolysis rate [1/d]	2.1000	2.1000	1.0290
External organics hydrolysis half sat. [-]	0.0600	0.0600	1.0000
Anoxic hydrolysis factor [-]	0.2800	0.2800	1.0000
Anaerobic hydrolysis factor (AS) [-]	0.0400	0.0400	1.0000
Anaerobic hydrolysis factor (AD) [-]	0.5000	0.5000	1.0000
Adsorption rate of colloids [L/(mgCOD d)]	0.1500	0.1500	1.0290
Ammonification rate [L/(mgCOD d)]	0.0800	0.0800	1.0290
Assimilative nitrate/nitrite reduction rate [1/d]	0.5000	0.5000	1.0000
Endogenous products decay rate [1/d]	0	0	1.0000

Ammonia oxidizing

Name	Default	Value	
Max. spec. growth rate [1/d]	0.9000	0.9000	1.0720
Substrate (NH4) half sat. [mgN/L]	0.7000	0.7000	1.0000
Byproduct NH4 logistic slope [-]	50.0000	50.0000	1.0000

Byproduct NH4 inflection point [mgN/L]	1.4000	1.4000	1.0000
Denite DO half sat. [mg/L]	0.1000	0.1000	1.0000
Denite HNO2 half sat. [mgN/L]	5.000E-6	5.000E-6	1.0000
Aerobic decay rate [1/d]	0.1700	0.1700	1.0290
Anoxic/anaerobic decay rate [1/d]	0.0800	0.0800	1.0290
KiHNO2 [mmol/L]	5.000E-3	5.000E-3	1.0000

Nitrite oxidizing

Name	Default	Value	
Max. spec. growth rate [1/d]	0.7000	0.7000	1.0600
Substrate (NO2) half sat. [mgN/L]	0.1000	0.1000	1.0000
Aerobic decay rate [1/d]	0.1700	0.1700	1.0290
Anoxic/anaerobic decay rate [1/d]	0.0800	0.0800	1.0290
KiNH3 [mmol/L]	0.0750	0.0750	1.0000

Anaerobic ammonia oxidizing

Name	Default	Value	
Max. spec. growth rate [1/d]	0.2000	0.2000	1.1000
Substrate (NH4) half sat. [mgN/L]	2.0000	2.0000	1.0000
Substrate (NO2) half sat. [mgN/L]	1.0000	1.0000	1.0000
Aerobic decay rate [1/d]	0.0190	0.0190	1.0290
Anoxic/anaerobic decay rate [1/d]	9.500E-3	9.500E-3	1.0290
Ki Nitrite [mgN/L]	1000.0000	1000.0000	1.0000
Nitrite sensitivity constant [L / (d mgN)]	0.0160	0.0160	1.0000

Ordinary heterotrophic

Name	Default	Value	
Max. spec. growth rate [1/d]	3.2000	3.2000	1.0290
Substrate half sat. [mgCOD/L]	5.0000	5.0000	1.0000
Anoxic growth factor [-]	0.5000	0.5000	1.0000
Denite N2 producers (NO3 or NO2) [-]	0.5000	0.5000	1.0000
Aerobic decay rate [1/d]	0.6200	0.6200	1.0290
Anoxic decay rate [1/d]	0.2330	0.2330	1.0290
Anaerobic decay rate [1/d]	0.1310	0.1310	1.0290
Fermentation rate [1/d]	1.6000	1.6000	1.0290
Fermentation half sat. [mgCOD/L]	5.0000	5.0000	1.0000
Fermentation growth factor (AS) [-]	0.2500	0.2500	1.0000
Free nitrous acid inhibition [mol/L]	1.000E-7	1.000E-7	1.0000

Heterotrophic on industrial COD

Name	Default	Value	
Maximum specific growth rate on Ind #1 COD [1/d]	4.3000	4.3000	1.0290
Substrate (Ind #1) half sat. [mgCOD/L]	1.0000	1.0000	1.0000
Inhibition coefficient for Ind #1 [mgCOD/L]	60.0000	60.0000	1.0000
Anaerobic growth factor for Ind #1 [mgCOD/L]	0.0500	0.0500	1.0000
Maximum specific growth rate on Ind #2 COD [1/d]	1.5000	1.5000	1.0290
Substrate (Ind #2) half sat. [mgCOD/L]	30.0000	30.0000	1.0000
Inhibition coefficient for Ind #2 [mgCOD/L]	3000.0000	3000.0000	1.0000
Anaerobic growth factor for Ind #2 [mgCOD/L]	0.0500	0.0500	1.0000
Maximum specific growth rate on Ind #3 COD [1/d]	4.3000	4.3000	1.0290
Substrate (Ind #3) half sat. [mgCOD/L]	1.0000	1.0000	1.0000
Inhibition coefficient for Ind #3 COD [mgCOD/L]	60.0000	60.0000	1.0000
Anaerobic growth factor for Ind #3 [mgCOD/L]	0.0500	0.0500	1.0000
Maximum specific growth rate on adsorbed hydrocarbon COD [1/d]	2.0000	2.0000	1.0290
Substrate (adsorbed hydrocarbon) half sat. [-]	0.1500	0.1500	1.0000
Anaerobic growth factor for adsorbed hydrocarbons [mgCOD/L]	0.0100	0.0100	1.0000
Adsorption rate of soluble hydrocarbons [l/(mgCOD d)]	0.2000	0.2000	1.0000

Methylotrophic

Name	Default	Value	
Max. spec. growth rate [1/d]	1.3000	1.3000	1.0720
Methanol half sat. [mgCOD/L]	0.5000	0.5000	1.0000
Denite N2 producers (NO3 or NO2) [-]	0.5000	0.5000	1.0000
Aerobic decay rate [1/d]	0.0400	0.0400	1.0290
Anoxic/anaerobic decay rate [1/d]	0.0300	0.0300	1.0290
Free nitrous acid inhibition [mmol/L]	1.000E-7	1.000E-7	1.0000

Phosphorus accumulating

Name	Default	Value	
Max. spec. growth rate [1/d]	0.9500	0.9500	1.0000
Max. spec. growth rate, P-limited [1/d]	0.4200	0.4200	1.0000
Substrate half sat. [mgCOD(PHB)/mgCOD(Zbp)]	0.1000	0.1000	1.0000
Substrate half sat., P-limited [mgCOD(PHB)/mgCOD(Zbp)]	0.0500	0.0500	1.0000
Magnesium half sat. [mgMg/L]	0.1000	0.1000	1.0000
Cation half sat. [mmol/L]	0.1000	0.1000	1.0000
Calcium half sat. [mgCa/L]	0.1000	0.1000	1.0000
Aerobic/anoxic decay rate [1/d]	0.1000	0.1000	1.0000
Aerobic/anoxic maintenance rate [1/d]	0	0	1.0000
Anaerobic decay rate [1/d]	0.0400	0.0400	1.0000
Anaerobic maintenance rate [1/d]	0	0	1.0000
Sequestration rate [1/d]	4.5000	4.5000	1.0000
Anoxic growth factor [-]	0.3300	0.3300	1.0000

Propionic acetogenic

Name	Default	Value	
Max. spec. growth rate [1/d]	0.2500	0.2500	1.0290
Substrate half sat. [mgCOD/L]	10.0000	10.0000	1.0000
Acetate inhibition [mgCOD/L]	10000.0000	10000.0000	1.0000
Anaerobic decay rate [1/d]	0.0500	0.0500	1.0290
Aerobic/anoxic decay rate [1/d]	0.5200	0.5200	1.0290

Methanogenic

Name	Default	Value	
Acetoclastic max. spec. growth rate [1/d]	0.3000	0.3000	1.0290
H2-utilizing max. spec. growth rate [1/d]	1.4000	1.4000	1.0290
Acetoclastic substrate half sat. [mgCOD/L]	100.0000	100.0000	1.0000
Acetoclastic methanol half sat. [mgCOD/L]	0.5000	0.5000	1.0000
H2-utilizing CO2 half sat. [mmol/L]	0.1000	0.1000	1.0000
H2-utilizing substrate half sat. [mgCOD/L]	1.0000	1.0000	1.0000
H2-utilizing methanol half sat. [mgCOD/L]	0.5000	0.5000	1.0000
Acetoclastic propionic inhibition [mgCOD/L]	10000.0000	10000.0000	1.0000
Acetoclastic anaerobic decay rate [1/d]	0.1300	0.1300	1.0290
Acetoclastic aerobic/anoxic decay rate [1/d]	0.6000	0.6000	1.0290
H2-utilizing anaerobic decay rate [1/d]	0.1300	0.1300	1.0290
H2-utilizing aerobic/anoxic decay rate [1/d]	2.8000	2.8000	1.0290

Sulfur oxidizing

Name	Default	Value	
Maximum specific growth rate (sulfide) [1/d]	0.7500	0.7500	1.0290
Maximum specific growth rate (sulfur) [1/d]	0.1000	0.1000	1.0290
Substrate (H2S) half sat. [mgS/L]	1.0000	1.0000	1.0000
Substrate (sulfur) half sat. [mgS/L]	1.0000	1.0000	1.0000
Anoxic growth factor [-]	0.5000	0.5000	1.0000

Decay rate [1/d]	0.0400	0.0400	1.0290
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Sulfur reducing

Name	Default	Value	
Propionic max. spec. growth rate [1/d]	0.5830	0.5830	1.0350
Propionic acid half sat. [mgCOD/L]	295.0000	295.0000	1.0000
Hydrogen sulfide inhibition coefficient [mgS/L]	185.0000	185.0000	1.0000
Sulfate (SO4=) half sat. [mgS/L]	2.4700	2.4700	1.0000
Decay rate [1/d]	0.0185	0.0185	1.0350
Acetotrophic max. spec. growth rate [1/d]	0.6120	0.6120	1.0350
Acetic acid half sat. [mgCOD/L]	24.0000	24.0000	1.0000
Hydrogen sulfide inhibition coefficient [mgS/L]	164.0000	164.0000	1.0000
Sulfate (SO4=) half sat. [mgS/L]	6.4100	6.4100	1.0000
Decay rate [1/d]	0.0275	0.0275	1.0350
Hydrogenotrophic max. spec. growth rate with SO4= [1/d]	2.8000	2.8000	1.0350
Hydrogenotrophic max. spec. growth rate with S [1/d]	0.1000	0.1000	1.0350
Hydrogen half sat. [mgCOD/L]	0.0700	0.0700	1.0000
Hydrogen sulfide inhibition coefficient [mgS/L]	550.0000	550.0000	1.0000
Sulfate (SO4=) half sat. [mgS/L]	6.4100	6.4100	1.0000
Sulfur (S) half sat. [mgS/L]	50.0000	50.0000	1.0000
Decay rate [1/d]	0.0600	0.0600	1.0350

pH

Name	Default	Value
Ordinary heterotrophic low pH limit [-]	4.0000	4.0000
Ordinary heterotrophic high pH limit [-]	10.0000	10.0000
Methyloctrophic low pH limit [-]	4.0000	4.0000
Methyloctrophic high pH limit [-]	10.0000	10.0000
Autotrophic low pH limit [-]	5.5000	5.5000

Autotrophic high pH limit [-]	9.5000	9.5000
Phosphorus accumulating low pH limit [-]	4.0000	4.0000
Phosphorus accumulating high pH limit [-]	10.0000	10.0000
Ordinary heterotrophic low pH limit (anaerobic) [-]	5.5000	5.5000
Ordinary heterotrophic high pH limit (anaerobic) [-]	8.5000	8.5000
Propionic acetogenic low pH limit [-]	4.0000	4.0000
Propionic acetogenic high pH limit [-]	10.0000	10.0000
Acetoclastic methanogenic low pH limit [-]	5.0000	5.0000
Acetoclastic methanogenic high pH limit [-]	9.0000	9.0000
H2-utilizing methanogenic low pH limit [-]	5.0000	5.0000
H2-utilizing methanogenic high pH limit [-]	9.0000	9.0000

Switches

Name	Default	Value
Ordinary heterotrophic DO half sat. [mgO2/L]	0.1500	0.0500
Phosphorus accumulating DO half sat. [mgO2/L]	0.0500	0.0500
Anoxic/anaerobic NOx half sat. [mgN/L]	0.1500	0.1500
Ammonia oxidizing DO half sat. [mgO2/L]	0.2500	0.2500
Nitrite oxidizing DO half sat. [mgO2/L]	0.5000	0.5000
Anaerobic ammonia oxidizing DO half sat. [mgO2/L]	0.0100	0.0100
Sulfur oxidizing sulfate pathway DO half sat. [mgO2/L]	0.2500	0.2500
Sulfur oxidizing sulfur pathway DO half sat. [mgO2/L]	0.0500	0.0500
Anoxic NO3(->NO2) half sat. [mgN/L]	0.1000	0.1000
Anoxic NO3(->N2) half sat. [mgN/L]	0.0500	0.0500
Anoxic NO2(->N2) half sat. (mgN/L)	0.0100	0.0100
NH3 nutrient half sat. [mgN/L]	5.000E-3	5.000E-3
PolyP half sat. [mgP/mgCOD]	0.0100	0.0100
VFA sequestration half sat. [mgCOD/L]	5.0000	5.0000
P uptake half sat. [mgP/L]	0.1500	0.1500
P nutrient half sat. [mgP/L]	1.000E-3	1.000E-3
Autotrophic CO2 half sat. [mmol/L]	0.1000	0.1000
H2 low/high half sat. [mgCOD/L]	1.0000	1.0000

Propionic acetogenic H2 inhibition [mgCOD/L]	5.0000	5.0000
Synthesis anion/cation half sat. [meq/L]	0.0100	0.0100

Common

Name	Default	Value
Biomass/Endog Ca content (gCa/gCOD)	3.912E-3	3.912E-3
Biomass/Endog Mg content (gMg/gCOD)	3.912E-3	3.912E-3
Biomass/Endog other cations content (mol/gCOD)	5.115E-4	5.115E-4
Biomass/Endog other Anions content (mol/gCOD)	1.410E-4	1.410E-4
N in endogenous residue [mgN/mgCOD]	0.0700	0.0700
P in endogenous residue [mgP/mgCOD]	0.0220	0.0220
Ca content of slowly biodegradable (gCa/gCOD)	3.912E-3	3.912E-3
Mg content of slowly biodegradable (gMg/gCOD)	3.700E-4	3.700E-4
Endogenous residue COD:VSS ratio [mgCOD/mgVSS]	1.4200	1.4200
Particulate substrate COD:VSS ratio [mgCOD/mgVSS]	1.6327	1.4200
Particulate inert COD:VSS ratio [mgCOD/mgVSS]	1.6000	1.4200
Cellulose COD:VSS ratio [mgCOD/mgVSS]	1.4000	1.4000
External organic COD:VSS ratio [mgCOD/mgVSS]	1.6000	1.6000
Molecular weight of other anions [mg/mmol]	35.5000	35.5000
Molecular weight of other cations [mg/mmol]	39.0983	39.1000

Ammonia oxidizing

Name	Default	Value
Yield [mgCOD/mgN]	0.1500	0.1500
Denite NO2 fraction as TEA [-]	0.5000	0.5000
Byproduct NH4 fraction to N2O [-]	2.500E-3	2.500E-3
N in biomass [mgN/mgCOD]	0.0700	0.0700
P in biomass [mgP/mgCOD]	0.0220	0.0220
Fraction to endogenous residue [-]	0.0800	0.0800

COD:VSS ratio [mgCOD/mgVSS]	1.4200	1.4200
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Nitrite oxidizing

Name	Default	Value
Yield [mgCOD/mgN]	0.0900	0.0900
N in biomass [mgN/mgCOD]	0.0700	0.0700
P in biomass [mgP/mgCOD]	0.0220	0.0220
Fraction to endogenous residue [-]	0.0800	0.0800
COD:VSS ratio [mgCOD/mgVSS]	1.4200	1.4200

Anaerobic ammonia oxidizing

Name	Default	Value
Yield [mgCOD/mgN]	0.1140	0.1140
Nitrate production [mgN/mgBiomassCOD]	2.2800	2.2800
N in biomass [mgN/mgCOD]	0.0700	0.0700
P in biomass [mgP/mgCOD]	0.0220	0.0220
Fraction to endogenous residue [-]	0.0800	0.0800
COD:VSS ratio [mgCOD/mgVSS]	1.4200	1.4200

Ordinary heterotrophic

Name	Default	Value
Yield (aerobic) [-]	0.6660	0.6660
Yield (fermentation, low H2) [-]	0.1000	0.1000
Yield (fermentation, high H2) [-]	0.1000	0.1000
H2 yield (fermentation low H2) [-]	0.3500	0.3500
H2 yield (fermentation high H2) [-]	0	0

Propionate yield (fermentation, low H2) [-]	0	0
Propionate yield (fermentation, high H2) [-]	0.7000	0.7000
CO2 yield (fermentation, low H2) [-]	0.7000	0.7000
CO2 yield (fermentation, high H2) [-]	0	0
N in biomass [mgN/mgCOD]	0.0700	0.0700
P in biomass [mgP/mgCOD]	0.0220	0.0220
Endogenous fraction - aerobic [-]	0.0800	0.0800
Endogenous fraction - anoxic [-]	0.1030	0.1030
Endogenous fraction - anaerobic [-]	0.1840	0.1840
COD:VSS ratio [mgCOD/mgVSS]	1.4200	1.4200
Yield (anoxic) [-]	0.5400	0.5400
Yield propionic (aerobic) [-]	0.6400	0.6400
Yield propionic (anoxic) [-]	0.4600	0.4600
Yield acetic (aerobic) [-]	0.6000	0.6000
Yield acetic (anoxic) [-]	0.4300	0.4300
Yield methanol (aerobic) [-]	0.5000	0.5000
Adsorp. max. [-]	1.0000	1.0000
Max fraction to N2O at high FNA over nitrate [-]	0.0500	0.0500
Max fraction to N2O at high FNA over nitrite [-]	0.1000	0.1000

Ordinary heterotrophic on industrial COD

Name	Default	Value
Yield Ind #1 COD (Aerobic) [-]	0.5000	0.5000
Yield Ind #1 COD (Anoxic) [-]	0.4000	0.4000
Yield Ind #1 COD (Anaerobic) [-]	0.0400	0.0400
COD:Mole ratio - Ind #1 COD [gCOD/Mol]	224.0000	224.0000
Yield Ind #2 COD (Aerobic) [-]	0.5000	0.5000
Yield Ind #2 COD (Anoxic) [-]	0.4000	0.4000
Yield Ind #2 COD (Anaerobic) [-]	0.0500	0.0500
COD:Mole ratio - Ind #2 COD [gCOD/Mol]	240.0000	240.0000
Yield on Ind #3 COD (Aerobic) [-]	0.5000	0.5000
Yield on Ind #3 COD (Anoxic) [-]	0.4000	0.4000

Yield on Ind #3 COD (Anaerobic) [-]	0.0400	0.0400
COD:Mole ratio - Ind #3 COD [gCOD/Mol]	288.0000	288.0000
Yield enmeshed hydrocarbons (Aerobic) [-]	0.5000	0.5000
Yield enmeshed hydrocarbons (Anoxic) [-]	0.4000	0.4000
Yield enmeshed hydrocarbons (Anaerobic) [-]	0.0400	0.0400
COD:Mole ratio - Hydrocarbon COD [gCOD/Mol]	336.0000	336.0000
Hydrocarbon COD:VSS ratio [mgCOD/mgVSS]	3.2000	3.2000
Max. hydrocarbon adsorp. ratio [-]	1.0000	1.0000
Yield of Ind #1 on Ind #3 COD (Aerobic) [-]	0	0
Yield of Ind #1 on Ind #3 COD (Anoxic) [-]	0	0
Hydrocarbon Yield on Ind #3 COD (Aerobic) [-]	0	0
Hydrocarbon Yield on Ind #3 COD (Anoxic) [-]	0	0

Methylotrophic

Name	Default	Value
Yield (anoxic) [-]	0.4000	0.4000
N in biomass [mgN/mgCOD]	0.0700	0.0700
P in biomass [mgP/mgCOD]	0.0220	0.0220
Fraction to endogenous residue [-]	0.0800	0.0800
COD:VSS ratio [mgCOD/mgVSS]	1.4200	1.4200
Max fraction to N2O at high FNA over nitrate [-]	0.1000	0.1000
Max fraction to N2O at high FNA over nitrite [-]	0.1500	0.1500

Phosphorus accumulating

Name	Default	Value
Yield (aerobic) [-]	0.6390	0.6390
Yield (anoxic) [-]	0.5200	0.5200
Aerobic P/PHA uptake [mgP/mgCOD]	0.9300	0.9300
Anoxic P/PHA uptake [mgP/mgCOD]	0.3500	0.3500

Yield of PHA on Ac sequestration [-]	0.8890	0.8890
N in biomass [mgN/mgCOD]	0.0700	0.0700
N in sol. inert [mgN/mgCOD]	0.0700	0.0700
P in biomass [mgP/mgCOD]	0.0220	0.0220
Fraction to endogenous part. [-]	0.2500	0.2500
Inert fraction of endogenous sol. [-]	0.2000	0.2000
P/Ac release ratio [mgP/mgCOD]	0.5100	0.5100
COD:VSS ratio [mgCOD/mgVSS]	1.4200	1.4200
Yield of low PP [-]	0.9400	0.9400
Mg to P mole ratio in polyphosphate [mmolMg/mmolP]	0.3000	0.3000
Cation to P mole ratio in polyphosphate [meq/mmolP]	0.1500	0.1500
Ca to P mole ratio in polyphosphate [mmolCa/mmolP]	0.0500	0.0500

Propionic acetogenic

Name	Default	Value
Yield [-]	0.1000	0.1000
H2 yield [-]	0.4000	0.4000
CO2 yield [-]	1.0000	1.0000
N in biomass [mgN/mgCOD]	0.0700	0.0700
P in biomass [mgP/mgCOD]	0.0220	0.0220
Fraction to endogenous residue [-]	0.0800	0.0800
COD:VSS ratio [mgCOD/mgVSS]	1.4200	1.4200

Methanogenic

Name	Default	Value
Acetoclastic yield [-]	0.1000	0.1000
Acetoclastic yield on methanol[-]	0.1000	0.1000
H2-utilizing yield [-]	0.1000	0.1000
H2-utilizing yield on methanol [-]	0.1000	0.1000

N in acetoclastic biomass [mgN/mgCOD]	0.0700	0.0700
N in H2-utilizing biomass [mgN/mgCOD]	0.0700	0.0700
P in acetoclastic biomass [mgP/mgCOD]	0.0220	0.0220
P in H2-utilizing biomass [mgP/mgCOD]	0.0220	0.0220
Acetoclastic fraction to endog. residue [-]	0.0800	0.0800
H2-utilizing fraction to endog. residue [-]	0.0800	0.0800
Acetoclastic COD:VSS ratio [mgCOD/mgVSS]	1.4200	1.4200
H2-utilizing COD:VSS ratio [mgCOD/mgVSS]	1.4200	1.4200

Sulfur oxidizing

Name	Default	Value
Yield (aerobic) [mgCOD/mgS]	0.5000	0.5000
Yield (Anoxic) [mgCOD/mgS]	0.3500	0.3500
N in biomass [mgN/mgCOD]	0.0700	0.0700
P in biomass [mgP/mgCOD]	0.0220	0.0220
Fraction to endogenous residue [-]	0.0800	0.0800
COD:VSS ratio [mgCOD/mgVSS]	1.4200	1.4200

Sulfur reducing

Name	Default	Value
Yield [mgCOD/mg H2 COD]	0.0712	0.0712
Yield [mgCOD/mg Ac COD]	0.0470	0.0470
Yield [mgCOD/mg Pr COD]	0.0384	0.0384
N in biomass [mgN/mgCOD]	0.0700	0.0700
P in biomass [mgP/mgCOD]	0.0220	0.0220
Fraction to endogenous residue [-]	0.0800	0.0800
COD:VSS ratio [mgCOD/mgVSS]	1.4200	1.4200

General

Name	Default	Value
Tank head loss per metre of length (from flow) [m/m]	2.500E-3	2.500E-3
BOD calculation rate constant for X _{sc} degradation [1/d]	0.5000	0.5000
BOD calculation rate constant for X _{sp} (and hydrocarbon) degradation [1/d]	0.5000	0.5000
BOD calculation rate constant for X _{eo} degradation [1/d]	0.5000	0.5000

Heating fuel/Chemical Costs

Name	Default	Value
Methanol [\$/gal]	1.6656	1.6656
Ferric chloride [\$/lb Fe]	0.5307	0.5307
Ferric sulfate [\$/lb Fe]	0.3583	0.3583
Ferrous chloride [\$/lb Fe]	0.2767	0.2767
Ferrous sulfate [\$/lb Fe]	1.0750	1.0750
Aluminum sulfate [\$/lb Al]	0.7666	0.7666
Aluminum chloride [\$/lb Al]	0.8981	0.8981
Poly Aluminum Chloride (PAC) [\$/lb Al]	0.5307	0.5307
Natural gas [\$/MMBTU]	3.1652	3.1652
Heating oil [\$/gal]	1.8927	1.8927
Diesel [\$/gal]	2.6498	2.6498
Custom fuel [\$/gal]	3.7854	3.7854
Biogas sale price [\$/MMBTU]	2.1101	2.1101

Anaerobic digester

Name	Default	Value
Bubble rise velocity (anaerobic digester) [cm/s]	23.9000	23.9000
Bubble Sauter mean diameter (anaerobic digester) [cm]	0.3500	0.3500

Anaerobic digester gas hold-up factor []	1.0000	1.0000
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Combined Heat and Power (CHP) engine

Name	Default	Value
Methane heat of combustion [kJ/mole]	800.0000	800.0000
Hydrogen heat of combustion [kJ/mole]	240.0000	240.0000
CHP engine heat price [\$/kWh]	0	0
CHP engine power price [\$/kWh]	0.1500	0.1500

Calorific values of heating fuels

Name	Default	Value
Calorific value of natural gas [BTU/lb]	20636	20636
Calorific value of heating fuel oil [BTU/lb]	18057	18057
Calorific value of diesel [BTU/lb]	19776	19776
Calorific value of custom fuel [BTU/lb]	13758	13758

Density of liquid heating fuels

Name	Default	Value
Density of heating fuel oil [lb/ft3]	56	56
Density of diesel [lb/ft3]	55	55
Density of custom fuel [lb/ft3]	49	49

Mass transfer

Name	Default	Value	
KI for H2 [m/d]	17.0000	17.0000	1.0240
KI for CO2 [m/d]	10.0000	10.0000	1.0240
KI for NH3 [m/d]	1.0000	1.0000	1.0240
KI for CH4 [m/d]	8.0000	8.0000	1.0240
KI for N2 [m/d]	15.0000	15.0000	1.0240
KI for N2O [m/d]	8.0000	8.0000	1.0240
KI for H2S [m/d]	1.0000	1.0000	1.0240
KI for Ind #1 COD [m/d]	0	0	1.0240
KI for Ind #2 COD [m/d]	0.5000	0.5000	1.0240
KI for Ind #3 COD [m/d]	0	0	1.0240
KI for O2 [m/d]	13.0000	13.0000	1.0240

Henry's law constants

Name	Default	Value	
CO2 [M/atm]	3.4000E-2	3.4000E-2	2400.0000
O2 [M/atm]	1.3000E-3	1.3000E-3	1500.0000
N2 [M/atm]	6.5000E-4	6.5000E-4	1300.0000
N2O [M/atm]	2.5000E-2	2.5000E-2	2600.0000
NH3 [M/atm]	5.8000E+1	5.8000E+1	4100.0000
CH4 [M/atm]	1.4000E-3	1.4000E-3	1600.0000
H2 [M/atm]	7.8000E-4	7.8000E-4	500.0000
H2S [M/Atm]	1.0000E-1	1.0000E-1	2200.0000
Ind 1 [M/Atm]	1.9000E+3	1.9000E+3	7300.0000
Ind 2 [M/Atm]	1.8000E-1	1.8000E-1	2200.0000
Ind 3 [M/Atm]	1.5000E-1	1.5000E-1	1900.0000

Properties constants

Name	Default	Value
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K in Viscosity = $K e^{-(Ea/RT)}$ [Pa s]	6.849E-7	6.849E-7
Ea in Viscosity = $K e^{-(Ea/RT)}$ [J/mol]	1.780E+4	1.780E+4
Y in ML Viscosity = H2O viscosity * (1+A*MLSS^Y) [-]	1.0000	1.0000
A in ML Viscosity = H2O viscosity * (1+A*MLSS^Y) [m3/g]	1.000E-7	1.000E-7
A in ML Density = H2O density + A*MLSS [(kg/m3)/(g/m3)]	3.248E-4	3.248E-4
A in Antoine equn. [T in K, P in Bar {NIST}]	5.2000	5.2039
B in Antoine equn. [T in K, P in Bar {NIST}]	1734.0000	1733.9260
C in Antoine equn. [T in K, P in Bar {NIST}]	-39.5000	-39.4800

Metal salt solution densities

Name	Default	Value
Ferric chloride solution density [kg/m3]	3820.0000	3820.0000
Ferric sulfate solution density [kg/m3]	4800.0000	4800.0000
Ferrous chloride solution density [kg/m3]	3160.0000	3160.0000
Ferrous sulfate solution density [kg/m3]	1150.0000	1150.0000
Aluminum sulfate solution density [kg/m3]	1950.0000	1950.0000
Aluminum chloride solution density [kg/m3]	2480.0000	2480.0000

Mineral precipitation rates

Name	Default	Value	
Vivianite precipitation rate [L/(mol d)]	1.000E+5	1.000E+5	1.0240
Vivianite redissolution rate [L/(mol d)]	1.000E+5	1.000E+5	1.0240
Vivianite half sat. [mgTSS/L]	0.0100	0.0100	1.0000
FeS precipitation rate [L/(mol d)]	1000.0000	1000.0000	1.0240
FeS redissolution rate [L/(mol d)]	10.0000	10.0000	1.0240
FeS half sat. [mgTSS/L]	0.1000	0.1000	1.0000
Struvite precipitation rate [L ² /(mol ² d)]	3.000E+10	3.000E+10	1.0240
Struvite redissolution rate [L ² /(mol ² d)]	3.000E+11	3.000E+11	1.0240
Struvite half sat. [mgTSS/L]	1.0000	1.0000	1.0000

Brushite precipitation rate [L/(mol d)]	1.000E+6	1.000E+6	1.0000
Brushite redissolution rate [L/(mol d)]	10000.0000	10000.0000	1.0000
Brushite half sat. [mgTSS/L]	1.0000	1.0000	1.0000
HAP precipitation rate [g/d]	5.000E-4	5.000E-4	1.0000

Mineral precipitation constants

Name	Default	Value
Vivianite solubility product [mol/L]^5	1.710E-36	1.710E-36
FeS solubility product [mol/L]^2	4.258E-4	4.258E-4
Struvite solubility product [mol/L]^3	6.918E-14	6.918E-14
Brushite solubility product [mol/L]^2	2.490E-7	2.490E-7

Fe rates

Name	Default	Value	
A in aging rate = $A * \exp(-G/B)$ [1/d]	16.1550	16.1550	1.0000
B in aging rate = $A * \exp(-G/B)$ [1/s]	57.3000	57.3000	1.0000
HFO(L) aging rate factor	2.500E-4	2.500E-4	1.0000
HFO(H) with H2PO4- bound aging factor []	1.000E-5	1.000E-5	1.0000
HFO(L) with H2PO4- bound aging factor []	0.4000	0.4000	1.0000
H2PO4- coprecipitation rate [mol/(L d)]	1.500E-9	1.500E-9	1.0000
H2PO4- Adsorption rate [mol/(L d)]	2.000E-11	2.000E-11	1.0000
H+ competition for HFO(H) protonation sites [L/(mmol . d)]	1000.0000	1000.0000	1.0000
H+ competition for HFO(L) protonation sites [L/(mmol . d)]	100.0000	100.0000	1.0000

Fe constants

Name	Default	Value
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Ferric active site factor(high) [{mol Sites}/{mol HFO(H)}]	4.0000	2.0000
Ferric active site factor(low) [{mol Sites}/{mol HFO(L)}]	2.4000	1.2000
H+ competition level for Fe(OH)3 [mol/L]	7.000E-7	7.000E-7
Equilibrium constant for FeOH3-H2PO4- [{mf HFO(H).H2PO4-}/{(mol H2PO4-){mf HFO(H)}^2}]	2.000E-9	2.000E-9
Colloidal COD removed with Ferric [gCOD/Fe active site]	80.0000	130.0000
Minimum residual P level with iron addition [mgP/L]	0.0150	0.0150
HFO(H) with H2PO4- P release factor	10000.0000	10000.0000
HFO(L) with H2PO4- P release factor	10000.0000	10000.0000

Fe RedOx rates

Name	Default	Value	
Iron reduction using acetic acid	1.000E-7	1.000E-7	1.0000
Half Sat. acetic acid	0.5000	0.5000	1.0000
Iron reduction using propionic acid	1.000E-7	1.000E-7	1.0000
Half Sat. propionic acid	0.5000	0.5000	1.0000
Iron reduction using dissolved hydrogen gas	1.000E-7	1.000E-7	1.0000
Half Sat. dissolved hydrogen gas	0.5000	0.5000	1.0000
Iron reduction using hydrogen sulfide	5.000E-5	5.000E-5	1.0000
Half Sat. hydrogen sulfide	0.5000	0.5000	1.0000
Iron oxidation rate (aerobic)	1.000E-3	1.000E-3	1.0000
Abiotic iron reduction using acetic acid	2.000E-5	2.000E-5	1.0000
Abiotic iron reduction using propionic acid	2.000E-5	2.000E-5	1.0000
Abiotic iron reduction using dissolved hydrogen gas	2.000E-5	2.000E-5	1.0000
Abiotic iron reduction using hydrogen sulfide	2.000E-5	2.000E-5	1.0000
Abiotic iron oxidation rate (aerobic)	1.0000	1.0000	1.0000

CEPT rates

Name	Default	Value	
HFO colloidal adsorption rate	1.0000	1.0000	1.0000

Residual Xsc for adsorption to HFO	5.0000	5.0000	1.0000
Slope for Xsc residual	1.0000	1.0000	1.0000
HAO colloidal adsorption rate	1.0000	1.0000	1.0000
Residual Xsc for adsorption to HAO	5.0000	5.0000	1.0000
Slope for Xsc residual	1.0000	1.0000	1.0000

Al rates

Name	Default	Value	
A in aging rate = $A * \exp(-G/B)$ [1/d]	16.1550	16.1550	1.0000
B in aging rate = $A * \exp(-G/B)$ [1/s]	57.3000	57.3000	1.0000
HAO(L) aging rate factor	2.500E-4	2.500E-4	1.0000
HAO(H) with H2PO4- bound aging factor []	1.000E-5	1.000E-5	1.0000
HAO(L) with H2PO4- bound aging factor []	0.4000	0.4000	1.0000
H2PO4- coprecipitation rate [mol/(L d)]	1.500E-9	1.500E-9	1.0000
H2PO4- Adsorption rate [mol/(L d)]	1.000E-9	1.000E-9	1.0000

Al constants

Name	Default	Value
Al active site factor(high) [$\frac{\text{mol Sites}}{\text{mol HAO(H)}}$]	3.0000	3.0000
Al active site factor(low) [$\frac{\text{mol Sites}}{\text{mol HAO(L)}}$]	1.5000	1.5000
Equilibrium constant for $\text{AlOH}_3\text{-H}_2\text{PO}_4\text{-}$ [$\frac{\text{mf HAO(H).H}_2\text{PO}_4}{(\text{mol H}_2\text{PO}_4\text{-})\{\text{mf HAO(H)}\}^2}$]	8.000E-10	8.000E-10
Colloidal COD removed with Al [gCOD/Al active site]	30.0000	30.0000
Minimum residual P level with Al addition [mgP/L]	0.0150	0.0150
HAO(H) with H2PO4- P release factor	10000.0000	10000.0000
HAO(L) with H2PO4- P release factor	10000.0000	10000.0000

Pipe and pump parameters

Name	Default	Value
Static head [ft]	0.8202	0.8202
Pipe length (headloss calc.s) [ft]	164.0420	164.0420
Pipe inside diameter [in]	19.68504	19.68504
K(fittings) - Total minor losses K	5.0000	5.0000
Pipe roughness [in]	0.00787	0.00787
'A' in overall pump efficiency = $A + B*Q + C*(Q^2)$ [-]	0.8500	0.8500
'B' in overall pump efficiency = $A + B*Q + C*(Q^2)$ [-]/(mgd)]	0	0
'C' in overall pump efficiency = $A + B*Q + C*(Q^2)$ [-]/(mgd)^2]	0	0

Fittings and loss coefficients ('K' values)

Name	Default	Value
Pipe entrance (bellmouth)	0.0500	1.0000
90° bend	0.7500	5.0000
45° bend	0.3000	2.0000
Butterfly valve (open)	0.3000	1.0000
Non-return valve	1.0000	0
Outlet (bellmouth)	0.2000	1.0000

Aeration

Name	Default	Value
Surface pressure [kPa]	101.3250	101.3250
Fractional effective saturation depth (Fed) [-]	0.3250	0.3250
Supply gas CO2 content [vol. %]	0.0400	0.0350
Supply gas O2 [vol. %]	20.9500	20.9500
Off-gas CO2 [vol. %]	2.0000	2.0000
Off-gas O2 [vol. %]	18.8000	18.8000
Off-gas H2 [vol. %]	0	0

Off-gas NH3 [vol. %]	0	0
Off-gas CH4 [vol. %]	0	0
Off-gas N2O [vol. %]	0	0
Surface turbulence factor [-]	2.0000	2.0000
Set point controller gain []	1.0000	1.0000

MABR Membrane effective diffusivities

Name	Default	Value	
O2 [m2/s]	2.500E-9	2.500E-9	1.0000
N2 [m2/s]	1.900E-9	1.900E-9	1.0000
CO2 [m2/s]	1.960E-9	1.960E-9	1.0000
H2 [m2/s]	5.850E-9	5.850E-9	1.0000
CH4 [m2/s]	1.963E-9	1.963E-9	1.0000
NH3 [m2/s]	2.000E-9	2.000E-9	1.0000
N2O [m2/s]	1.607E-9	1.607E-9	1.0000
H2S [m2/s]	1.530E-9	1.530E-9	1.0000
Ind 1 [m2/s]	7.240E-10	7.240E-10	1.0000
Ind 2 [m2/s]	8.900E-10	8.900E-10	1.0000
Ind 3 [m2/s]	7.960E-10	7.960E-10	1.0000

MABR Membrane transfer factors

Name	Default	Value	
O2 []	1.0000	1.0000	1.0000
N2 []	1.0000	1.0000	1.0000
CO2 []	1.0000	1.0000	1.0000
H2 []	1.0000	1.0000	1.0000
CH4 []	1.0000	1.0000	1.0000
NH3 []	1.0000	1.0000	1.0000
N2O []	1.0000	1.0000	1.0000

H2S []	1.0000	1.0000	1.0000
Ind 1 []	1.0000	1.0000	1.0000
Ind 2 []	1.0000	1.0000	1.0000
Ind 3 []	1.0000	1.0000	1.0000

Blower

Name	Default	Value
Intake filter pressure drop [psi]	0.5076	0.5076
Pressure drop through distribution system (piping/valves) [psi]	0.4351	0.4351
Adiabatic/polytropic compression exponent (1.4 for adiabatic)	1.4000	1.4000
'A' in blower efficiency = $A + B \cdot Q_a + C \cdot (Q_a^2)$ [-]	0.7500	0.7500
'B' in blower efficiency = $A + B \cdot Q_a + C \cdot (Q_a^2)$ [-]/(ft ³ /min (20C, 1 atm))]	0	0
'C' in blower efficiency = $A + B \cdot Q_a + C \cdot (Q_a^2)$ [-]/(ft ³ /min (20C, 1 atm)) ²]	0	0

Diffuser

Name	Default	Value
k1 in $C = k1(PC)^{0.25} + k2$	1.2400	1.2400
k2 in $C = k1(PC)^{0.25} + k2$	0.8960	0.8960
Y in $Kla = C Usg^Y - Usg$ in [m ³ /(m ² d)]	0.8880	0.8880
Area of one diffuser [ft ²]	0.4413	0.4413
Diffuser mounting height [ft]	0.8202	0.8202
Min. air flow rate per diffuser ft ³ /min (20C, 1 atm)	0.2943	0.2943
Max. air flow rate per diffuser ft ³ /min (20C, 1 atm)	5.8858	5.8858
'A' in diffuser pressure drop = $A + B \cdot (Q_a/Diff) + C \cdot (Q_a/Diff)^2$ [psi]	0.4351	0.4351
'B' in diffuser pressure drop = $A + B \cdot (Q_a/Diff) + C \cdot (Q_a/Diff)^2$ [psi/(ft ³ /min (20C, 1 atm))]	0	0
'C' in diffuser pressure drop = $A + B \cdot (Q_a/Diff) + C \cdot (Q_a/Diff)^2$ [psi/(ft ³ /min (20C, 1 atm)) ²]	0	0

Surface aerators

Name	Default	Value
Surface aerator Std. oxygen transfer rate [lb O / (hp hr)]	2.46697	2.46697

Modified Vesilind

Name	Default	Value
Maximum Vesilind settling velocity (Vo) [ft/min]	0.387	0.355
Vesilind hindered zone settling parameter (K) [L/g]	0.370	0.336
Clarification switching function [mg/L]	100.000	100.000
Specified TSS conc. for height calc. [mg/L]	2500.000	2500.000
Maximum compactability constant [mg/L]	15000.000	15000.000
Maximum compactability slope [L/mg]	0.010	0.010

Double exponential

Name	Default	Value
Maximum Vesilind settling velocity (Vo) [ft/min]	0.934	0.934
Maximum (practical) settling velocity (Vo') [ft/min]	0.615	0.615
Hindered zone settling parameter (Kh) [L/g]	0.400	0.400
Flocculent zone settling parameter (Kf) [L/g]	2.500	2.500
Maximum non-settleable TSS [mg/L]	20.0000	20.0000
Non-settleable fraction [-]	1.000E-3	1.000E-3
Specified TSS conc. for height calc. [mg/L]	2500.0000	2500.0000

Emission factors

Name	Default	Value
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Carbon dioxide equivalence of nitrous oxide	296.0000	296.0000
Carbon dioxide equivalence of methane	23.0000	23.0000

Biofilm general

Name	Default	Value	
Attachment rate [g / (m2 d)]	8.0000	80.0000	1.0000
Attachment TSS half sat. [mg/L]	100.0000	100.0000	1.0000
Detachment rate [g/(m3 d)]	8000.0000	8.000E+4	1.0000
Solids movement factor []	10.0000	10.0000	1.0000
Diffusion neta []	0.8000	0.8000	1.0000
Thin film limit [mm]	0.5000	0.5000	1.0000
Thick film limit [mm]	3.0000	3.0000	1.0000
Assumed Film thickness for tank volume correction (temp independent) [mm]	1.2500	0.7500	1.0000
Film surface area to media area ratio - Max.[]	1.0000	1.0000	1.0000
Minimum biofilm conc. for streamer formation [gTSS/m2]	4.0000	4.0000	1.0000

Maximum biofilm concentrations [mg/L]

Name	Default	Value	
Biomass - Ordinary heterotrophic	5.000E+4	5.000E+4	1.0000
Biomass - Methylotrophic	5.000E+4	5.000E+4	1.0000
Biomass - Ammonia oxidizing	1.000E+5	1.000E+5	1.0000
Biomass - Nitrite oxidizing	1.000E+5	1.000E+5	1.0000
Biomass - Anaerobic ammonia oxidizing	5.000E+4	5.000E+4	1.0000
Biomass - Phosphorus accumulating	5.000E+4	5.000E+4	1.0000
Biomass - Propionic acetogenic	5.000E+4	5.000E+4	1.0000
Biomass - Acetoclastic methanogenic	5.000E+4	5.000E+4	1.0000
Biomass - Hydrogenotrophic methanogenic	5.000E+4	5.000E+4	1.0000
Biomass - Endogenous products	3.000E+4	3.000E+4	1.0000
CODp - Slowly degradable particulate	5000.0000	5000.0000	1.0000

CODp - Slowly degradable colloidal	4000.0000	4000.0000	1.0000
CODp - Degradable external organics	5000.0000	5000.0000	1.0000
CODp - Undegradable non-cellulose	5000.0000	5000.0000	1.0000
CODp - Undegradable cellulose	5000.0000	5000.0000	1.0000
N - Particulate degradable organic	0	0	1.0000
P - Particulate degradable organic	0	0	1.0000
N - Particulate degradable external organics	0	0	1.0000
P - Particulate degradable external organics	0	0	1.0000
N - Particulate undegradable	0	0	1.0000
P - Particulate undegradable	0	0	1.0000
CODp - Stored PHA	5000.0000	5000.0000	1.0000
P - Releasable stored polyP	1.150E+6	1.150E+6	1.0000
P - Unreleasable stored polyP	1.150E+6	1.150E+6	1.0000
CODs - Complex readily degradable	0	0	1.0000
CODs - Acetate	0	0	1.0000
CODs - Propionate	0	0	1.0000
CODs - Methanol	0	0	1.0000
Gas - Dissolved hydrogen	0	0	1.0000
Gas - Dissolved methane	0	0	1.0000
N - Ammonia	0	0	1.0000
N - Soluble degradable organic	0	0	1.0000
Gas - Dissolved nitrous oxide	0	0	1.0000
N - Nitrite	0	0	1.0000
N - Nitrate	0	0	1.0000
Gas - Dissolved nitrogen	0	0	1.0000
P - Soluble phosphate	0	0	1.0000
CODs - Undegradable	0	0	1.0000
N - Soluble undegradable organic	0	0	1.0000
Influent inorganic suspended solids	1.300E+6	1.300E+6	1.0000
Precipitate - Struvite	8.500E+5	8.500E+5	1.0000
Precipitate - Brushite	1.165E+6	1.165E+6	1.0000
Precipitate - Hydroxy - apatite	1.600E+6	1.600E+6	1.0000
Precipitate - Vivianite	1.340E+6	1.340E+6	1.0000
HFO - High surface	5.000E+4	5.000E+4	1.0000
HFO - Low surface	5.000E+4	5.000E+4	1.0000

HFO - High with H2PO4- adsorbed	5.000E+4	5.000E+4	1.0000
HFO - Low with H2PO4- adsorbed	5.000E+4	5.000E+4	1.0000
HFO - Aged	5.000E+4	5.000E+4	1.0000
HFO - Low with H+ adsorbed	5.000E+4	5.000E+4	1.0000
HFO - High with H+ adsorbed	5.000E+4	5.000E+4	1.0000
HAO - High surface	5.000E+4	5.000E+4	1.0000
HAO - Low surface	5.000E+4	5.000E+4	1.0000
HAO - High with H2PO4- adsorbed	5.000E+4	5.000E+4	1.0000
HAO - Low with H2PO4- adsorbed	5.000E+4	5.000E+4	1.0000
HAO - Aged	5.000E+4	5.000E+4	1.0000
P - Bound on aged HMO	5.000E+4	5.000E+4	1.0000
Metal soluble - Magnesium	0	0	1.0000
Metal soluble - Calcium	0	0	1.0000
Metal soluble - Ferric	0	0	1.0000
Metal soluble - Ferrous	0	0	1.0000
Metal soluble - Aluminum	0	0	1.0000
Other Cations (strong bases)	0	0	1.0000
Other Anions (strong acids)	0	0	1.0000
Gas - Dissolved total CO2	0	0	1.0000
User defined - UD1	0	0	1.0000
User defined - UD2	0	0	1.0000
User defined - UD3	5.000E+4	5.000E+4	1.0000
User defined - UD4	5.000E+4	5.000E+4	1.0000
Biomass - Sulfur oxidizing	1.000E+5	1.000E+5	1.0000
Biomass - Sulfur reducing propionic acetogenic	5.000E+4	5.000E+4	1.0000
Biomass - Sulfur reducing acetotrophic	5.000E+4	5.000E+4	1.0000
Biomass - Sulfur reducing hydrogenotrophic	1.000E+5	1.000E+5	1.0000
Gas - Dissolved total sulfides	0	0	1.0000
S - Soluble sulfate	0	0	1.0000
S - Particulate elemental sulfur	5.000E+4	5.000E+4	1.0000
Precipitate - Ferrous sulfide	5.000E+4	5.000E+4	1.0000
CODp - Adsorbed hydrocarbon	5.000E+4	5.000E+4	1.0000
CODs - Degradable volatile ind. #1	0	0	1.0000
CODs - Degradable volatile ind. #2	0	0	1.0000
CODs - Degradable volatile ind. #3	0	0	1.0000

CODs - Soluble hydrocarbon	0	0	1.0000
Gas - Dissolved oxygen	0	0	1.0000

Effective diffusivities [m2/s]

Name	Default	Value	
Biomass - Ordinary heterotrophic	5.000E-14	5.000E-14	1.0290
Biomass - Methylothetic	5.000E-14	5.000E-14	1.0290
Biomass - Ammonia oxidizing	5.000E-14	5.000E-14	1.0290
Biomass - Nitrite oxidizing	5.000E-14	5.000E-14	1.0290
Biomass - Anaerobic ammonia oxidizing	5.000E-14	5.000E-14	1.0290
Biomass - Phosphorus accumulating	5.000E-14	5.000E-14	1.0290
Biomass - Propionic acetogenic	5.000E-14	5.000E-14	1.0290
Biomass - Acetoclastic methanogenic	5.000E-14	5.000E-14	1.0290
Biomass - Hydrogenotrophic methanogenic	5.000E-14	5.000E-14	1.0290
Biomass - Endogenous products	5.000E-14	5.000E-14	1.0290
CODp - Slowly degradable particulate	5.000E-14	5.000E-14	1.0290
CODp - Slowly degradable colloidal	5.000E-10	5.000E-10	1.0290
CODp - Degradable external organics	5.000E-14	5.000E-14	1.0290
CODp - Undegradable non-cellulose	5.000E-14	5.000E-14	1.0290
CODp - Undegradable cellulose	5.000E-14	5.000E-14	1.0290
N - Particulate degradable organic	5.000E-14	5.000E-14	1.0290
P - Particulate degradable organic	5.000E-14	5.000E-14	1.0290
N - Particulate degradable external organics	5.000E-14	5.000E-14	1.0290
P - Particulate degradable external organics	5.000E-14	5.000E-14	1.0290
N - Particulate undegradable	5.000E-14	5.000E-14	1.0290
P - Particulate undegradable	5.000E-14	5.000E-14	1.0290
CODp - Stored PHA	5.000E-14	5.000E-14	1.0290
P - Releasable stored polyP	5.000E-14	5.000E-14	1.0290
P - Unreleasable stored polyP	5.000E-14	5.000E-14	1.0290
CODs - Complex readily degradable	6.900E-10	6.900E-10	1.0290
CODs - Acetate	1.240E-9	1.240E-9	1.0290
CODs - Propionate	8.300E-10	8.300E-10	1.0290

CODs - Methanol	1.600E-9	1.600E-9	1.0290
Gas - Dissolved hydrogen	5.850E-9	5.850E-9	1.0290
Gas - Dissolved methane	1.963E-9	1.963E-9	1.0290
N - Ammonia	2.000E-9	2.000E-9	1.0290
N - Soluble degradable organic	1.370E-9	1.370E-9	1.0290
Gas - Dissolved nitrous oxide	1.607E-9	1.607E-9	1.0290
N - Nitrite	2.980E-9	2.980E-9	1.0290
N - Nitrate	2.980E-9	2.980E-9	1.0290
Gas - Dissolved nitrogen	1.900E-9	1.900E-9	1.0290
P - Soluble phosphate	2.000E-9	2.000E-9	1.0290
CODs - Undegradable	6.900E-10	6.900E-10	1.0290
N - Soluble undegradable organic	6.850E-10	6.850E-10	1.0290
Influent inorganic suspended solids	5.000E-14	5.000E-14	1.0290
Precipitate - Struvite	5.000E-14	5.000E-14	1.0290
Precipitate - Brushite	5.000E-14	5.000E-14	1.0290
Precipitate - Hydroxy - apatite	5.000E-14	5.000E-14	1.0290
Precipitate - Vivianite	5.000E-14	5.000E-14	1.0290
HFO - High surface	5.000E-14	5.000E-14	1.0290
HFO - Low surface	5.000E-14	5.000E-14	1.0290
HFO - High with H ₂ PO ₄ - adsorbed	5.000E-14	5.000E-14	1.0290
HFO - Low with H ₂ PO ₄ - adsorbed	5.000E-14	5.000E-14	1.0290
HFO - Aged	5.000E-14	5.000E-14	1.0290
HFO - Low with H ⁺ adsorbed	5.000E-14	5.000E-14	1.0290
HFO - High with H ⁺ adsorbed	5.000E-14	5.000E-14	1.0290
HAO - High surface	5.000E-14	5.000E-14	1.0290
HAO - Low surface	5.000E-14	5.000E-14	1.0290
HAO - High with H ₂ PO ₄ - adsorbed	5.000E-14	5.000E-14	1.0290
HAO - Low with H ₂ PO ₄ - adsorbed	5.000E-14	5.000E-14	1.0290
HAO - Aged	5.000E-14	5.000E-14	1.0290
P - Bound on aged HMO	5.000E-14	5.000E-14	1.0290
Metal soluble - Magnesium	7.200E-10	7.200E-10	1.0290
Metal soluble - Calcium	7.200E-10	7.200E-10	1.0290
Metal soluble - Ferric	4.800E-10	4.800E-10	1.0290
Metal soluble - Ferrous	4.800E-10	4.800E-10	1.0290
Metal soluble - Aluminum	4.800E-10	4.800E-10	1.0290

Other Cations (strong bases)	1.440E-9	1.440E-9	1.0290
Other Anions (strong acids)	1.440E-9	1.440E-9	1.0290
Gas - Dissolved total CO2	1.960E-9	1.960E-9	1.0290
User defined - UD1	6.900E-10	6.900E-10	1.0290
User defined - UD2	6.900E-10	6.900E-10	1.0290
User defined - UD3	5.000E-14	5.000E-14	1.0290
User defined - UD4	5.000E-14	5.000E-14	1.0290
Biomass - Sulfur oxidizing	5.000E-14	5.000E-14	1.0290
Biomass - Sulfur reducing propionic acetogenic	5.000E-14	5.000E-14	1.0290
Biomass - Sulfur reducing acetotrophic	5.000E-14	5.000E-14	1.0290
Biomass - Sulfur reducing hydrogenotrophic	5.000E-14	5.000E-14	1.0290
Gas - Dissolved total sulfides	1.530E-9	1.530E-9	1.0290
S - Soluble sulfate	2.130E-10	2.130E-10	1.0290
S - Particulate elemental sulfur	5.000E-14	5.000E-14	1.0290
Precipitate - Ferrous sulfide	5.000E-14	5.000E-14	1.0290
CODp - Adsorbed hydrocarbon	5.000E-14	5.000E-14	1.0290
CODs - Degradable volatile ind. #1	7.240E-10	7.240E-10	1.0290
CODs - Degradable volatile ind. #2	8.900E-10	8.900E-10	1.0290
CODs - Degradable volatile ind. #3	7.960E-10	7.960E-10	1.0290
CODs - Soluble hydrocarbon	7.120E-10	7.120E-10	1.0290
Gas - Dissolved oxygen	2.500E-9	2.500E-9	1.0290

EPS Strength coefficients []

Name	Default	Value	
Biomass - Ordinary heterotrophic	1.0000	1.0000	1.0000
Biomass - Methylotrophic	1.0000	1.0000	1.0000
Biomass - Ammonia oxidizing	5.0000	5.0000	1.0000
Biomass - Nitrite oxidizing	25.0000	25.0000	1.0000
Biomass - Anaerobic ammonia oxidizing	10.0000	10.0000	1.0000
Biomass - Phosphorus accumulating	1.0000	1.0000	1.0000
Biomass - Propionic acetogenic	1.0000	1.0000	1.0000
Biomass - Acetoclastic methanogenic	1.0000	1.0000	1.0000

Biomass - Hydrogenotrophic methanogenic	1.0000	1.0000	1.0000
Biomass - Endogenous products	1.0000	1.0000	1.0000
CODp - Slowly degradable particulate	1.0000	1.0000	1.0000
CODp - Slowly degradable colloidal	1.0000	1.0000	1.0000
CODp - Degradable external organics	1.0000	1.0000	1.0000
CODp - Undegradable non-cellulose	1.0000	1.0000	1.0000
CODp - Undegradable cellulose	1.0000	1.0000	1.0000
N - Particulate degradable organic	1.0000	1.0000	1.0000
P - Particulate degradable organic	1.0000	1.0000	1.0000
N - Particulate degradable external organics	1.0000	1.0000	1.0000
P - Particulate degradable external organics	1.0000	1.0000	1.0000
N - Particulate undegradable	1.0000	1.0000	1.0000
P - Particulate undegradable	1.0000	1.0000	1.0000
CODp - Stored PHA	1.0000	1.0000	1.0000
P - Releasable stored polyP	1.0000	1.0000	1.0000
P - Unreleasable stored polyP	1.0000	1.0000	1.0000
CODs - Complex readily degradable	0	0	1.0000
CODs - Acetate	0	0	1.0000
CODs - Propionate	0	0	1.0000
CODs - Methanol	0	0	1.0000
Gas - Dissolved hydrogen	0	0	1.0000
Gas - Dissolved methane	0	0	1.0000
N - Ammonia	0	0	1.0000
N - Soluble degradable organic	0	0	1.0000
Gas - Dissolved nitrous oxide	0	0	1.0000
N - Nitrite	0	0	1.0000
N - Nitrate	0	0	1.0000
Gas - Dissolved nitrogen	0	0	1.0000
P - Soluble phosphate	0	0	1.0000
CODs - Undegradable	0	0	1.0000
N - Soluble undegradable organic	0	0	1.0000
Influent inorganic suspended solids	0.3300	0.3300	1.0000
Precipitate - Struvite	1.0000	1.0000	1.0000
Precipitate - Brushite	1.0000	1.0000	1.0000
Precipitate - Hydroxy - apatite	1.0000	1.0000	1.0000

Precipitate - Vivianite	1.0000	1.0000	1.0000
HFO - High surface	1.0000	1.0000	1.0000
HFO - Low surface	1.0000	1.0000	1.0000
HFO - High with H ₂ PO ₄ - adsorbed	1.0000	1.0000	1.0000
HFO - Low with H ₂ PO ₄ - adsorbed	1.0000	1.0000	1.0000
HFO - Aged	1.0000	1.0000	1.0000
HFO - Low with H ⁺ adsorbed	1.0000	1.0000	1.0000
HFO - High with H ⁺ adsorbed	1.0000	1.0000	1.0000
HAO - High surface	1.0000	1.0000	1.0000
HAO - Low surface	1.0000	1.0000	1.0000
HAO - High with H ₂ PO ₄ - adsorbed	1.0000	1.0000	1.0000
HAO - Low with H ₂ PO ₄ - adsorbed	1.0000	1.0000	1.0000
HAO - Aged	1.0000	1.0000	1.0000
P - Bound on aged HMO	1.0000	1.0000	1.0000
Metal soluble - Magnesium	0	0	1.0000
Metal soluble - Calcium	0	0	1.0000
Metal soluble - Ferric	0	0	1.0000
Metal soluble - Ferrous	0	0	1.0000
Metal soluble - Aluminum	0	0	1.0000
Other Cations (strong bases)	0	0	1.0000
Other Anions (strong acids)	0	0	1.0000
Gas - Dissolved total CO ₂	0	0	1.0000
User defined - UD1	0	0	1.0000
User defined - UD2	0	0	1.0000
User defined - UD3	1.0000	1.0000	1.0000
User defined - UD4	1.0000	1.0000	1.0000
Biomass - Sulfur oxidizing	1.0000	1.0000	1.0000
Biomass - Sulfur reducing propionic acetogenic	1.0000	1.0000	1.0000
Biomass - Sulfur reducing acetotrophic	1.0000	1.0000	1.0000
Biomass - Sulfur reducing hydrogenotrophic	1.0000	1.0000	1.0000
Gas - Dissolved total sulfides	0	0	1.0000
S - Soluble sulfate	0	0	1.0000
S - Particulate elemental sulfur	1.0000	1.0000	1.0000
Precipitate - Ferrous sulfide	1.0000	1.0000	1.0000
CODp - Adsorbed hydrocarbon	1.0000	1.0000	1.0000

CODs - Degradable volatile ind. #1	0	0	1.0000
CODs - Degradable volatile ind. #2	0	0	1.0000
CODs - Degradable volatile ind. #3	0	0	1.0000
CODs - Soluble hydrocarbon	0	0	1.0000
Gas - Dissolved oxygen	0	0	1.0000

Steady state solution

Elements	Flow [mgd]	Temperature [deg. C]	BOD - Total Carbonaceous [mg/L]	BOD - Filtered Carbonaceous [mg/L]	COD - Total [mg/L]	COD - F [mg/L]
Influent - BOD49	2.76	11.00	164.00	55.05	342.27	106.86
Anoxic 1	5.52	11.00	1278.58	7.15	3948.72	33.78
Anoxic 2	5.52	11.00	1276.83	3.77	3947.29	29.22
Swing	5.52	11.00	1273.24	2.04	3941.20	25.81
Aerobic 1	5.52	11.00	1254.63	1.28	3912.19	24.15
Model clarifier5	1.38	11.00	6.77	1.28	41.16	24.15
Model clarifier5 (U)	1.38	11.00	2501.75	1.28	7780.90	24.15
Model clarifier70	1.38	11.00	6.77	1.28	41.16	24.15

Elements	Flow [mgd]	Temperature [deg. C]	BOD - Total Carbonaceous [mg/L]	BOD - Filtered Carbonaceous [mg/L]	COD - Total [mg/L]	COD - F [mg/L]
Model clarifier70 (U)	1.38	11.00	2501.75	1.28	7780.90	24.15
Effluent29	2.76	11.00	6.77	1.28	41.16	24.15

Elements	Total suspended solids [mg/L]	Volatile suspended solids [mg/L]	pH []	Alkalinity [mmol/L]	N - Total Kjeldahl Nitrogen [mgN/L]	N - Amn [mgN/L]
Influent - BOD49	186.00	166.00	7.10	2.00	28.00	20.59
Anoxic 1	3145.91	2762.77	6.76	1.98	235.72	8.20
Anoxic 2	3148.13	2764.97	6.78	2.04	235.72	8.38
Swing	3146.58	2763.09	6.66	1.95	235.17	7.50
Aerobic 1	3128.54	2743.82	6.44	1.46	231.96	3.57
Model clarifier5	13.68	12.00	6.44	1.46	5.69	3.57
Model clarifier5 (U)	6241.54	5474.00	6.44	1.46	458.09	3.57
Model clarifier70	13.68	12.00	6.44	1.46	5.69	3.57
Model clarifier70 (U)	6241.54	5474.00	6.44	1.46	458.09	3.57
Effluent29	13.68	12.00	6.44	1.46	5.69	3.57

Elements	N - Nitrite [mgN/L]	N - Nitrate [mgN/L]	Air flow rate [ft3/min (20C, 1 atm)]	OTR [lb/hr]	OUR - Total [mgO/L/hr]	SOTR [lb/hr]
Influent - BOD49	0	0	-----	-----	-----	-----
Anoxic 1	0.79	0.03	0	0	0	0
Anoxic 2	0.01	0.00	0	0	0	0
Swing	0.47	0.06	198.93	17.45	43.27	72.55
Aerobic 1	3.00	0.54	750.79	76.26	35.50	292.62
Model clarifier5	3.00	0.54	-----	-----	-----	-----
Model clarifier5 (U)	3.00	0.54	-----	-----	-----	-----
Model clarifier70	3.00	0.54	-----	-----	-----	-----
Model clarifier70 (U)	3.00	0.54	-----	-----	-----	-----
Effluent29	3.00	0.54	-----	-----	-----	-----

Elements	Alpha []
Influent - BOD49	-----
Anoxic 1	0.50
Anoxic 2	0.50

Elements	Alpha []
Swing	0.36
Aerobic 1	0.39
Model clarifier5	-----
Model clarifier5 (U)	-----
Model clarifier70	-----
Model clarifier70 (U)	-----
Effluent29	-----

BioWin user and configuration data

Project details

Project name: Unknown Project ref.: BW1

Plant name: Unknown

User name: Jason.Flowers

Created: 5/18/2018

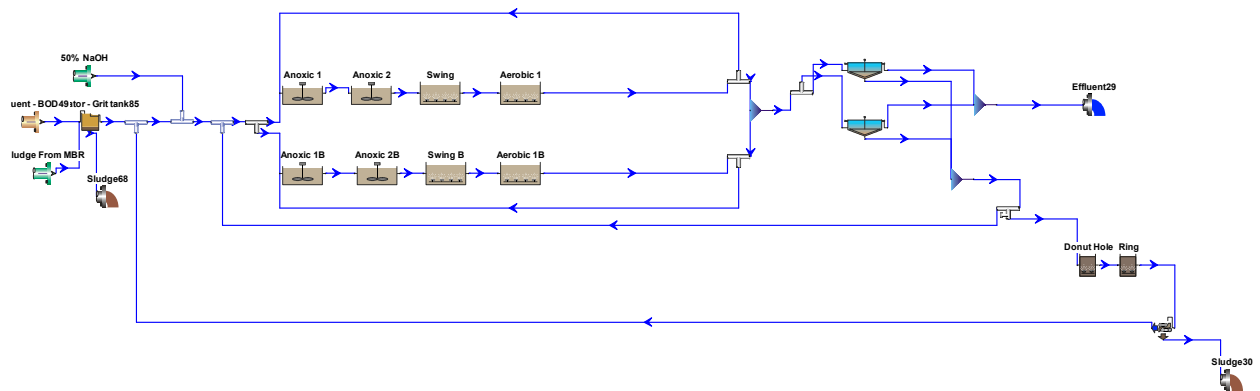
Saved: 9/16/2020

Steady state solution

Target SRT: 6.00 days SRT #0: 5.99 days

Temperature: 22.0°C

Flowsheet



Configuration information for all Digester - Aerobic units

Physical data

Element name	Volume [Mil. Gal]	Area [ft2]	Depth [ft]	# of diffusers
Donut Hole	0.0900	802.0834	15.000	182
Ring	0.1800	1604.1668	15.000	363

Operating data Average (flow/time weighted as required)

Element name	Average DO Setpoint [mg/L]
Donut Hole	2.0
Ring	2.0

Configuration information for all Bioreactor units

Physical data

Element name	Volume [Mil. Gal]	Area [ft2]	Depth [ft]	# of diffusers
Anoxic 1	0.0377	278.7476	18.080	Un-aerated
Anoxic 2	0.0377	278.7476	18.080	Un-aerated
Swing	0.0377	278.7476	18.080	63
Aerobic 1	0.2574	1903.1735	18.080	431
Anoxic 1B	0.0377	278.7476	18.080	Un-aerated
Anoxic 2B	0.0377	278.7476	18.080	Un-aerated
Swing B	0.0377	278.7476	18.080	63
Aerobic 1B	0.2574	1903.1735	18.080	431

Operating data Average (flow/time weighted as required)

Element name	Average DO Setpoint [mg/L]
Anoxic 1	0
Anoxic 2	0
Swing	2.0
Aerobic 1	2.0
Anoxic 1B	0
Anoxic 2B	0
Swing B	2.0
Aerobic 1B	2.0

Aeration equipment parameters

Element name	k_1 in C = $k_1(PC)^{0.25} + k_2$	k_2 in C = $k_1(PC)^{0.25} + k_2$	Y in $Kla = C Usg - Y$ in $[m^3/(m^2 d)]$	Area of one diffuser	Diffuser mounting height	Min. air flow rate per diffuser (20C, 1 atm)	Max. air flow rate per diffuser (20C, 1 atm)	'A' in diffuser pressure drop = $A + B*(Qa/Diff) + C*(Qa/Diff)^2$	'B' in diffuser pressure drop = $A + B*(Qa/Diff) + C*(Qa/Diff)^2$	'C' in diffuser pressure drop = $A + B*(Qa/Diff) + C*(Qa/Diff)^2$
Anoxic 1	1.2400	0.8960	0.8880	0.4413	0.2500	0.2943	5.8858	3.0000	0	0
Anoxic 2	1.2400	0.8960	0.8880	0.4413	0.2500	0.2943	5.8858	3.0000	0	0
Swing	1.2400	0.8960	0.8880	0.4413	0.2500	0.2943	5.8858	3.0000	0	0
Aerobic 1	1.2400	0.8960	0.8880	0.4413	0.2500	0.2943	5.8858	3.0000	0	0
Anoxic 1B	1.2400	0.8960	0.8880	0.4413	0.2500	0.2943	5.8858	3.0000	0	0
Anoxic 2B	1.2400	0.8960	0.8880	0.4413	0.2500	0.2943	5.8858	3.0000	0	0
Swing B	1.2400	0.8960	0.8880	0.4413	0.2500	0.2943	5.8858	3.0000	0	0
Aerobic 1B	1.2400	0.8960	0.8880	0.4413	0.2500	0.2943	5.8858	3.0000	0	0

Configuration information for all Influent - BOD units

Operating data Average (flow/time weighted as required)

Element name	Influent - BOD49
Flow	0.94
BOD - Total Carbonaceous mgBOD/L	350.00
Volatile suspended solids mg/L	302.00
Total suspended solids mg/L	338.00
N - Total Kjeldahl Nitrogen mgN/L	58.50
P - Total P mgP/L	5.10
S - Total S mgS/L	0
N - Nitrate mgN/L	0
pH	7.10
Alkalinity mmol/L	4.00
Metal soluble - Calcium mg/L	11.10
Metal soluble - Magnesium mg/L	3.20
Gas - Dissolved oxygen mg/L	0

Element name	Influent - BOD49
Fbs - Readily biodegradable (including Acetate) [gCOD/g of total COD]	0.1410
Fac - Acetate [gCOD/g of readily biodegradable COD]	0.1418
Fxsp - Non-colloidal slowly biodegradable [gCOD/g of slowly degradable COD]	0.6770
Fus - Unbiodegradable soluble [gCOD/g of total COD]	0.0650
Fup - Unbiodegradable particulate [gCOD/g of total COD]	0.1300
Fcel - Cellulose fraction of unbiodegradable particulate [gCOD/gCOD]	0.5000
Fna - Ammonia [gNH3-N/gTKN]	0.7353
Fnox - Particulate organic nitrogen [gN/g Organic N]	0.5000
Fnus - Soluble unbiodegradable TKN [gN/gTKN]	0.0200
FupN - N:COD ratio for unbiodegradable part. COD [gN/gCOD]	0.0700
Fpo4 - Phosphate [gPO4-P/gTP]	0.4717
FupP - P:COD ratio for unbiodegradable part. COD [gP/gCOD]	0.0220

Fsr - Reduced sulfur [H2S] [gS/gS]	0
FZbh - Ordinary heterotrophic COD fraction [gCOD/g of total COD]	0.0200
FZbm - Methylotrophic COD fraction [gCOD/g of total COD]	1.000E-4
FZao - Ammonia oxidizing COD fraction [gCOD/g of total COD]	1.000E-4
FZno - Nitrite oxidizing COD fraction [gCOD/g of total COD]	1.000E-4
FZaao - Anaerobic ammonia oxidizing COD fraction [gCOD/g of total COD]	1.000E-4
FZppa - Phosphorus accumulating COD fraction [gCOD/g of total COD]	1.000E-4
FZpa - Propionic acetogenic COD fraction [gCOD/g of total COD]	1.000E-4
FZam - Acetoclastic methanogenic COD fraction [gCOD/g of total COD]	1.000E-4
FZhm - Hydrogenotrophic methanogenic COD fraction [gCOD/g of total COD]	1.000E-4
FZso - Sulfur oxidizing COD fraction [gCOD/g of total COD]	1.000E-4
FZsrpa - Sulfur reducing propionic acetogenic COD fraction [gCOD/g of total COD]	1.000E-4
FZsra - Sulfur reducing acetotrophic COD fraction [gCOD/g of total COD]	1.000E-4
FZsrh - Sulfur reducing hydrogenotrophic COD fraction [gCOD/g of total COD]	1.000E-4
FZe - Endogenous products COD fraction [gCOD/g of total COD]	0

Configuration information for all Clarifier - Model units

Physical data

Element name	Volume[Mil. Gal]	Area[ft2]	Depth[ft]	Number of layers	Top feed layer	Feed Layers
Model clarifier5	0.2570	2290.0000	15.000	10	6	1
Model clarifier70	0.2570	2290.0000	15.000	10	6	1

Operating data Average (flow/time weighted as required)

Element name	Split method	Average Split specification
Model clarifier5	Flow paced	50.00 %
Model clarifier70	Flow paced	50.00 %

Element name	Average Temperature	Reactive
Model clarifier5	Uses global setting	No
Model clarifier70	Uses global setting	No

Configuration information for all Separator - Grit tank units

Physical data

Element name	Volume [Mil. Gal]	Area [ft2]	Depth [ft]
Separator - Grit tank85	4.000E-3	89.1204	6.000

Operating data Average (flow/time weighted as required)

Element name	Split method	Average Split specification
Separator - Grit tank85	Flowrate [Under]	0.0002642

Element name	Percent removal	Blanket fraction
Separator - Grit tank85	65.00	0.10

Configuration information for all Separator - Dewatering unit units

Operating data Average (flow/time weighted as required)

Element name	Split method	Average Split specification
Separator - Dewatering unit83	Fraction	0.03

Element name	Percent removal
Separator - Dewatering unit83	90.00

Configuration information for all Splitter units

Operating data Average (flow/time weighted as required)

Element name	Split method	Average Split specification
Splitter11	Flow paced	100.00 %
Splitter12	Flow paced	100.00 %
Splitter13	Fraction	0.50
Splitter40	Flowrate [Side]	0.0617499999485417
Splitter32	Fraction	0.50

Configuration information for all Influent - State variable units

Operating data Average (flow/time weighted as required)

Element name	50% NaOH	Sludge From MBR
Biomass - Ordinary heterotrophic [mgCOD/L]	0	3337.76
Biomass - Methylothetic [mgCOD/L]	0	1.70
Biomass - Ammonia oxidizing [mgCOD/L]	0	48.02
Biomass - Nitrite oxidizing [mgCOD/L]	0	28.69

Biomass - Anaerobic ammonia oxidizing [mgCOD/L]	0	2.36
Biomass - Phosphorus accumulating [mgCOD/L]	0	11.15
Biomass - Propionic acetogenic [mgCOD/L]	0	0.35
Biomass - Acetoclastic methanogenic [mgCOD/L]	0	0.30
Biomass - Hydrogenotrophic methanogenic [mgCOD/L]	0	0.08
Biomass - Endogenous products [mgCOD/L]	0	2379.38
CODp - Slowly degradable particulate [mgCOD/L]	0	186.16
CODp - Slowly degradable colloidal [mgCOD/L]	0	0.02
CODp - Degradable external organics [mgCOD/L]	0	0
CODp - Undegradable non-cellulose [mgCOD/L]	0	1872.51
CODp - Undegradable cellulose [mgCOD/L]	0	1872.51
N - Particulate degradable organic [mgN/L]	0	8.06
P - Particulate degradable organic [mgP/L]	0	2.73
N - Particulate degradable external organics [mgN/L]	0	0
P - Particulate degradable external organics [mgP/L]	0	0
N - Particulate undegradable [mgN/L]	0	131.08
P - Particulate undegradable [mgP/L]	0	41.20
CODp - Stored PHA [mgCOD/L]	0	0.27
P - Releasable stored polyP [mgP/L]	0	3.62
P - Unreleasable stored polyP [mgP/L]	0	0.81
CODs - Complex readily degradable [mgCOD/L]	0	1.43
CODs - Acetate [mgCOD/L]	0	0
CODs - Propionate [mgCOD/L]	0	0
CODs - Methanol [mgCOD/L]	0	0
Gas - Dissolved hydrogen [mgCOD/L]	0	0.03
Gas - Dissolved methane [mg/L]	0	0
N - Ammonia [mgN/L]	0	0.15
N - Soluble degradable organic [mgN/L]	0	0.53
Gas - Dissolved nitrous oxide [mgN/L]	0	0
N - Nitrite [mgN/L]	0	0.07
N - Nitrate [mgN/L]	0	4.19
Gas - Dissolved nitrogen [mgN/L]	0	15.70
P - Soluble phosphate [mgP/L]	0	1.94
CODs - Undegradable [mgCOD/L]	0	47.53
N - Soluble undegradable organic [mgN/L]	0	0.80

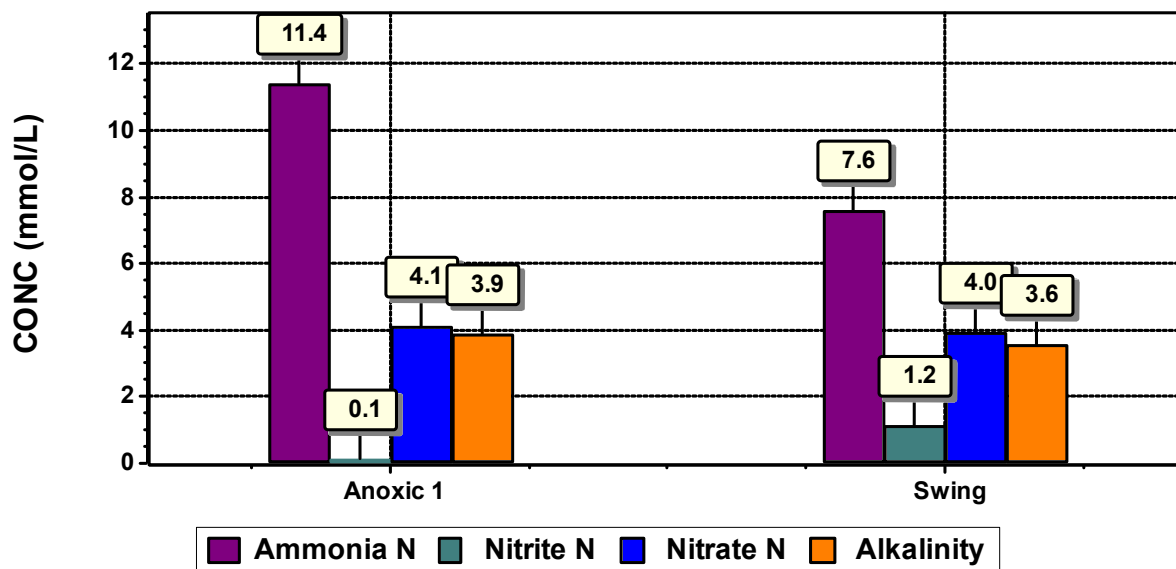
Influent inorganic suspended solids [mgISS/L]	0	1314.50
Precipitate - Struvite [mgISS/L]	0	0
Precipitate - Brushite [mgISS/L]	0	0
Precipitate - Hydroxy - apatite [mgISS/L]	0	0
Precipitate - Vivianite [mgISS/L]	0	0
HFO - High surface [mg/L]	0	0
HFO - Low surface [mg/L]	0	0
HFO - High with H ₂ PO ₄ - adsorbed [mg/L]	0	0
HFO - Low with H ₂ PO ₄ - adsorbed [mg/L]	0	0
HFO - Aged [mg/L]	0	0
HFO - Low with H ⁺ adsorbed [mg/L]	0	0
HFO - High with H ⁺ adsorbed [mg/L]	0	0
HAO - High surface [mg/L]	0	0
HAO - Low surface [mg/L]	0	0
HAO - High with H ₂ PO ₄ - adsorbed [mg/L]	0	0
HAO - Low with H ₂ PO ₄ - adsorbed [mg/L]	0	0
HAO - Aged [mg/L]	0	0
P - Bound on aged HMO [mgP/L]	0	0
Metal soluble - Magnesium [mg/L]	0	14.64
Metal soluble - Calcium [mg/L]	0	81.20
Metal soluble - Ferric [mg/L]	0	0
Metal soluble - Ferrous [mg/L]	0	0
Metal soluble - Aluminum [mg/L]	0	0
Other Cations (strong bases) [meq/L]	12500.00	147.74
Other Anions (strong acids) [meq/L]	0	4.98
Gas - Dissolved total CO ₂ [mmol/L]	0	145.75
User defined - UD1 [mg/L]	0	0
User defined - UD2 [mg/L]	0	0
User defined - UD3 [mgVSS/L]	0	0
User defined - UD4 [mgISS/L]	0	0
Biomass - Sulfur oxidizing [mgCOD/L]	0	1.76
Biomass - Sulfur reducing propionic acetogenic [mgCOD/L]	0	2.22
Biomass - Sulfur reducing acetotrophic [mgCOD/L]	0	2.00
Biomass - Sulfur reducing hydrogenotrophic [mgCOD/L]	0	1.47
Gas - Dissolved total sulfides [mgS/L]	0	0

S - Soluble sulfate [mgS/L]	0	0
S - Particulate elemental sulfur [mgS/L]	0	0
Precipitate - Ferrous sulfide [mgISS/L]	0	0
CODp - Adsorbed hydrocarbon [mgCOD/L]	0	0
CODs - Degradable volatile ind. #1 [mgCOD/L]	0	0
CODs - Degradable volatile ind. #2 [mgCOD/L]	0	0
CODs - Degradable volatile ind. #3 [mgCOD/L]	0	0
CODs - Soluble hydrocarbon [mgCOD/L]	0	0
Gas - Dissolved oxygen [mg/L]	0	2.00
Flow	0	0.0152

BioWin Album

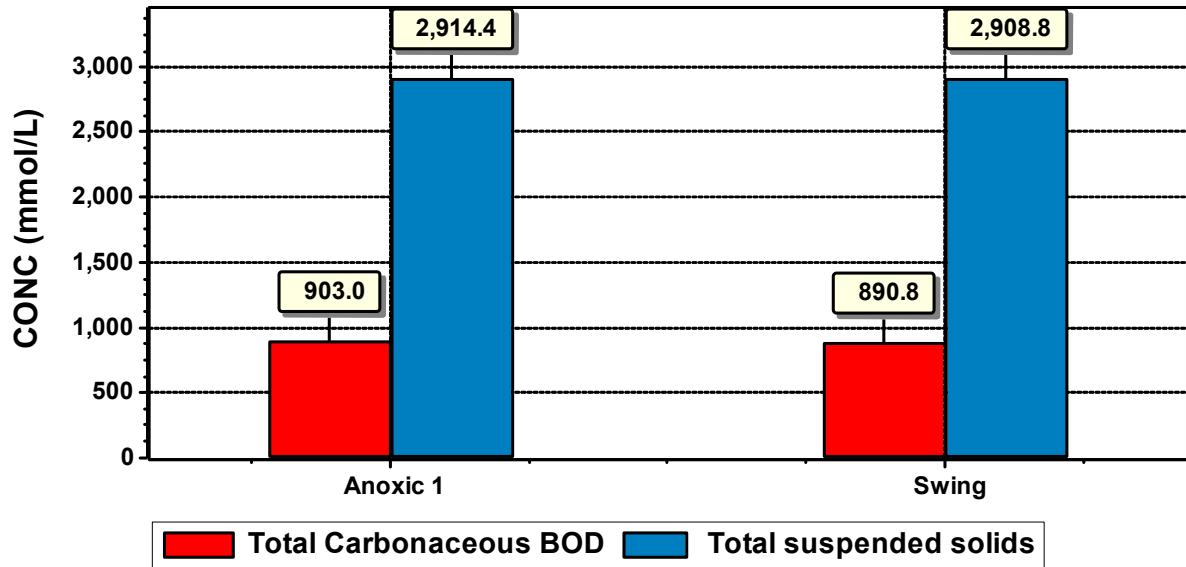
Album page - Nitrogen species

Chart



Album page - BOD_TSS

Chart

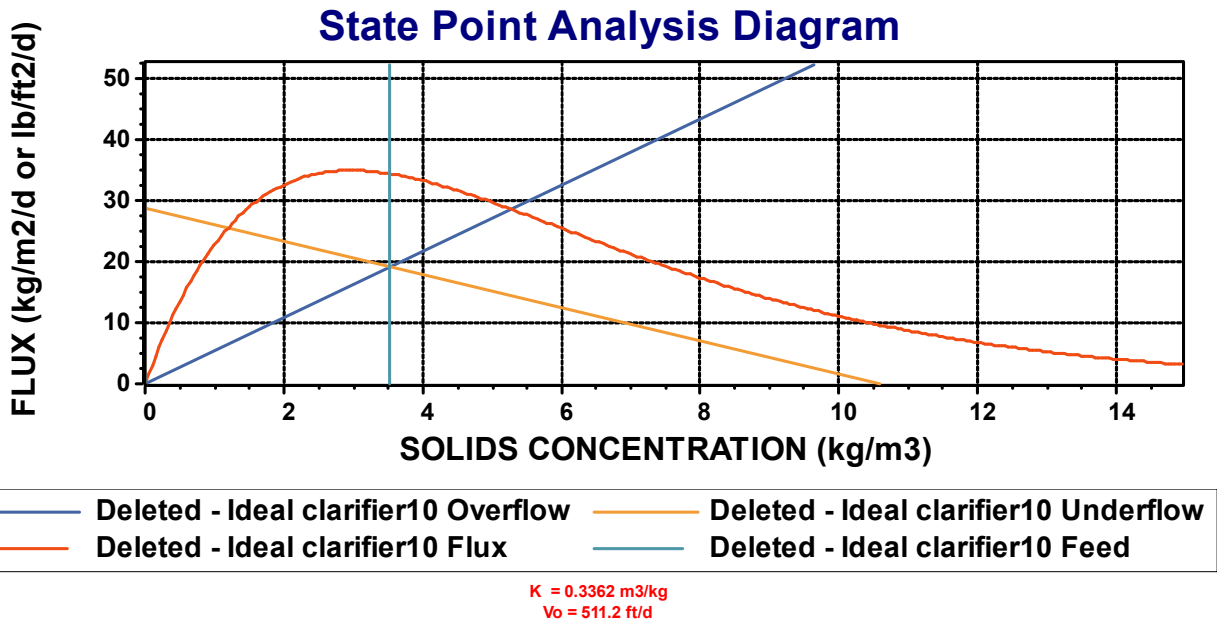


Album page - Page 3

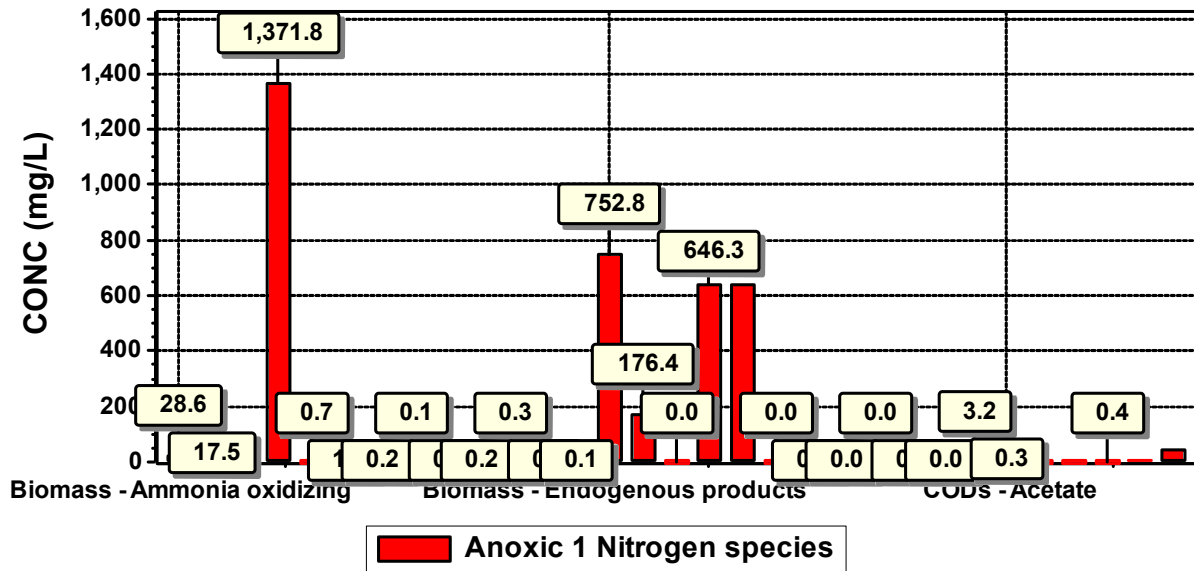
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Album page - Page 4

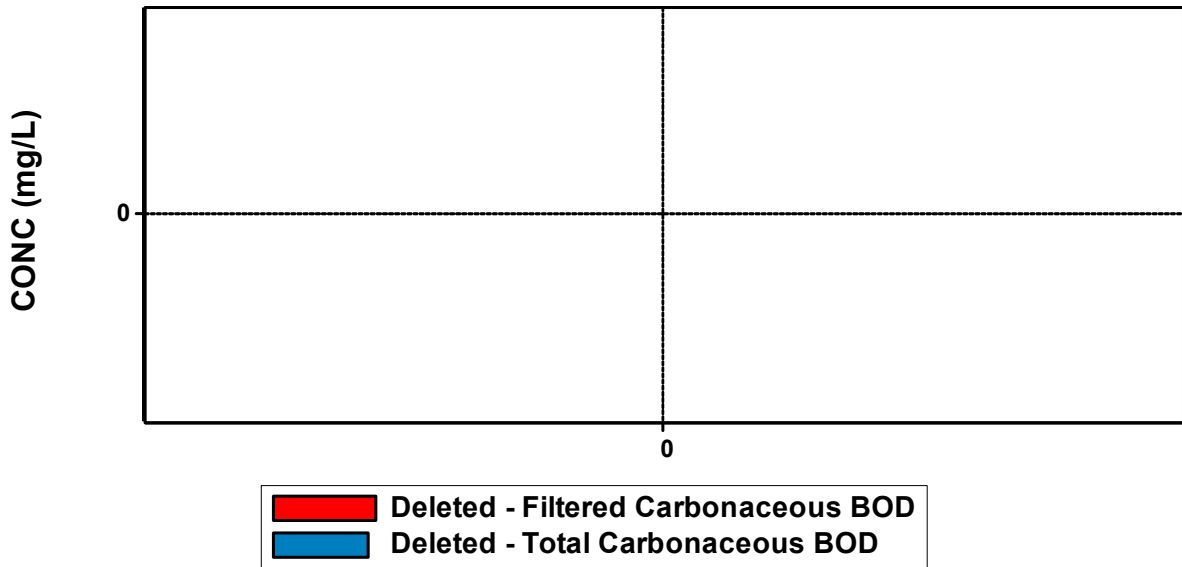


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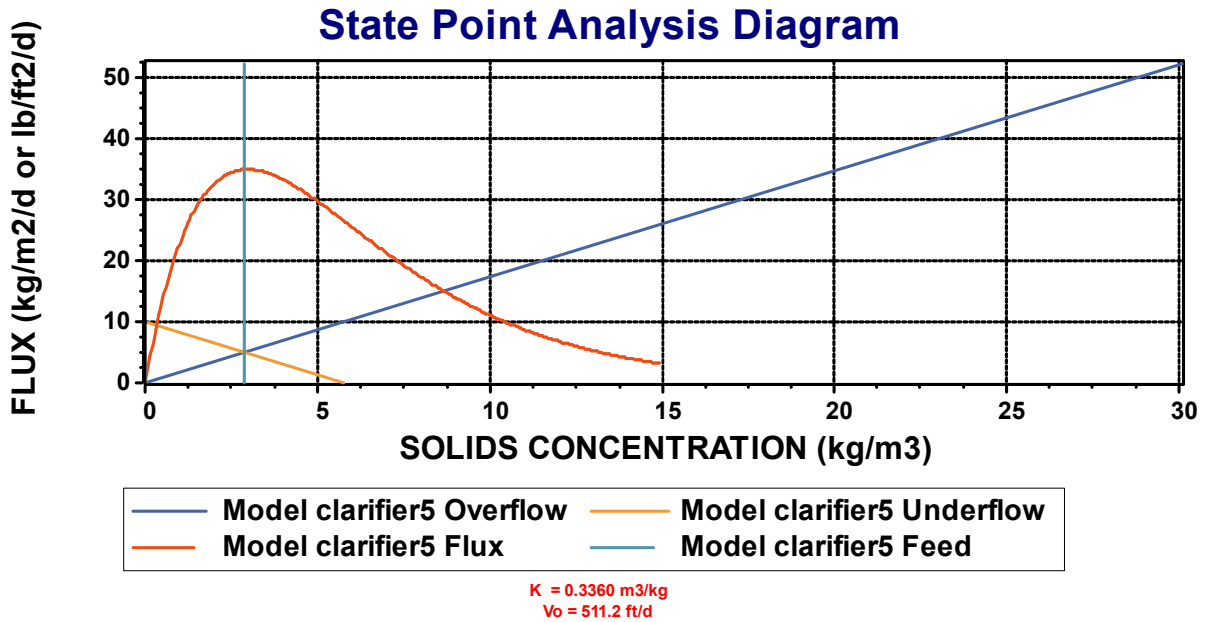


Album page - Page 7

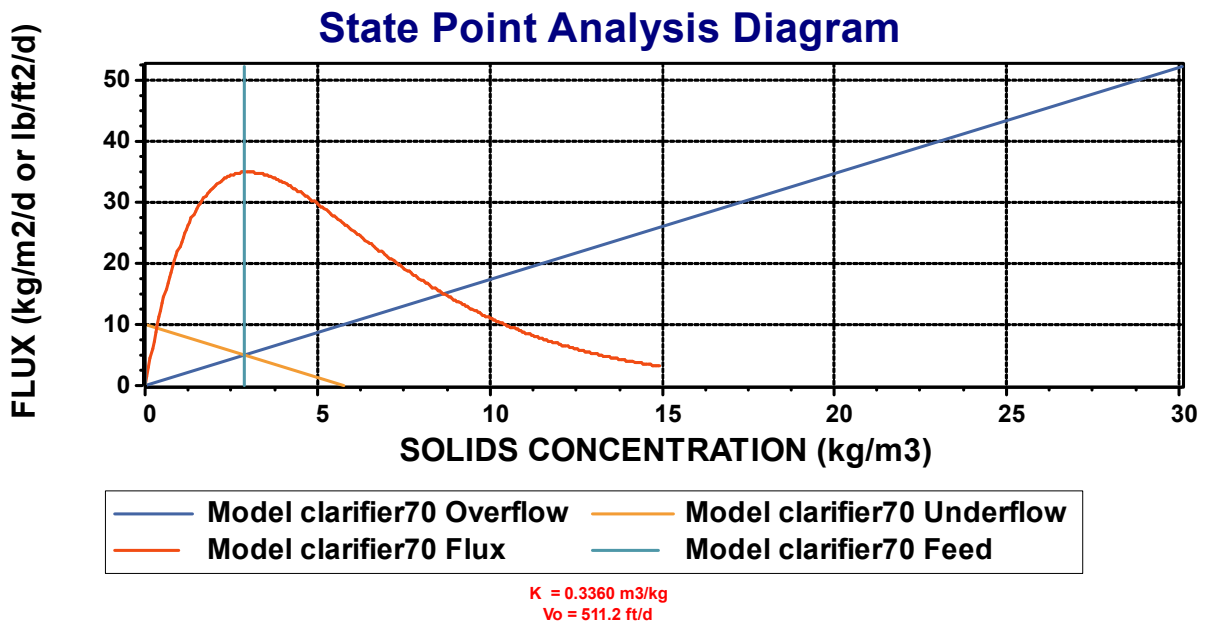
Chart



Album page - Page 8



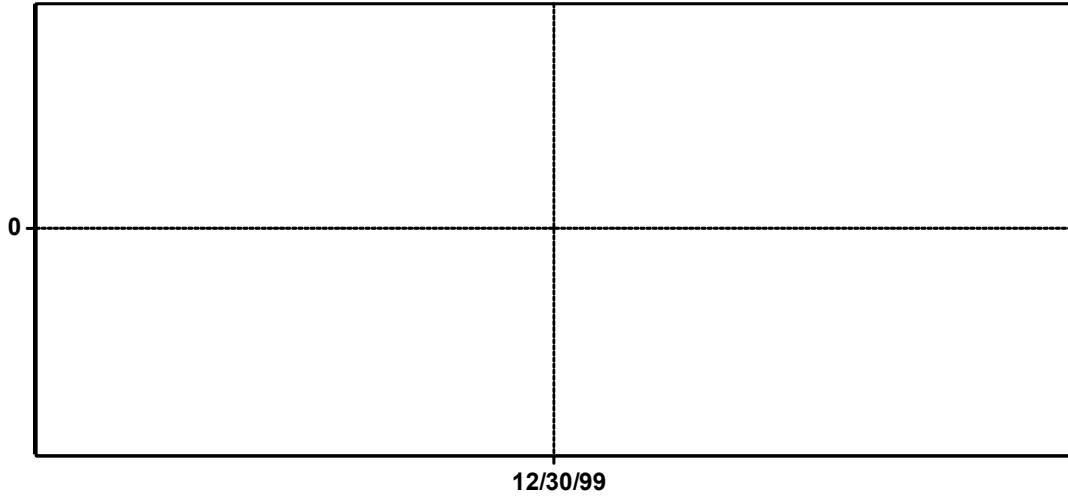
Album page - Page 9



Album page - Page 10

HEIGHT OF SPECIFIED CONCENTRATION

Chart



Deleted - Ideal primary settling tank57 Height of specified concentration

Album page - Page 11

Album page - Page 12

Elements	Liquid volume [Mil. Gal]
Anoxic 1	0.04
Anoxic 2	0.04
Swing	0.04
Aerobic 1	0.26
Anoxic 1B	0.04
Anoxic 2B	0.04
Swing B	0.04
Aerobic 1B	0.26

Album page - Page 13

Elements	Air flow rate [ft3/min (20C, 1 atm)]
Anoxic 1	0
Anoxic 2	0
Swing	230.39
Aerobic 1	588.65
Anoxic 1B	0
Anoxic 2B	0
Swing B	230.39
Aerobic 1B	588.65

Album page - Existing Plant Summary

Elements	Flow [mgd]	Temp [deg. C]	BO D - Total Caou s [mg/L]	BO D - Filt Ca rbo ce ou s [mg/L]	C O D - Total [mg/L]	C O D - Filt ere [mg/L]	C O D - Ds Co lex rea dil de gra ble [mgCO D/L]	Tot al suspen ded solids [mg/L]	Volatil esol ids [mg/L]	pH []	Alkalinity [mg/L]	N - Total Kjeldahl Nitrogen [mg/L]	N - Ammonia Nitrogen [mg/L]	N - Nitrite [mg/L]	N - Nitrate [mg/L]	Air flow rate [ft3/min (20 C, 1 atm)]	OT R [lb/hr]	O UR - Total [mgO/L/hr]	SO TR [lb/hr]	Alp ha []
Influent - BO D49	0.94	22.00	34.996	15.983	73.036	30.219	88.38	33.800	30.200	7.10	4.00	58.50	43.02	0	0	----	----	----	----	----
Anoxic 1	1.89	22.00	90.301	7.36	37.0356	59.88	3.20	29.1437	25.7247	6.93	3.89	21.545	11.42	0.13	4.13	0	0	0	0	0.50
Anoxic 2	1.89	22.00	89.856	1.79	36.9734	50.983	0.93	29.1636	25.7436	6.95	4.05	21.545	11.54	0.11	1.97	0	0	0	0	0.50

Swing	1.89	22.00	89.078	1.67	36.8461	50.03	2.02	29.0877	25.6606	6.85	3.57	21.232	7.63	1.16	3.96	23.039	17.76	52.27	82.66	0.32
Aerobic 1	1.89	22.00	84.803	0.99	36.1989	48.91	1.39	28.6514	25.2128	6.71	2.56	20.509	0.32	0.12	11.77	58.865	63.98	29.78	23.57	0.41
Model classifier5	0.48	22.00	2.06	0.99	53.41	48.91	1.39	3.61	3.18	6.71	2.56	2.31	0.32	0.12	11.77	----	----	----	----	----
Model classifier5 (U)	0.47	22.00	17.0577	0.99	72.3602	48.91	1.39	57.6650	50.7443	6.71	2.56	41.069	0.32	0.12	11.77	----	----	----	----	----
Model classifier70	0.48	22.00	2.06	0.99	53.41	48.91	1.39	3.61	3.18	6.71	2.56	2.31	0.32	0.12	11.77	----	----	----	----	----
Model classifier70 (U)	0.47	22.00	17.0577	0.99	72.3602	48.91	1.39	57.6650	50.7443	6.71	2.56	41.069	0.32	0.12	11.77	----	----	----	----	----
Effluent29	0.95	22.00	2.06	0.99	53.41	48.91	1.39	3.61	3.18	6.71	2.56	2.31	0.32	0.12	11.77	----	----	----	----	----

Album page - New Plant Summary

Elements	BOD Total Carbonaceous [mg/L]	COD Filtered [mg/L]	Total suspended solids [mg/L]	Volatile suspended solids [mg/L]	pH []	Alkalinity [mmol/L]	N - Total Kjeldahl Nitrogen [mgN/L]	N - Ammonia [mgN/L]	N - Nitrite [mgN/L]	N - Nitrate [mgN/L]	Air flow rate [ft ³ /min (20C, 1 atm)]	OTR [lb/hr]	OUR Total [mgO/L/hr]	SOT R [lb/hr]
Influent - BOD49	349.96	302.19	338.00	302.00	7.10	4.00	58.50	43.02	0	0	-----	-----	-----	-----

Anoxic 1B	903.01	59.88	2914.37	2572.47	6.93	3.89	215.45	11.42	0.13	4.13	0	0	0	0
Anoxic 2B	898.56	50.98	2916.36	2574.36	6.95	4.05	215.45	11.54	0.11	1.97	0	0	0	0
Swing B	890.78	50.03	2908.77	2566.06	6.85	3.57	212.32	7.63	1.16	3.96	230.39	17.76	52.27	82.66
Aerobic 1B	848.03	48.91	2865.14	2521.28	6.71	2.56	205.09	0.32	0.12	11.77	588.65	63.98	29.78	235.77
Model clarifier5	2.06	48.91	3.61	3.18	6.71	2.56	2.31	0.32	0.12	11.77	----	----	----	----
Model clarifier5 (U)	1705.77	48.91	5766.50	5074.43	6.71	2.56	410.69	0.32	0.12	11.77	----	----	----	----
Model clarifier70	2.06	48.91	3.61	3.18	6.71	2.56	2.31	0.32	0.12	11.77	----	----	----	----
Model clarifier70 (U)	1705.77	48.91	5766.50	5074.43	6.71	2.56	410.69	0.32	0.12	11.77	----	----	----	----
Effluent29	2.06	48.91	3.61	3.18	6.71	2.56	2.31	0.32	0.12	11.77	----	----	----	----

Global Parameters

Common

Name	Default	Value
Hydrolysis rate [1/d]	2.1000	1.0290
Hydrolysis half sat. [-]	0.0600	1.0000
External organics hydrolysis rate [1/d]	2.1000	1.0290
External organics hydrolysis half sat. [-]	0.0600	1.0000
Anoxic hydrolysis factor [-]	0.2800	1.0000
Anaerobic hydrolysis factor (AS) [-]	0.0400	1.0000
Anaerobic hydrolysis factor (AD) [-]	0.5000	1.0000

Adsorption rate of colloids [L/(mgCOD d)]	0.1500	0.1500	1.0290
Ammonification rate [L/(mgCOD d)]	0.0800	0.0800	1.0290
Assimilative nitrate/nitrite reduction rate [1/d]	0.5000	0.5000	1.0000
Endogenous products decay rate [1/d]	0	0	1.0000

Ammonia oxidizing

Name	Default	Value	
Max. spec. growth rate [1/d]	0.9000	0.9000	1.0720
Substrate (NH4) half sat. [mgN/L]	0.7000	0.7000	1.0000
Byproduct NH4 logistic slope [-]	50.0000	50.0000	1.0000
Byproduct NH4 inflection point [mgN/L]	1.4000	1.4000	1.0000
Denite DO half sat. [mg/L]	0.1000	0.1000	1.0000
Denite HNO2 half sat. [mgN/L]	5.000E-6	5.000E-6	1.0000
Aerobic decay rate [1/d]	0.1700	0.1700	1.0290
Anoxic/anaerobic decay rate [1/d]	0.0800	0.0800	1.0290
KiHNO2 [mmol/L]	5.000E-3	5.000E-3	1.0000

Nitrite oxidizing

Name	Default	Value	
Max. spec. growth rate [1/d]	0.7000	0.7000	1.0600
Substrate (NO2) half sat. [mgN/L]	0.1000	0.1000	1.0000
Aerobic decay rate [1/d]	0.1700	0.1700	1.0290
Anoxic/anaerobic decay rate [1/d]	0.0800	0.0800	1.0290
KiNH3 [mmol/L]	0.0750	0.0750	1.0000

Anaerobic ammonia oxidizing

Name	Default	Value	
Max. spec. growth rate [1/d]	0.2000	0.2000	1.1000
Substrate (NH4) half sat. [mgN/L]	2.0000	2.0000	1.0000
Substrate (NO2) half sat. [mgN/L]	1.0000	1.0000	1.0000
Aerobic decay rate [1/d]	0.0190	0.0190	1.0290
Anoxic/anaerobic decay rate [1/d]	9.500E-3	9.500E-3	1.0290
Ki Nitrite [mgN/L]	1000.0000	1000.0000	1.0000
Nitrite sensitivity constant [L / (d mgN)]	0.0160	0.0160	1.0000

Ordinary heterotrophic

Name	Default	Value	
Max. spec. growth rate [1/d]	3.2000	3.2000	1.0290
Substrate half sat. [mgCOD/L]	5.0000	5.0000	1.0000
Anoxic growth factor [-]	0.5000	0.5000	1.0000
Denite N2 producers (NO3 or NO2) [-]	0.5000	0.5000	1.0000
Aerobic decay rate [1/d]	0.6200	0.6200	1.0290
Anoxic decay rate [1/d]	0.2330	0.2330	1.0290
Anaerobic decay rate [1/d]	0.1310	0.1310	1.0290
Fermentation rate [1/d]	1.6000	1.6000	1.0290
Fermentation half sat. [mgCOD/L]	5.0000	5.0000	1.0000
Fermentation growth factor (AS) [-]	0.2500	0.2500	1.0000
Free nitrous acid inhibition [mol/L]	1.000E-7	1.000E-7	1.0000

Heterotrophic on industrial COD

Name	Default	Value	
Maximum specific growth rate on Ind #1 COD [1/d]	4.3000	4.3000	1.0290
Substrate (Ind #1) half sat. [mgCOD/L]	1.0000	1.0000	1.0000
Inhibition coefficient for Ind #1 [mgCOD/L]	60.0000	60.0000	1.0000
Anaerobic growth factor for Ind #1 [mgCOD/L]	0.0500	0.0500	1.0000

Maximum specific growth rate on Ind #2 COD [1/d]	1.5000	1.5000	1.0290
Substrate (Ind #2) half sat. [mgCOD/L]	30.0000	30.0000	1.0000
Inhibition coefficient for Ind #2 [mgCOD/L]	3000.0000	3000.0000	1.0000
Anaerobic growth factor for Ind #2 [mgCOD/L]	0.0500	0.0500	1.0000
Maximum specific growth rate on Ind #3 COD [1/d]	4.3000	4.3000	1.0290
Substrate (Ind #3) half sat. [mgCOD/L]	1.0000	1.0000	1.0000
Inhibition coefficient for Ind #3 COD [mgCOD/L]	60.0000	60.0000	1.0000
Anaerobic growth factor for Ind #3 [mgCOD/L]	0.0500	0.0500	1.0000
Maximum specific growth rate on adsorbed hydrocarbon COD [1/d]	2.0000	2.0000	1.0290
Substrate (adsorbed hydrocarbon) half sat. [-]	0.1500	0.1500	1.0000
Anaerobic growth factor for adsorbed hydrocarbons [mgCOD/L]	0.0100	0.0100	1.0000
Adsorption rate of soluble hydrocarbons [l/(mgCOD d)]	0.2000	0.2000	1.0000

Methylotrophic

Name	Default	Value	
Max. spec. growth rate [1/d]	1.3000	1.3000	1.0720
Methanol half sat. [mgCOD/L]	0.5000	0.5000	1.0000
Denite N2 producers (NO3 or NO2) [-]	0.5000	0.5000	1.0000
Aerobic decay rate [1/d]	0.0400	0.0400	1.0290
Anoxic/anaerobic decay rate [1/d]	0.0300	0.0300	1.0290
Free nitrous acid inhibition [mmol/L]	1.000E-7	1.000E-7	1.0000

Phosphorus accumulating

Name	Default	Value	
Max. spec. growth rate [1/d]	0.9500	0.9500	1.0000
Max. spec. growth rate, P-limited [1/d]	0.4200	0.4200	1.0000
Substrate half sat. [mgCOD(PHB)/mgCOD(Zbp)]	0.1000	0.1000	1.0000
Substrate half sat., P-limited [mgCOD(PHB)/mgCOD(Zbp)]	0.0500	0.0500	1.0000
Magnesium half sat. [mgMg/L]	0.1000	0.1000	1.0000

Cation half sat. [mmol/L]	0.1000	0.1000	1.0000
Calcium half sat. [mgCa/L]	0.1000	0.1000	1.0000
Aerobic/anoxic decay rate [1/d]	0.1000	0.1000	1.0000
Aerobic/anoxic maintenance rate [1/d]	0	0	1.0000
Anaerobic decay rate [1/d]	0.0400	0.0400	1.0000
Anaerobic maintenance rate [1/d]	0	0	1.0000
Sequestration rate [1/d]	4.5000	4.5000	1.0000
Anoxic growth factor [-]	0.3300	0.3300	1.0000

Propionic acetogenic

Name	Default	Value	
Max. spec. growth rate [1/d]	0.2500	0.2500	1.0290
Substrate half sat. [mgCOD/L]	10.0000	10.0000	1.0000
Acetate inhibition [mgCOD/L]	10000.0000	10000.0000	1.0000
Anaerobic decay rate [1/d]	0.0500	0.0500	1.0290
Aerobic/anoxic decay rate [1/d]	0.5200	0.5200	1.0290

Methanogenic

Name	Default	Value	
Acetoclastic max. spec. growth rate [1/d]	0.3000	0.3000	1.0290
H2-utilizing max. spec. growth rate [1/d]	1.4000	1.4000	1.0290
Acetoclastic substrate half sat. [mgCOD/L]	100.0000	100.0000	1.0000
Acetoclastic methanol half sat. [mgCOD/L]	0.5000	0.5000	1.0000
H2-utilizing CO2 half sat. [mmol/L]	0.1000	0.1000	1.0000
H2-utilizing substrate half sat. [mgCOD/L]	1.0000	1.0000	1.0000
H2-utilizing methanol half sat. [mgCOD/L]	0.5000	0.5000	1.0000
Acetoclastic propionic inhibition [mgCOD/L]	10000.0000	10000.0000	1.0000
Acetoclastic anaerobic decay rate [1/d]	0.1300	0.1300	1.0290
Acetoclastic aerobic/anoxic decay rate [1/d]	0.6000	0.6000	1.0290

H2-utilizing anaerobic decay rate [1/d]	0.1300	0.1300	1.0290
H2-utilizing aerobic/anoxic decay rate [1/d]	2.8000	2.8000	1.0290

Sulfur oxidizing

Name	Default	Value	
Maximum specific growth rate (sulfide) [1/d]	0.7500	0.7500	1.0290
Maximum specific growth rate (sulfur) [1/d]	0.1000	0.1000	1.0290
Substrate (H2S) half sat. [mgS/L]	1.0000	1.0000	1.0000
Substrate (sulfur) half sat. [mgS/L]	1.0000	1.0000	1.0000
Anoxic growth factor [-]	0.5000	0.5000	1.0000
Decay rate [1/d]	0.0400	0.0400	1.0290

Sulfur reducing

Name	Default	Value	
Propionic max. spec. growth rate [1/d]	0.5830	0.5830	1.0350
Propionic acid half sat. [mgCOD/L]	295.0000	295.0000	1.0000
Hydrogen sulfide inhibition coefficient [mgS/L]	185.0000	185.0000	1.0000
Sulfate (SO4=) half sat. [mgS/L]	2.4700	2.4700	1.0000
Decay rate [1/d]	0.0185	0.0185	1.0350
Acetotrophic max. spec. growth rate [1/d]	0.6120	0.6120	1.0350
Acetic acid half sat. [mgCOD/L]	24.0000	24.0000	1.0000
Hydrogen sulfide inhibition coefficient [mgS/L]	164.0000	164.0000	1.0000
Sulfate (SO4=) half sat. [mgS/L]	6.4100	6.4100	1.0000
Decay rate [1/d]	0.0275	0.0275	1.0350
Hydrogenotrophic max. spec. growth rate with SO4= [1/d]	2.8000	2.8000	1.0350
Hydrogenotrophic max. spec. growth rate with S [1/d]	0.1000	0.1000	1.0350
Hydrogen half sat. [mgCOD/L]	0.0700	0.0700	1.0000
Hydrogen sulfide inhibition coefficient [mgS/L]	550.0000	550.0000	1.0000
Sulfate (SO4=) half sat. [mgS/L]	6.4100	6.4100	1.0000

Sulfur (S) half sat. [mgS/L]	50.0000	50.0000	1.0000
Decay rate [1/d]	0.0600	0.0600	1.0350

pH

Name	Default	Value
Ordinary heterotrophic low pH limit [-]	4.0000	4.0000
Ordinary heterotrophic high pH limit [-]	10.0000	10.0000
Methylotrophic low pH limit [-]	4.0000	4.0000
Methylotrophic high pH limit [-]	10.0000	10.0000
Autotrophic low pH limit [-]	5.5000	5.5000
Autotrophic high pH limit [-]	9.5000	9.5000
Phosphorus accumulating low pH limit [-]	4.0000	4.0000
Phosphorus accumulating high pH limit [-]	10.0000	10.0000
Ordinary heterotrophic low pH limit (anaerobic) [-]	5.5000	5.5000
Ordinary heterotrophic high pH limit (anaerobic) [-]	8.5000	8.5000
Propionic acetogenic low pH limit [-]	4.0000	4.0000
Propionic acetogenic high pH limit [-]	10.0000	10.0000
Acetoclastic methanogenic low pH limit [-]	5.0000	5.0000
Acetoclastic methanogenic high pH limit [-]	9.0000	9.0000
H2-utilizing methanogenic low pH limit [-]	5.0000	5.0000
H2-utilizing methanogenic high pH limit [-]	9.0000	9.0000

Switches

Name	Default	Value
Ordinary heterotrophic DO half sat. [mgO2/L]	0.1500	0.0500
Phosphorus accumulating DO half sat. [mgO2/L]	0.0500	0.0500
Anoxic/anaerobic NOx half sat. [mgN/L]	0.1500	0.1500
Ammonia oxidizing DO half sat. [mgO2/L]	0.2500	0.2500
Nitrite oxidizing DO half sat. [mgO2/L]	0.5000	0.5000

Anaerobic ammonia oxidizing DO half sat. [mgO ₂ /L]	0.0100	0.0100
Sulfur oxidizing sulfate pathway DO half sat. [mgO ₂ /L]	0.2500	0.2500
Sulfur oxidizing sulfur pathway DO half sat. [mgO ₂ /L]	0.0500	0.0500
Anoxic NO ₃ (->NO ₂) half sat. [mgN/L]	0.1000	0.1000
Anoxic NO ₃ (->N ₂) half sat. [mgN/L]	0.0500	0.0500
Anoxic NO ₂ (->N ₂) half sat. (mgN/L)	0.0100	0.0100
NH ₃ nutrient half sat. [mgN/L]	5.000E-3	5.000E-3
PolyP half sat. [mgP/mgCOD]	0.0100	0.0100
VFA sequestration half sat. [mgCOD/L]	5.0000	5.0000
P uptake half sat. [mgP/L]	0.1500	0.1500
P nutrient half sat. [mgP/L]	1.000E-3	1.000E-3
Autotrophic CO ₂ half sat. [mmol/L]	0.1000	0.1000
H ₂ low/high half sat. [mgCOD/L]	1.0000	1.0000
Propionic acetogenic H ₂ inhibition [mgCOD/L]	5.0000	5.0000
Synthesis anion/cation half sat. [meq/L]	0.0100	0.0100

Common

Name	Default	Value
Biomass/Endog Ca content (gCa/gCOD)	3.912E-3	3.912E-3
Biomass/Endog Mg content (gMg/gCOD)	3.912E-3	3.912E-3
Biomass/Endog other cations content (mol/gCOD)	5.115E-4	5.115E-4
Biomass/Endog other Anions content (mol/gCOD)	1.410E-4	1.410E-4
N in endogenous residue [mgN/mgCOD]	0.0700	0.0700
P in endogenous residue [mgP/mgCOD]	0.0220	0.0220
Ca content of slowly biodegradable (gCa/gCOD)	3.912E-3	3.912E-3
Mg content of slowly biodegradable (gMg/gCOD)	3.700E-4	3.700E-4
Endogenous residue COD:VSS ratio [mgCOD/mgVSS]	1.4200	1.4200
Particulate substrate COD:VSS ratio [mgCOD/mgVSS]	1.6327	1.4200
Particulate inert COD:VSS ratio [mgCOD/mgVSS]	1.6000	1.4200
Cellulose COD:VSS ratio [mgCOD/mgVSS]	1.4000	1.4000
External organic COD:VSS ratio [mgCOD/mgVSS]	1.6000	1.6000
Molecular weight of other anions [mg/mmol]	35.5000	35.5000

Molecular weight of other cations [mg/mmol]	39.0983	39.1000
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Ammonia oxidizing

Name	Default	Value
Yield [mgCOD/mgN]	0.1500	0.1500
Denite NO2 fraction as TEA [-]	0.5000	0.5000
Byproduct NH4 fraction to N2O [-]	2.500E-3	2.500E-3
N in biomass [mgN/mgCOD]	0.0700	0.0700
P in biomass [mgP/mgCOD]	0.0220	0.0220
Fraction to endogenous residue [-]	0.0800	0.0800
COD:VSS ratio [mgCOD/mgVSS]	1.4200	1.4200

Nitrite oxidizing

Name	Default	Value
Yield [mgCOD/mgN]	0.0900	0.0900
N in biomass [mgN/mgCOD]	0.0700	0.0700
P in biomass [mgP/mgCOD]	0.0220	0.0220
Fraction to endogenous residue [-]	0.0800	0.0800
COD:VSS ratio [mgCOD/mgVSS]	1.4200	1.4200

Anaerobic ammonia oxidizing

Name	Default	Value
Yield [mgCOD/mgN]	0.1140	0.1140
Nitrate production [mgN/mgBiomassCOD]	2.2800	2.2800
N in biomass [mgN/mgCOD]	0.0700	0.0700
P in biomass [mgP/mgCOD]	0.0220	0.0220

Fraction to endogenous residue [-]	0.0800	0.0800
COD:VSS ratio [mgCOD/mgVSS]	1.4200	1.4200

Ordinary heterotrophic

Name	Default	Value
Yield (aerobic) [-]	0.6660	0.6660
Yield (fermentation, low H2) [-]	0.1000	0.1000
Yield (fermentation, high H2) [-]	0.1000	0.1000
H2 yield (fermentation low H2) [-]	0.3500	0.3500
H2 yield (fermentation high H2) [-]	0	0
Propionate yield (fermentation, low H2) [-]	0	0
Propionate yield (fermentation, high H2) [-]	0.7000	0.7000
CO2 yield (fermentation, low H2) [-]	0.7000	0.7000
CO2 yield (fermentation, high H2) [-]	0	0
N in biomass [mgN/mgCOD]	0.0700	0.0700
P in biomass [mgP/mgCOD]	0.0220	0.0220
Endogenous fraction - aerobic [-]	0.0800	0.0800
Endogenous fraction - anoxic [-]	0.1030	0.1030
Endogenous fraction - anaerobic [-]	0.1840	0.1840
COD:VSS ratio [mgCOD/mgVSS]	1.4200	1.4200
Yield (anoxic) [-]	0.5400	0.5400
Yield propionic (aerobic) [-]	0.6400	0.6400
Yield propionic (anoxic) [-]	0.4600	0.4600
Yield acetic (aerobic) [-]	0.6000	0.6000
Yield acetic (anoxic) [-]	0.4300	0.4300
Yield methanol (aerobic) [-]	0.5000	0.5000
Adsorp. max. [-]	1.0000	1.0000
Max fraction to N2O at high FNA over nitrate [-]	0.0500	0.0500
Max fraction to N2O at high FNA over nitrite [-]	0.1000	0.1000

Ordinary heterotrophic on industrial COD

Name	Default	Value
Yield Ind #1 COD (Aerobic) [-]	0.5000	0.5000
Yield Ind #1 COD (Anoxic) [-]	0.4000	0.4000
Yield Ind #1 COD (Anaerobic) [-]	0.0400	0.0400
COD:Mole ratio - Ind #1 COD [gCOD/Mol]	224.0000	224.0000
Yield Ind #2 COD (Aerobic) [-]	0.5000	0.5000
Yield Ind #2 COD (Anoxic) [-]	0.4000	0.4000
Yield Ind #2 COD (Anaerobic) [-]	0.0500	0.0500
COD:Mole ratio - Ind #2 COD [gCOD/Mol]	240.0000	240.0000
Yield on Ind #3 COD (Aerobic) [-]	0.5000	0.5000
Yield on Ind #3 COD (Anoxic) [-]	0.4000	0.4000
Yield on Ind #3 COD (Anaerobic) [-]	0.0400	0.0400
COD:Mole ratio - Ind #3 COD [gCOD/Mol]	288.0000	288.0000
Yield enmeshed hydrocarbons (Aerobic) [-]	0.5000	0.5000
Yield enmeshed hydrocarbons (Anoxic) [-]	0.4000	0.4000
Yield enmeshed hydrocarbons (Anaerobic) [-]	0.0400	0.0400
COD:Mole ratio - Hydrocarbon COD [gCOD/Mol]	336.0000	336.0000
Hydrocarbon COD:VSS ratio [mgCOD/mgVSS]	3.2000	3.2000
Max. hydrocarbon adsorp. ratio [-]	1.0000	1.0000
Yield of Ind #1 on Ind #3 COD (Aerobic) [-]	0	0
Yield of Ind #1 on Ind #3 COD (Anoxic) [-]	0	0
Hydrocarbon Yield on Ind #3 COD (Aerobic) [-]	0	0
Hydrocarbon Yield on Ind #3 COD (Anoxic) [-]	0	0

Methylotrophic

Name	Default	Value
Yield (anoxic) [-]	0.4000	0.4000
N in biomass [mgN/mgCOD]	0.0700	0.0700
P in biomass [mgP/mgCOD]	0.0220	0.0220
Fraction to endogenous residue [-]	0.0800	0.0800
COD:VSS ratio [mgCOD/mgVSS]	1.4200	1.4200

Max fraction to N2O at high FNA over nitrate [-]	0.1000	0.1000
Max fraction to N2O at high FNA over nitrite [-]	0.1500	0.1500

Phosphorus accumulating

Name	Default	Value
Yield (aerobic) [-]	0.6390	0.6390
Yield (anoxic) [-]	0.5200	0.5200
Aerobic P/PHA uptake [mgP/mgCOD]	0.9300	0.9300
Anoxic P/PHA uptake [mgP/mgCOD]	0.3500	0.3500
Yield of PHA on Ac sequestration [-]	0.8890	0.8890
N in biomass [mgN/mgCOD]	0.0700	0.0700
N in sol. inert [mgN/mgCOD]	0.0700	0.0700
P in biomass [mgP/mgCOD]	0.0220	0.0220
Fraction to endogenous part. [-]	0.2500	0.2500
Inert fraction of endogenous sol. [-]	0.2000	0.2000
P/Ac release ratio [mgP/mgCOD]	0.5100	0.5100
COD:VSS ratio [mgCOD/mgVSS]	1.4200	1.4200
Yield of low PP [-]	0.9400	0.9400
Mg to P mole ratio in polyphosphate [mmolMg/mmolP]	0.3000	0.3000
Cation to P mole ratio in polyphosphate [meq/mmolP]	0.1500	0.1500
Ca to P mole ratio in polyphosphate [mmolCa/mmolP]	0.0500	0.0500

Propionic acetogenic

Name	Default	Value
Yield [-]	0.1000	0.1000
H2 yield [-]	0.4000	0.4000
CO2 yield [-]	1.0000	1.0000
N in biomass [mgN/mgCOD]	0.0700	0.0700
P in biomass [mgP/mgCOD]	0.0220	0.0220

Fraction to endogenous residue [-]	0.0800	0.0800
COD:VSS ratio [mgCOD/mgVSS]	1.4200	1.4200

Methanogenic

Name	Default	Value
Acetoclastic yield [-]	0.1000	0.1000
Acetoclastic yield on methanol[-]	0.1000	0.1000
H2-utilizing yield [-]	0.1000	0.1000
H2-utilizing yield on methanol [-]	0.1000	0.1000
N in acetoclastic biomass [mgN/mgCOD]	0.0700	0.0700
N in H2-utilizing biomass [mgN/mgCOD]	0.0700	0.0700
P in acetoclastic biomass [mgP/mgCOD]	0.0220	0.0220
P in H2-utilizing biomass [mgP/mgCOD]	0.0220	0.0220
Acetoclastic fraction to endog. residue [-]	0.0800	0.0800
H2-utilizing fraction to endog. residue [-]	0.0800	0.0800
Acetoclastic COD:VSS ratio [mgCOD/mgVSS]	1.4200	1.4200
H2-utilizing COD:VSS ratio [mgCOD/mgVSS]	1.4200	1.4200

Sulfur oxidizing

Name	Default	Value
Yield (aerobic) [mgCOD/mgS]	0.5000	0.5000
Yield (Anoxic) [mgCOD/mgS]	0.3500	0.3500
N in biomass [mgN/mgCOD]	0.0700	0.0700
P in biomass [mgP/mgCOD]	0.0220	0.0220
Fraction to endogenous residue [-]	0.0800	0.0800
COD:VSS ratio [mgCOD/mgVSS]	1.4200	1.4200

Sulfur reducing

Name	Default	Value
Yield [mgCOD/mg H2 COD]	0.0712	0.0712
Yield [mgCOD/mg Ac COD]	0.0470	0.0470
Yield [mgCOD/mg Pr COD]	0.0384	0.0384
N in biomass [mgN/mgCOD]	0.0700	0.0700
P in biomass [mgP/mgCOD]	0.0220	0.0220
Fraction to endogenous residue [-]	0.0800	0.0800
COD:VSS ratio [mgCOD/mgVSS]	1.4200	1.4200

General

Name	Default	Value
Tank head loss per metre of length (from flow) [m/m]	2.500E-3	2.500E-3
BOD calculation rate constant for Xsc degradation [/d]	0.5000	0.5000
BOD calculation rate constant for Xsp (and hydrocarbon) degradation [/d]	0.5000	0.5000
BOD calculation rate constant for Xeo degradation [/d]	0.5000	0.5000

Heating fuel/Chemical Costs

Name	Default	Value
Methanol [\$/gal]	1.6656	1.6656
Ferric chloride [\$/lb Fe]	0.5307	0.5307
Ferric sulfate [\$/lb Fe]	0.3583	0.3583
Ferrous chloride [\$/lb Fe]	0.2767	0.2767
Ferrous sulfate [\$/lb Fe]	1.0750	1.0750
Aluminum sulfate [\$/lb Al]	0.7666	0.7666
Aluminum chloride [\$/lb Al]	0.8981	0.8981
Poly Aluminum Chloride (PAC) [\$/lb Al]	0.5307	0.5307
Natural gas [\$/MMBTU]	3.1652	3.1652
Heating oil [\$/gal]	1.8927	1.8927

Diesel [\$/gal]	2.6498	2.6498
Custom fuel [\$/gal]	3.7854	3.7854
Biogas sale price [\$/MMBTU]	2.1101	2.1101

Anaerobic digester

Name	Default	Value
Bubble rise velocity (anaerobic digester) [cm/s]	23.9000	23.9000
Bubble Sauter mean diameter (anaerobic digester) [cm]	0.3500	0.3500
Anaerobic digester gas hold-up factor []	1.0000	1.0000

Combined Heat and Power (CHP) engine

Name	Default	Value
Methane heat of combustion [kJ/mole]	800.0000	800.0000
Hydrogen heat of combustion [kJ/mole]	240.0000	240.0000
CHP engine heat price [\$/kWh]	0	0
CHP engine power price [\$/kWh]	0.1500	0.1500

Calorific values of heating fuels

Name	Default	Value
Calorific value of natural gas [BTU/lb]	20636	20636
Calorific value of heating fuel oil [BTU/lb]	18057	18057
Calorific value of diesel [BTU/lb]	19776	19776
Calorific value of custom fuel [BTU/lb]	13758	13758

Density of liquid heating fuels

Name	Default	Value
Density of heating fuel oil [lb/ft3]	56	56
Density of diesel [lb/ft3]	55	55
Density of custom fuel [lb/ft3]	49	49

Mass transfer

Name	Default	Value
Kl for H2 [m/d]	17.0000	17.0000 1.0240
Kl for CO2 [m/d]	10.0000	10.0000 1.0240
Kl for NH3 [m/d]	1.0000	1.0000 1.0240
Kl for CH4 [m/d]	8.0000	8.0000 1.0240
Kl for N2 [m/d]	15.0000	15.0000 1.0240
Kl for N2O [m/d]	8.0000	8.0000 1.0240
Kl for H2S [m/d]	1.0000	1.0000 1.0240
Kl for Ind #1 COD [m/d]	0	0 1.0240
Kl for Ind #2 COD [m/d]	0.5000	0.5000 1.0240
Kl for Ind #3 COD [m/d]	0	0 1.0240
Kl for O2 [m/d]	13.0000	13.0000 1.0240

Henry's law constants

Name	Default	Value
CO2 [M/atm]	3.4000E-2	3.4000E-2 2400.0000
O2 [M/atm]	1.3000E-3	1.3000E-3 1500.0000
N2 [M/atm]	6.5000E-4	6.5000E-4 1300.0000
N2O [M/atm]	2.5000E-2	2.5000E-2 2600.0000
NH3 [M/atm]	5.8000E+1	5.8000E+1 4100.0000

CH4 [M/atm]	1.4000E-3	1.4000E-3	1600.0000
H2 [M/atm]	7.8000E-4	7.8000E-4	500.0000
H2S [M/Atm]	1.0000E-1	1.0000E-1	2200.0000
Ind 1 [M/Atm]	1.9000E+3	1.9000E+3	7300.0000
Ind 2 [M/Atm]	1.8000E-1	1.8000E-1	2200.0000
Ind 3 [M/Atm]	1.5000E-1	1.5000E-1	1900.0000

BioWin user and configuration data

Project details

Project name: Unknown Project ref.: BW1

Plant name: Unknown

User name: Jason.Flowers

Created: 5/18/2018

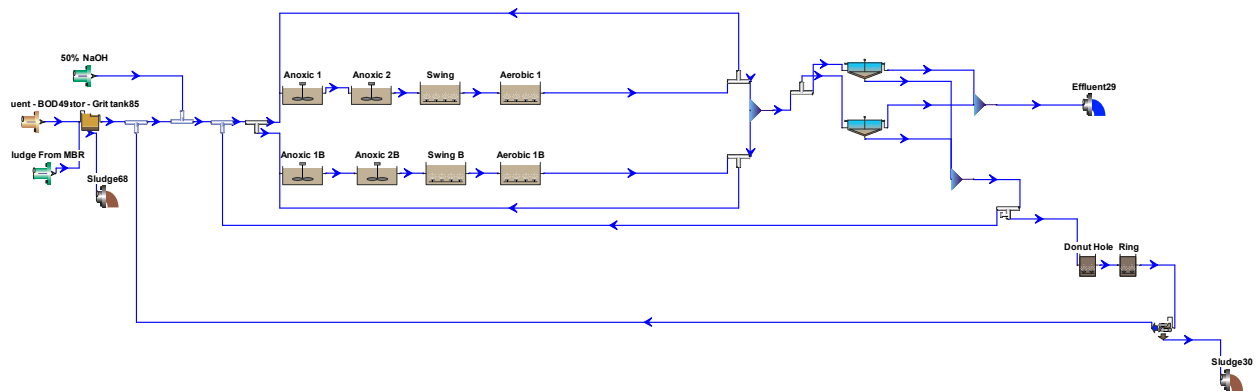
Saved: 9/16/2020

Steady state solution

Target SRT: 6.00 days SRT #0: 6.00 days

Temperature: 11.0°C

Flowsheet



Configuration information for all Digester - Aerobic units

Physical data

Element name	Volume [Mil. Gal]	Area [ft2]	Depth [ft]	# of diffusers
Donut Hole	0.0900	802.0834	15.000	182
Ring	0.1800	1604.1668	15.000	363

Operating data Average (flow/time weighted as required)

Element name	Average DO Setpoint [mg/L]
Donut Hole	2.0
Ring	2.0

Aeration equipment parameters

Element name	k_1 in C = $k_1(PC)^{0.25} + k_2$	k_2 in C = $k_1(PC)^{0.25} + k_2$	Y in $Kla = C Usg$ $^{\wedge} Y - Usg$ in $[m^3/(m^2 d)]$	Area of one diffuser	Diffuser mounting height	Min. air flow rate per diffuser (20C, 1 atm)	Max. air flow rate per diffuser (20C, 1 atm)	'A' in diffuser pressure drop = A + $B^*(Qa/Diff)^2$	'B' in diffuser pressure drop = A + $B^*(Qa/Diff)^2$	'C' in diffuser pressure drop = A + $C^*(Qa/Diff)^2$
Donut Hole	1.2400	0.8960	0.8880	0.4413	0.2500	0.2943	5.8858	3.0000	0	0
Ring	1.2400	0.8960	0.8880	0.4413	0.2500	0.2943	5.8858	3.0000	0	0

Configuration information for all Bioreactor units

Physical data

Element name	Volume [Mil. Gal]	Area [ft2]	Depth [ft]	# of diffusers
Anoxic 1	0.0377	278.7476	18.080	Un-aerated
Anoxic 2	0.0377	278.7476	18.080	Un-aerated

Swing	0.0377	278.7476	18.080	63
Aerobic 1	0.2574	1903.1735	18.080	431
Anoxic 1B	0.0377	278.7476	18.080	Un-aerated
Anoxic 2B	0.0377	278.7476	18.080	Un-aerated
Swing B	0.0377	278.7476	18.080	63
Aerobic 1B	0.2574	1903.1735	18.080	431

Operating data Average (flow/time weighted as required)

Element name	Average DO Setpoint [mg/L]
Anoxic 1	0
Anoxic 2	0
Swing	2.0
Aerobic 1	2.0
Anoxic 1B	0
Anoxic 2B	0
Swing B	2.0
Aerobic 1B	2.0

Aeration equipment parameters

Element name	k_1 in C = $k_1(PC)^{0.25} + k_2$	k_2 in C = $k_1(PC)^{0.25} + k_2$	Y in $Kla = C Usg - Y$ in $[m^3/(m^2 d)]$	Area of one diffuser	Diffuser mounting height	Min. air flow rate per diffuser (20C, 1 atm)	Max. air flow rate per diffuser (20C, 1 atm)	'A' in diffuser pressure drop = $A + B*(Qa/Diff) + C*(Qa/Diff)^2$	'B' in diffuser pressure drop = $A + B*(Qa/Diff) + C*(Qa/Diff)^2$	'C' in diffuser pressure drop = $A + B*(Qa/Diff) + C*(Qa/Diff)^2$
Anoxic 1	1.2400	0.8960	0.8880	0.4413	0.2500	0.2943	5.8858	3.0000	0	0
Anoxic 2	1.2400	0.8960	0.8880	0.4413	0.2500	0.2943	5.8858	3.0000	0	0
Swing	1.2400	0.8960	0.8880	0.4413	0.2500	0.2943	5.8858	3.0000	0	0
Aerobic 1	1.2400	0.8960	0.8880	0.4413	0.2500	0.2943	5.8858	3.0000	0	0

Anoxic 1B	1.2400	0.8960	0.8880	0.4413	0.2500	0.2943	5.8858	3.0000	0	0
Anoxic 2B	1.2400	0.8960	0.8880	0.4413	0.2500	0.2943	5.8858	3.0000	0	0
Swing B	1.2400	0.8960	0.8880	0.4413	0.2500	0.2943	5.8858	3.0000	0	0
Aerobic 1B	1.2400	0.8960	0.8880	0.4413	0.2500	0.2943	5.8858	3.0000	0	0

Configuration information for all Influent - BOD units

Operating data Average (flow/time weighted as required)

Element name	Influent - BOD49
Flow	1.78
BOD - Total Carbonaceous mgBOD/L	179.04
Volatile suspended solids mg/L	188.00
Total suspended solids mg/L	202.79
N - Total Kjeldahl Nitrogen mgN/L	30.00
P - Total P mgP/L	5.10
S - Total S mgS/L	0
N - Nitrate mgN/L	0
pH	7.10
Alkalinity mmol/L	2.00
Metal soluble - Calcium mg/L	11.10
Metal soluble - Magnesium mg/L	3.20
Gas - Dissolved oxygen mg/L	0

Element name	Influent - BOD49
Fbs - Readily biodegradable (including Acetate) [gCOD/g of total COD]	0.1410
Fac - Acetate [gCOD/g of readily biodegradable COD]	0.1418
Fxsp - Non-colloidal slowly biodegradable [gCOD/g of slowly degradable COD]	0.8750
Fus - Unbiodegradable soluble [gCOD/g of total COD]	0.0650

Fup - Unbiodegradable particulate [gCOD/g of total COD]	0.1300
Fcel - Cellulose fraction of unbiodegradable particulate [gCOD/gCOD]	0.5000
Fna - Ammonia [gNH3-N/gTKN]	0.7353
Fnox - Particulate organic nitrogen [gN/g Organic N]	0.5000
Fnus - Soluble unbiodegradable TKN [gN/gTKN]	0.0200
FupN - N:COD ratio for unbiodegradable part. COD [gN/gCOD]	0.0700
Fpo4 - Phosphate [gPO4-P/gTP]	0.4717
FupP - P:COD ratio for unbiodegradable part. COD [gP/gCOD]	0.0220
Fsr - Reduced sulfur [H2S] [gS/gS]	0
FZbh - Ordinary heterotrophic COD fraction [gCOD/g of total COD]	0.0200
FZbm - Methyloctrophic COD fraction [gCOD/g of total COD]	1.000E-4
FZao - Ammonia oxidizing COD fraction [gCOD/g of total COD]	1.000E-4
FZno - Nitrite oxidizing COD fraction [gCOD/g of total COD]	1.000E-4
FZaao - Anaerobic ammonia oxidizing COD fraction [gCOD/g of total COD]	1.000E-4
FZppa - Phosphorus accumulating COD fraction [gCOD/g of total COD]	1.000E-4
FZpa - Propionic acetogenic COD fraction [gCOD/g of total COD]	1.000E-4
FZam - Acetoclastic methanogenic COD fraction [gCOD/g of total COD]	1.000E-4
FZhm - Hydrogenotrophic methanogenic COD fraction [gCOD/g of total COD]	1.000E-4
FZso - Sulfur oxidizing COD fraction [gCOD/g of total COD]	1.000E-4
FZsrpa - Sulfur reducing propionic acetogenic COD fraction [gCOD/g of total COD]	1.000E-4
FZsra - Sulfur reducing acetotrophic COD fraction [gCOD/g of total COD]	1.000E-4
FZsrh - Sulfur reducing hydrogenotrophic COD fraction [gCOD/g of total COD]	1.000E-4
FZe - Endogenous products COD fraction [gCOD/g of total COD]	0

Configuration information for all Clarifier - Model units

Physical data

Element name	Volume[Mil. Gal]	Area[ft2]	Depth[ft]	Number of layers	Top feed layer	Feed Layers
Model clarifier5	0.2570	2290.0000	15.000	10	6	1
Model clarifier70	0.2570	2290.0000	15.000	10	6	1

Operating data Average (flow/time weighted as required)

Element name	Split method	Average Split specification
Model clarifier5	Flow paced	50.00 %
Model clarifier70	Flow paced	50.00 %

Element name	Average Temperature	Reactive
Model clarifier5	Uses global setting	No
Model clarifier70	Uses global setting	No

Configuration information for all Separator - Grit tank units

Physical data

Element name	Volume [Mil. Gal]	Area [ft2]	Depth [ft]
Separator - Grit tank85	4.000E-3	89.1204	6.000

Operating data Average (flow/time weighted as required)

Element name	Split method	Average Split specification
Separator - Grit tank85	Flowrate [Under]	0.0002642

Element name	Percent removal	Blanket fraction
Separator - Grit tank85	65.00	0.10

Configuration information for all Separator - Dewatering unit units

Operating data Average (flow/time weighted as required)

Element name	Split method	Average Split specification
Separator - Dewatering unit83	Fraction	0.02

Element name	Percent removal
Separator - Dewatering unit83	90.00

Configuration information for all Splitter units

Operating data Average (flow/time weighted as required)

Element name	Split method	Average Split specification
Splitter11	Flow paced	100.00 %
Splitter12	Flow paced	100.00 %
Splitter13	Fraction	0.50
Splitter40	Flowrate [Side]	0.0617499999485417
Splitter32	Fraction	0.50

Configuration information for all Influent - State variable units

Operating data Average (flow/time weighted as required)

Element name	50% NaOH	Sludge From MBR
Biomass - Ordinary heterotrophic [mgCOD/L]	0	4118.29
Biomass - Methylothetic [mgCOD/L]	0	1.92
Biomass - Ammonia oxidizing [mgCOD/L]	0	51.22
Biomass - Nitrite oxidizing [mgCOD/L]	0	28.63
Biomass - Anaerobic ammonia oxidizing [mgCOD/L]	0	2.37
Biomass - Phosphorus accumulating [mgCOD/L]	0	5.40
Biomass - Propionic acetogenic [mgCOD/L]	0	0.45
Biomass - Acetoclastic methanogenic [mgCOD/L]	0	0.39
Biomass - Hydrogenotrophic methanogenic [mgCOD/L]	0	0.10
Biomass - Endogenous products [mgCOD/L]	0	2142.58
CODp - Slowly degradable particulate [mgCOD/L]	0	243.55
CODp - Slowly degradable colloidal [mgCOD/L]	0	0.04
CODp - Degradable external organics [mgCOD/L]	0	0
CODp - Undegradable non-cellulose [mgCOD/L]	0	1819.21
CODp - Undegradable cellulose [mgCOD/L]	0	1819.21
N - Particulate degradable organic [mgN/L]	0	10.25
P - Particulate degradable organic [mgP/L]	0	4.22
N - Particulate degradable external organics [mgN/L]	0	0
P - Particulate degradable external organics [mgP/L]	0	0
N - Particulate undegradable [mgN/L]	0	127.35
P - Particulate undegradable [mgP/L]	0	40.02
CODp - Stored PHA [mgCOD/L]	0	0.11
P - Releasable stored polyP [mgP/L]	0	1.74
P - Unreleasable stored polyP [mgP/L]	0	0.35
CODs - Complex readily degradable [mgCOD/L]	0	1.41
CODs - Acetate [mgCOD/L]	0	0
CODs - Propionate [mgCOD/L]	0	0
CODs - Methanol [mgCOD/L]	0	0
Gas - Dissolved hydrogen [mgCOD/L]	0	0.08
Gas - Dissolved methane [mg/L]	0	0
N - Ammonia [mgN/L]	0	1.12
N - Soluble degradable organic [mgN/L]	0	0.51
Gas - Dissolved nitrous oxide [mgN/L]	0	0

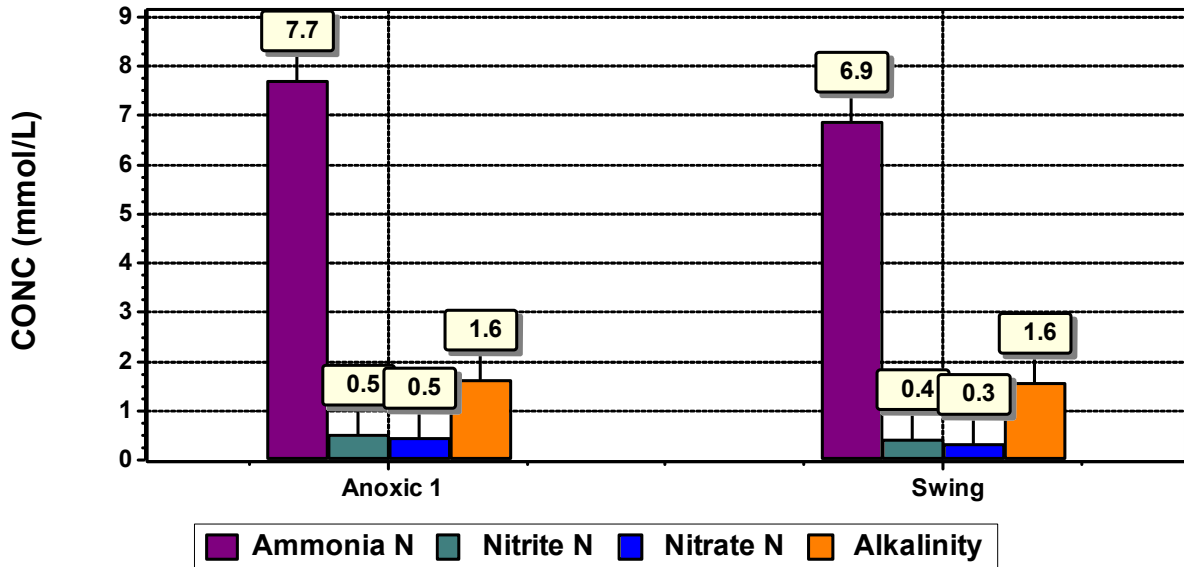
N - Nitrite [mgN/L]	0	0.34
N - Nitrate [mgN/L]	0	1.29
Gas - Dissolved nitrogen [mgN/L]	0	18.83
P - Soluble phosphate [mgP/L]	0	3.91
CODs - Undegradable [mgCOD/L]	0	24.30
N - Soluble undegradable organic [mgN/L]	0	0.42
Influent inorganic suspended solids [mgISS/L]	0	1499.26
Precipitate - Struvite [mgISS/L]	0	0
Precipitate - Brushite [mgISS/L]	0	0
Precipitate - Hydroxy - apatite [mgISS/L]	0	0
Precipitate - Vivianite [mgISS/L]	0	0
HFO - High surface [mg/L]	0	0
HFO - Low surface [mg/L]	0	0
HFO - High with H ₂ PO ₄ - adsorbed [mg/L]	0	0
HFO - Low with H ₂ PO ₄ - adsorbed [mg/L]	0	0
HFO - Aged [mg/L]	0	0
HFO - Low with H ⁺ adsorbed [mg/L]	0	0
HFO - High with H ⁺ adsorbed [mg/L]	0	0
HAO - High surface [mg/L]	0	0
HAO - Low surface [mg/L]	0	0
HAO - High with H ₂ PO ₄ - adsorbed [mg/L]	0	0
HAO - Low with H ₂ PO ₄ - adsorbed [mg/L]	0	0
HAO - Aged [mg/L]	0	0
P - Bound on aged HMO [mgP/L]	0	0
Metal soluble - Magnesium [mg/L]	0	14.79
Metal soluble - Calcium [mg/L]	0	80.58
Metal soluble - Ferric [mg/L]	0	0
Metal soluble - Ferrous [mg/L]	0	0
Metal soluble - Aluminum [mg/L]	0	0
Other Cations (strong bases) [meq/L]	12500.00	4.96
Other Anions (strong acids) [meq/L]	0	9.17
Gas - Dissolved total CO ₂ [mmol/L]	0	2.14
User defined - UD1 [mg/L]	0	0
User defined - UD2 [mg/L]	0	0
User defined - UD3 [mgVSS/L]	0	0

User defined - UD4 [mgISS/L]	0	0
Biomass - Sulfur oxidizing [mgCOD/L]	0	1.91
Biomass - Sulfur reducing propionic acetogenic [mgCOD/L]	0	2.33
Biomass - Sulfur reducing acetotrophic [mgCOD/L]	0	2.15
Biomass - Sulfur reducing hydrogenotrophic [mgCOD/L]	0	1.69
Gas - Dissolved total sulfides [mgS/L]	0	0
S - Soluble sulfate [mgS/L]	0	0
S - Particulate elemental sulfur [mgS/L]	0	0
Precipitate - Ferrous sulfide [mgISS/L]	0	0
CODp - Adsorbed hydrocarbon [mgCOD/L]	0	0
CODs - Degradable volatile ind. #1 [mgCOD/L]	0	0
CODs - Degradable volatile ind. #2 [mgCOD/L]	0	0
CODs - Degradable volatile ind. #3 [mgCOD/L]	0	0
CODs - Soluble hydrocarbon [mgCOD/L]	0	0
Gas - Dissolved oxygen [mg/L]	0	2.00
Flow	0.0001	0.0152

BioWin Album

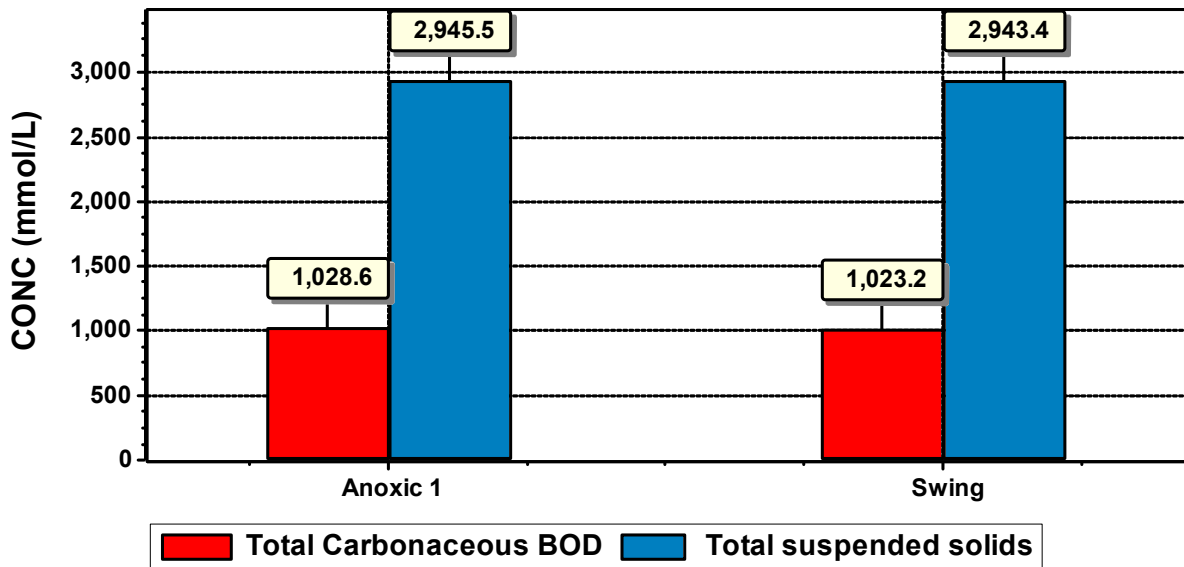
Album page - Nitrogen species

Chart



Album page - BOD_TSS

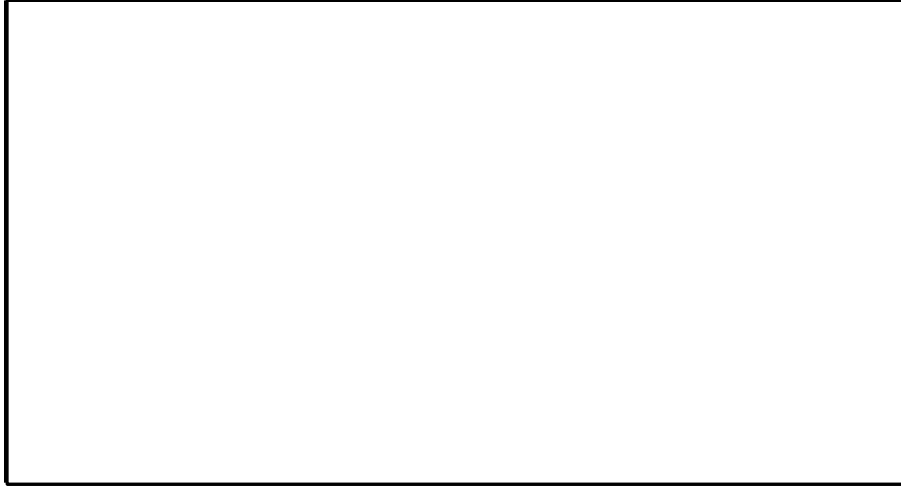
Chart



Album page - Page 3

Chart

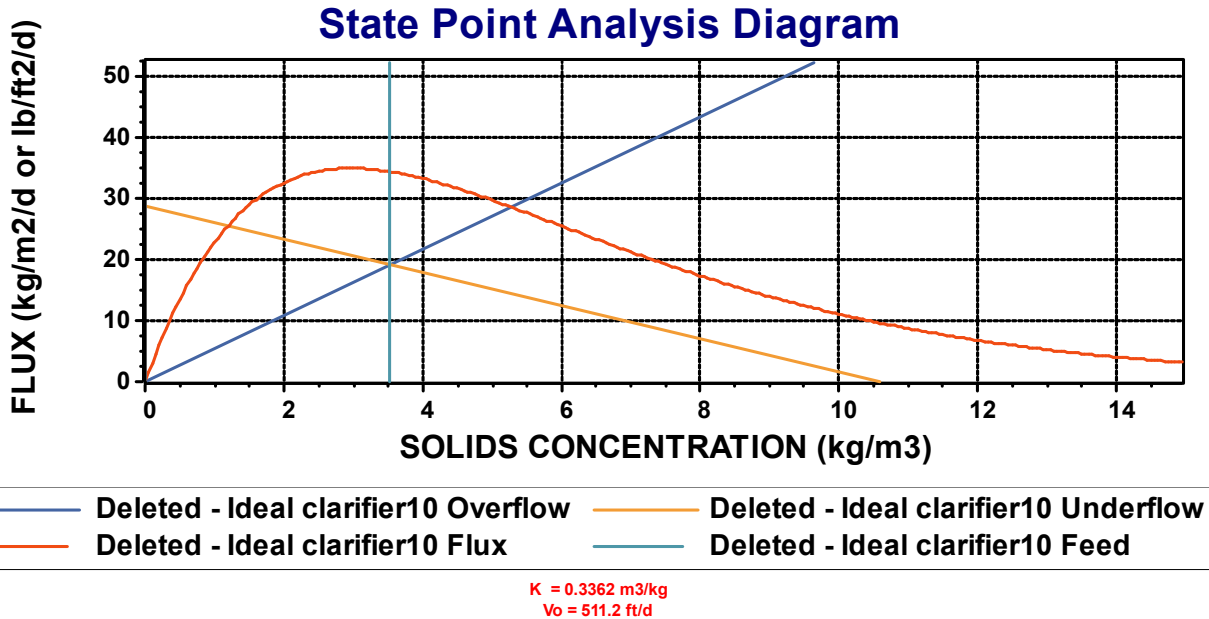
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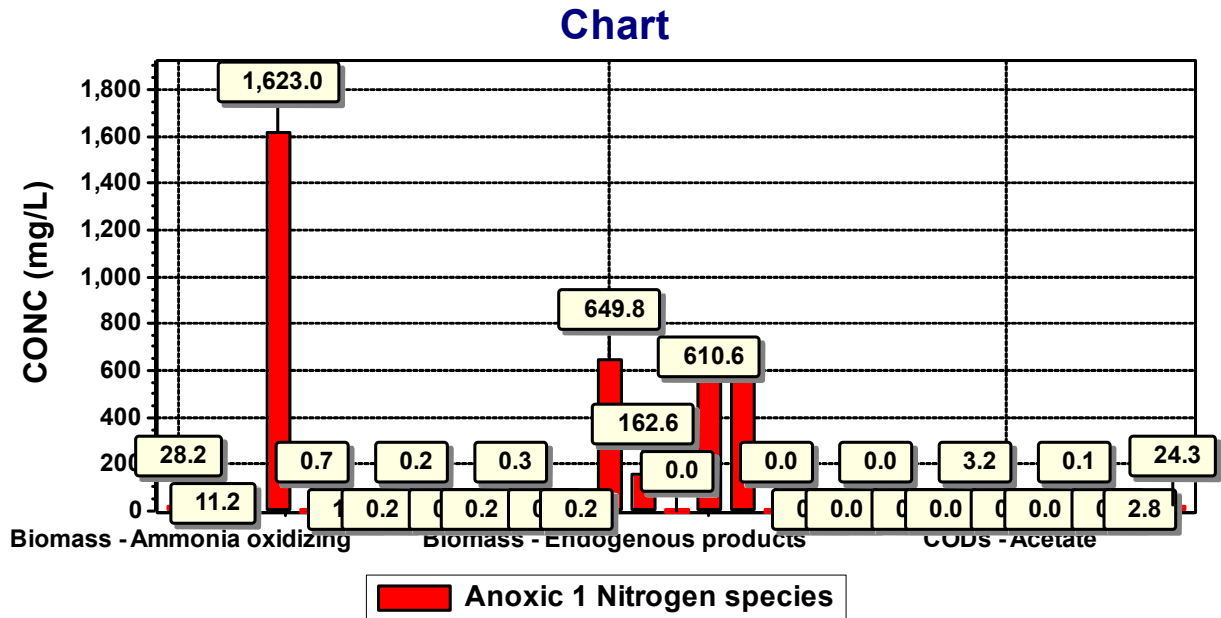
CONC (mg/L)

Album page - Page 4

Album page - Page 5

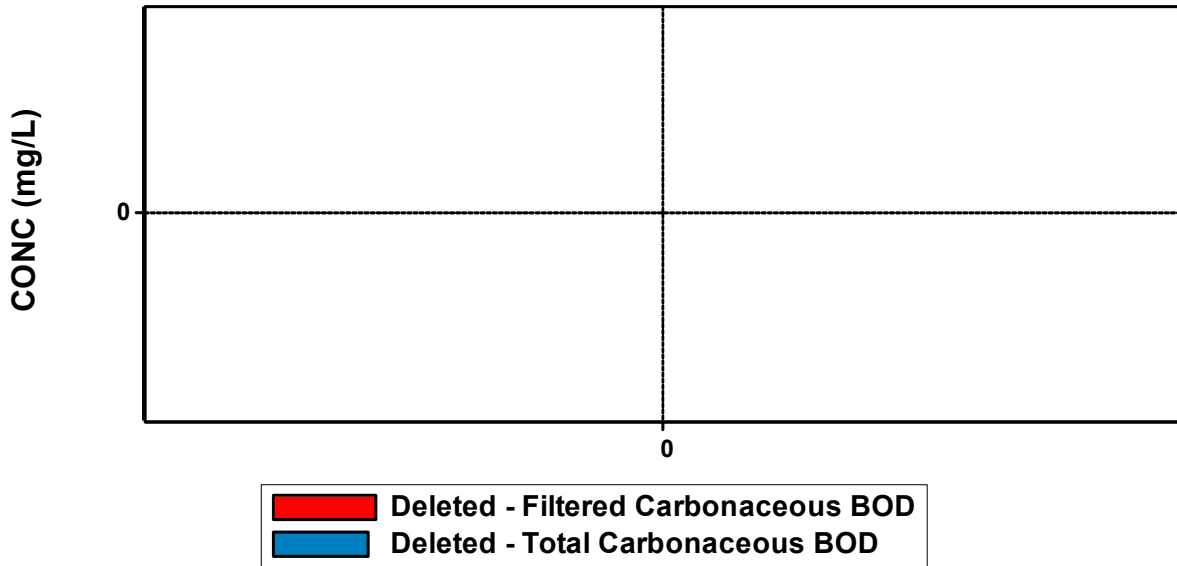


Album page - Page 6



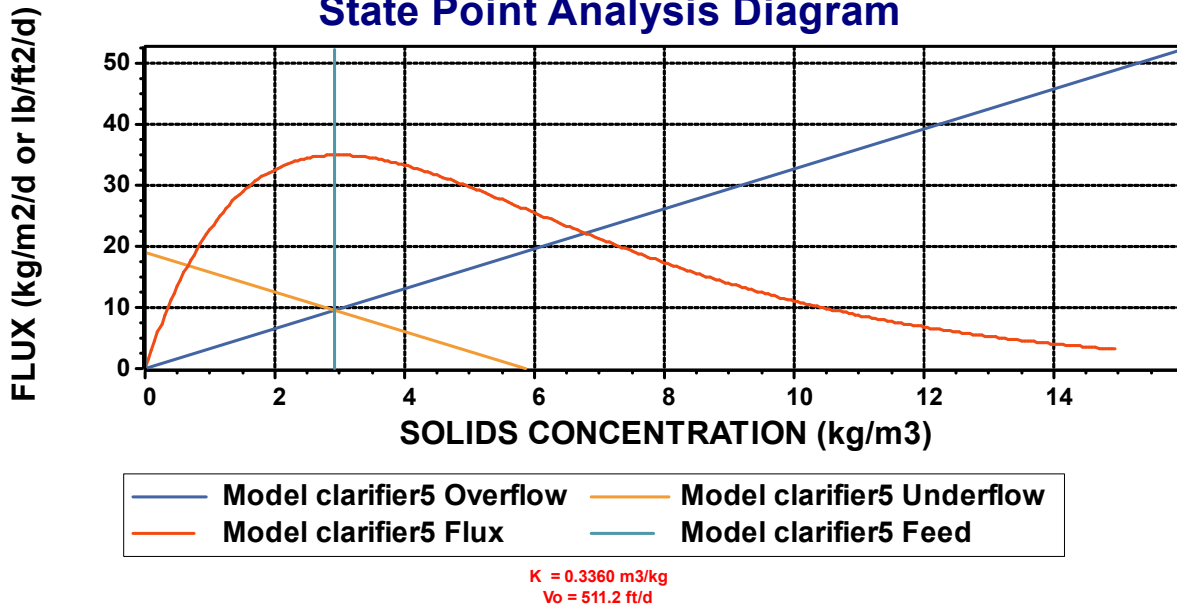
Album page - Page 7

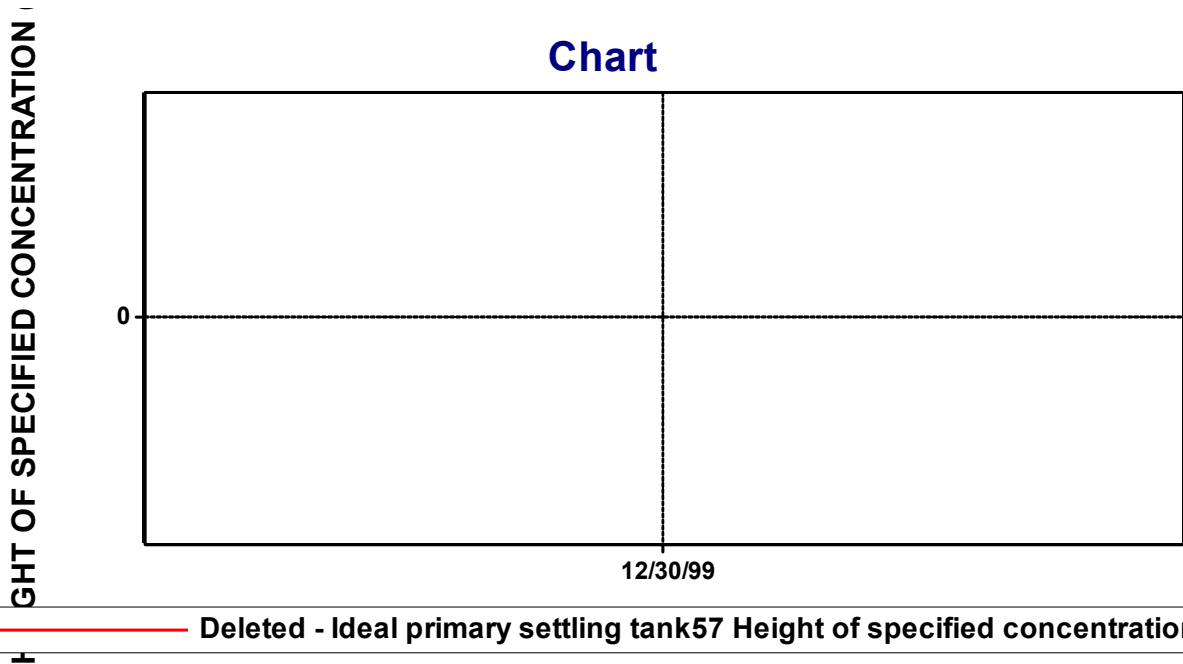
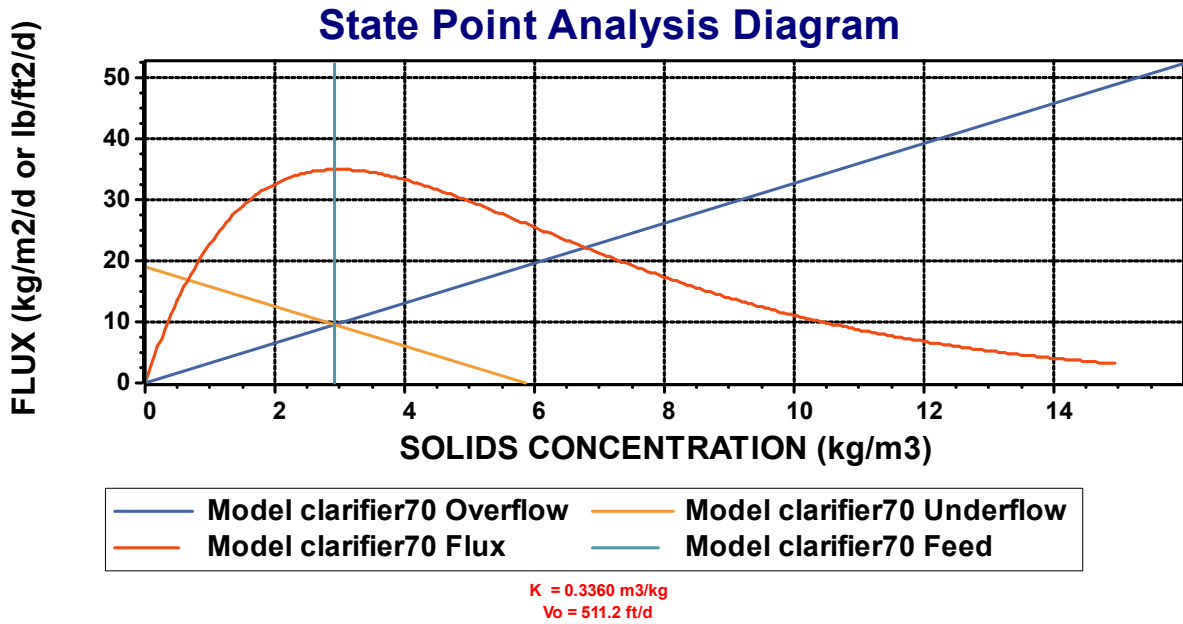
Chart



Album page - Page 8

State Point Analysis Diagram





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Album page - Page 12

Elements	Liquid volume [Mil. Gal]
Anoxic 1	0.04
Anoxic 2	0.04
Swing	0.04
Aerobic 1	0.26
Anoxic 1B	0.04
Anoxic 2B	0.04
Swing B	0.04
Aerobic 1B	0.26

Album page - Page 13

Elements	Air flow rate [ft3/min (20C, 1 atm)]
Anoxic 1	0
Anoxic 2	0
Swing	119.25
Aerobic 1	504.87
Anoxic 1B	0
Anoxic 2B	0
Swing B	119.25
Aerobic 1B	504.87

Album page - Existing Plant Summary

Elements	Flow [mgd]	Temperature [deg. C]	BO D - Total Carbonaceous [mg/L]	BO D - Filtered Carbonaceous [mg/L]	COD - Total [mg/L]	COD - Filtered [mg/L]	COD - Dissolved [mg/L]	Total suspended solids [mg/L]	Volatilized solids [mg/L]	pH []	Alkalinity [mg/L]	N - Total Kjeldahl Nitrogen [mg/L]	N - Ammonia [mg/L]	N - Nitrite [mg/L]	N - Nitrate [mg/L]	Air flow rate [ft3/min (20 C, 1 atm)]	OTR [lb/hr]	OUR - Total [mgO/L/hr]	SOUR [lb/hr]	Alphaha [l]
Influent - BO D49	1.78	11.00	17.902	54.58	37.361	10.700	45.21	20.279	18.800	7.10	2.00	30.00	22.06	0	0	----	----	----	----	----
Anoxic 1	3.57	11.00	10.2862	4.35	37.317	31.54	3.17	29.452	26.1151	6.65	1.64	21.904	7.73	0.53	0.45	0	0	0	0	0.50
Anoxic 2	3.57	11.00	10.2662	1.47	37.2912	27.64	0.53	29.4685	26.1282	6.68	1.71	21.904	7.91	0.04	0.04	0	0	0	0	0.50
Swing	3.57	11.00	10.2323	1.52	37.2308	26.91	1.76	29.4336	26.0908	6.55	1.60	21.833	6.89	0.43	0.33	11.925	12.45	31.70	46.06	0.40
Aerobic 1	3.57	11.00	10.0191	1.13	36.9018	25.94	1.58	29.2193	25.8659	6.28	1.02	21.447	2.49	1.86	2.51	50.487	59.34	27.62	20.572	0.43
Model clarifier5	0.90	11.00	3.72	1.13	35.41	25.94	1.58	7.55	6.68	6.28	1.02	4.19	2.49	1.86	2.51	----	----	----	----	----
Model clarifier5 (U)	0.89	11.00	20.0784	1.13	73.7329	25.94	1.58	58.5891	51.8651	6.28	1.02	42.637	2.49	1.86	2.51	----	----	----	----	----
Model clarifier70	0.90	11.00	3.72	1.13	35.41	25.94	1.58	7.55	6.68	6.28	1.02	4.19	2.49	1.86	2.51	----	----	----	----	----

Model clarifier70 (U)	0.89	11.00	20.07	1.13	73.29	25.94	1.58	58.91	51.51	6.28	1.02	42.63	2.49	1.86	2.51	----	----	----	----	----
Effluent29	1.79	11.00	3.72	1.13	35.41	25.94	1.58	7.55	6.68	6.28	1.02	4.19	2.49	1.86	2.51	----	----	----	----	----

Album page - New Plant Summary

Elements	BOD - Total Carbonaceous [mg/L]	COD - Filtered [mg/L]	Total suspended solids [mg/L]	Volatile suspended solids [mg/L]	pH []	Alkalinity [mmo/L]	N - Total Kjeldahl Nitrogen [mgN/L]	N - Ammonia [mgN/L]	N - Nitrite [mgN/L]	N - Nitrate [mgN/L]	Air flow rate [ft3/min (20C, 1 atm)]	OTR [lb/hr]	OUR - Total [mgO/L/hr]	SOTR [lb/hr]
Influent - BOD49	179.02	107.00	202.79	188.00	7.10	2.00	30.00	22.06	0	0	----	----	----	----
Anoxic 1B	1028.62	31.54	2945.52	2611.51	6.65	1.64	219.04	7.73	0.53	0.45	0	0	0	0
Anoxic 2B	1026.62	27.64	2946.85	2612.82	6.68	1.71	219.04	7.91	0.04	0.04	0	0	0	0
Swing B	1023.23	26.91	2943.36	2609.08	6.55	1.60	218.33	6.89	0.43	0.33	119.25	12.45	31.70	46.06
Aerobic 1B	1001.91	25.94	2921.93	2586.59	6.28	1.02	214.47	2.49	1.86	2.51	504.87	59.34	27.62	205.72
Model clarifier5	3.72	25.94	7.55	6.68	6.28	1.02	4.19	2.49	1.86	2.51	----	----	----	----
Model clarifier5 (U)	2007.84	25.94	5858.91	5186.51	6.28	1.02	426.37	2.49	1.86	2.51	----	----	----	----
Model clarifier70	3.72	25.94	7.55	6.68	6.28	1.02	4.19	2.49	1.86	2.51	----	----	----	----

Model clarifier70 (U)	2007.84	25.94	5858.91	5186.51	6.28	1.02	426.37	2.49	1.86	2.51	-----	-----	-----	-----
Effluent29	3.72	25.94	7.55	6.68	6.28	1.02	4.19	2.49	1.86	2.51	-----	-----	-----	-----

Global Parameters

Common

Name	Default	Value	
Hydrolysis rate [1/d]	2.1000	2.1000	1.0290
Hydrolysis half sat. [-]	0.0600	0.0600	1.0000
External organics hydrolysis rate [1/d]	2.1000	2.1000	1.0290
External organics hydrolysis half sat. [-]	0.0600	0.0600	1.0000
Anoxic hydrolysis factor [-]	0.2800	0.2800	1.0000
Anaerobic hydrolysis factor (AS) [-]	0.0400	0.0400	1.0000
Anaerobic hydrolysis factor (AD) [-]	0.5000	0.5000	1.0000
Adsorption rate of colloids [L/(mgCOD d)]	0.1500	0.1500	1.0290
Ammonification rate [L/(mgCOD d)]	0.0800	0.0800	1.0290
Assimilative nitrate/nitrite reduction rate [1/d]	0.5000	0.5000	1.0000
Endogenous products decay rate [1/d]	0	0	1.0000

Ammonia oxidizing

Name	Default	Value	
Max. spec. growth rate [1/d]	0.9000	0.9000	1.0720
Substrate (NH4) half sat. [mgN/L]	0.7000	0.7000	1.0000
Byproduct NH4 logistic slope [-]	50.0000	50.0000	1.0000
Byproduct NH4 inflection point [mgN/L]	1.4000	1.4000	1.0000
Denite DO half sat. [mg/L]	0.1000	0.1000	1.0000

Denite HNO2 half sat. [mgN/L]	5.000E-6	5.000E-6	1.0000
Aerobic decay rate [1/d]	0.1700	0.1700	1.0290
Anoxic/anaerobic decay rate [1/d]	0.0800	0.0800	1.0290
KiHNO2 [mmol/L]	5.000E-3	5.000E-3	1.0000

Nitrite oxidizing

Name	Default	Value	
Max. spec. growth rate [1/d]	0.7000	0.7000	1.0600
Substrate (NO2) half sat. [mgN/L]	0.1000	0.1000	1.0000
Aerobic decay rate [1/d]	0.1700	0.1700	1.0290
Anoxic/anaerobic decay rate [1/d]	0.0800	0.0800	1.0290
KiNH3 [mmol/L]	0.0750	0.0750	1.0000

Anaerobic ammonia oxidizing

Name	Default	Value	
Max. spec. growth rate [1/d]	0.2000	0.2000	1.1000
Substrate (NH4) half sat. [mgN/L]	2.0000	2.0000	1.0000
Substrate (NO2) half sat. [mgN/L]	1.0000	1.0000	1.0000
Aerobic decay rate [1/d]	0.0190	0.0190	1.0290
Anoxic/anaerobic decay rate [1/d]	9.500E-3	9.500E-3	1.0290
Ki Nitrite [mgN/L]	1000.0000	1000.0000	1.0000
Nitrite sensitivity constant [L / (d mgN)]	0.0160	0.0160	1.0000

Ordinary heterotrophic

Name	Default	Value	
Max. spec. growth rate [1/d]	3.2000	3.2000	1.0290

Substrate half sat. [mgCOD/L]	5.0000	5.0000	1.0000
Anoxic growth factor [-]	0.5000	0.5000	1.0000
Denite N2 producers (NO3 or NO2) [-]	0.5000	0.5000	1.0000
Aerobic decay rate [1/d]	0.6200	0.6200	1.0290
Anoxic decay rate [1/d]	0.2330	0.2330	1.0290
Anaerobic decay rate [1/d]	0.1310	0.1310	1.0290
Fermentation rate [1/d]	1.6000	1.6000	1.0290
Fermentation half sat. [mgCOD/L]	5.0000	5.0000	1.0000
Fermentation growth factor (AS) [-]	0.2500	0.2500	1.0000
Free nitrous acid inhibition [mol/L]	1.000E-7	1.000E-7	1.0000

Heterotrophic on industrial COD

Name	Default	Value	
Maximum specific growth rate on Ind #1 COD [1/d]	4.3000	4.3000	1.0290
Substrate (Ind #1) half sat. [mgCOD/L]	1.0000	1.0000	1.0000
Inhibition coefficient for Ind #1 [mgCOD/L]	60.0000	60.0000	1.0000
Anaerobic growth factor for Ind #1 [mgCOD/L]	0.0500	0.0500	1.0000
Maximum specific growth rate on Ind #2 COD [1/d]	1.5000	1.5000	1.0290
Substrate (Ind #2) half sat. [mgCOD/L]	30.0000	30.0000	1.0000
Inhibition coefficient for Ind #2 [mgCOD/L]	3000.0000	3000.0000	1.0000
Anaerobic growth factor for Ind #2 [mgCOD/L]	0.0500	0.0500	1.0000
Maximum specific growth rate on Ind #3 COD [1/d]	4.3000	4.3000	1.0290
Substrate (Ind #3) half sat. [mgCOD/L]	1.0000	1.0000	1.0000
Inhibition coefficient for Ind #3 COD [mgCOD/L]	60.0000	60.0000	1.0000
Anaerobic growth factor for Ind #3 [mgCOD/L]	0.0500	0.0500	1.0000
Maximum specific growth rate on adsorbed hydrocarbon COD [1/d]	2.0000	2.0000	1.0290
Substrate (adsorbed hydrocarbon) half sat. [-]	0.1500	0.1500	1.0000
Anaerobic growth factor for adsorbed hydrocarbons [mgCOD/L]	0.0100	0.0100	1.0000
Adsorption rate of soluble hydrocarbons [l/(mgCOD d)]	0.2000	0.2000	1.0000

Methylotrophic

Name	Default	Value	
Max. spec. growth rate [1/d]	1.3000	1.3000	1.0720
Methanol half sat. [mgCOD/L]	0.5000	0.5000	1.0000
Denite N2 producers (NO3 or NO2) [-]	0.5000	0.5000	1.0000
Aerobic decay rate [1/d]	0.0400	0.0400	1.0290
Anoxic/anaerobic decay rate [1/d]	0.0300	0.0300	1.0290
Free nitrous acid inhibition [mmol/L]	1.000E-7	1.000E-7	1.0000

Phosphorus accumulating

Name	Default	Value	
Max. spec. growth rate [1/d]	0.9500	0.9500	1.0000
Max. spec. growth rate, P-limited [1/d]	0.4200	0.4200	1.0000
Substrate half sat. [mgCOD(PHB)/mgCOD(Zbp)]	0.1000	0.1000	1.0000
Substrate half sat., P-limited [mgCOD(PHB)/mgCOD(Zbp)]	0.0500	0.0500	1.0000
Magnesium half sat. [mgMg/L]	0.1000	0.1000	1.0000
Cation half sat. [mmol/L]	0.1000	0.1000	1.0000
Calcium half sat. [mgCa/L]	0.1000	0.1000	1.0000
Aerobic/anoxic decay rate [1/d]	0.1000	0.1000	1.0000
Aerobic/anoxic maintenance rate [1/d]	0	0	1.0000
Anaerobic decay rate [1/d]	0.0400	0.0400	1.0000
Anaerobic maintenance rate [1/d]	0	0	1.0000
Sequestration rate [1/d]	4.5000	4.5000	1.0000
Anoxic growth factor [-]	0.3300	0.3300	1.0000

Propionic acetogenic

Name	Default	Value	
Max. spec. growth rate [1/d]	0.2500	0.2500	1.0290
Substrate half sat. [mgCOD/L]	10.0000	10.0000	1.0000

Acetate inhibition [mgCOD/L]	10000.0000	10000.0000	1.0000
Anaerobic decay rate [1/d]	0.0500	0.0500	1.0290
Aerobic/anoxic decay rate [1/d]	0.5200	0.5200	1.0290

Methanogenic

Name	Default	Value	
Acetoclastic max. spec. growth rate [1/d]	0.3000	0.3000	1.0290
H2-utilizing max. spec. growth rate [1/d]	1.4000	1.4000	1.0290
Acetoclastic substrate half sat. [mgCOD/L]	100.0000	100.0000	1.0000
Acetoclastic methanol half sat. [mgCOD/L]	0.5000	0.5000	1.0000
H2-utilizing CO2 half sat. [mmol/L]	0.1000	0.1000	1.0000
H2-utilizing substrate half sat. [mgCOD/L]	1.0000	1.0000	1.0000
H2-utilizing methanol half sat. [mgCOD/L]	0.5000	0.5000	1.0000
Acetoclastic propionic inhibition [mgCOD/L]	10000.0000	10000.0000	1.0000
Acetoclastic anaerobic decay rate [1/d]	0.1300	0.1300	1.0290
Acetoclastic aerobic/anoxic decay rate [1/d]	0.6000	0.6000	1.0290
H2-utilizing anaerobic decay rate [1/d]	0.1300	0.1300	1.0290
H2-utilizing aerobic/anoxic decay rate [1/d]	2.8000	2.8000	1.0290

Sulfur oxidizing

Name	Default	Value	
Maximum specific growth rate (sulfide) [1/d]	0.7500	0.7500	1.0290
Maximum specific growth rate (sulfur) [1/d]	0.1000	0.1000	1.0290
Substrate (H2S) half sat. [mgS/L]	1.0000	1.0000	1.0000
Substrate (sulfur) half sat. [mgS/L]	1.0000	1.0000	1.0000
Anoxic growth factor [-]	0.5000	0.5000	1.0000
Decay rate [1/d]	0.0400	0.0400	1.0290

Sulfur reducing

Name	Default	Value	
Propionic max. spec. growth rate [1/d]	0.5830	0.5830	1.0350
Propionic acid half sat. [mgCOD/L]	295.0000	295.0000	1.0000
Hydrogen sulfide inhibition coefficient [mgS/L]	185.0000	185.0000	1.0000
Sulfate (SO4=) half sat. [mgS/L]	2.4700	2.4700	1.0000
Decay rate [1/d]	0.0185	0.0185	1.0350
Acetotrophic max. spec. growth rate [1/d]	0.6120	0.6120	1.0350
Acetic acid half sat. [mgCOD/L]	24.0000	24.0000	1.0000
Hydrogen sulfide inhibition coefficient [mgS/L]	164.0000	164.0000	1.0000
Sulfate (SO4=) half sat. [mgS/L]	6.4100	6.4100	1.0000
Decay rate [1/d]	0.0275	0.0275	1.0350
Hydrogenotrophic max. spec. growth rate with SO4= [1/d]	2.8000	2.8000	1.0350
Hydrogenotrophic max. spec. growth rate with S [1/d]	0.1000	0.1000	1.0350
Hydrogen half sat. [mgCOD/L]	0.0700	0.0700	1.0000
Hydrogen sulfide inhibition coefficient [mgS/L]	550.0000	550.0000	1.0000
Sulfate (SO4=) half sat. [mgS/L]	6.4100	6.4100	1.0000
Sulfur (S) half sat. [mgS/L]	50.0000	50.0000	1.0000
Decay rate [1/d]	0.0600	0.0600	1.0350

pH

Name	Default	Value
Ordinary heterotrophic low pH limit [-]	4.0000	4.0000
Ordinary heterotrophic high pH limit [-]	10.0000	10.0000
Methylophilic low pH limit [-]	4.0000	4.0000
Methylophilic high pH limit [-]	10.0000	10.0000
Autotrophic low pH limit [-]	5.5000	5.5000
Autotrophic high pH limit [-]	9.5000	9.5000
Phosphorus accumulating low pH limit [-]	4.0000	4.0000
Phosphorus accumulating high pH limit [-]	10.0000	10.0000
Ordinary heterotrophic low pH limit (anaerobic) [-]	5.5000	5.5000

Ordinary heterotrophic high pH limit (anaerobic) [-]	8.5000	8.5000
Propionic acetogenic low pH limit [-]	4.0000	4.0000
Propionic acetogenic high pH limit [-]	10.0000	10.0000
Acetoclastic methanogenic low pH limit [-]	5.0000	5.0000
Acetoclastic methanogenic high pH limit [-]	9.0000	9.0000
H2-utilizing methanogenic low pH limit [-]	5.0000	5.0000
H2-utilizing methanogenic high pH limit [-]	9.0000	9.0000

Switches

Name	Default	Value
Ordinary heterotrophic DO half sat. [mgO2/L]	0.1500	0.0500
Phosphorus accumulating DO half sat. [mgO2/L]	0.0500	0.0500
Anoxic/anaerobic NOx half sat. [mgN/L]	0.1500	0.1500
Ammonia oxidizing DO half sat. [mgO2/L]	0.2500	0.2500
Nitrite oxidizing DO half sat. [mgO2/L]	0.5000	0.5000
Anaerobic ammonia oxidizing DO half sat. [mgO2/L]	0.0100	0.0100
Sulfur oxidizing sulfate pathway DO half sat. [mgO2/L]	0.2500	0.2500
Sulfur oxidizing sulfur pathway DO half sat. [mgO2/L]	0.0500	0.0500
Anoxic NO3(->NO2) half sat. [mgN/L]	0.1000	0.1000
Anoxic NO3(->N2) half sat. [mgN/L]	0.0500	0.0500
Anoxic NO2(->N2) half sat. (mgN/L)	0.0100	0.0100
NH3 nutrient half sat. [mgN/L]	5.000E-3	5.000E-3
PolyP half sat. [mgP/mgCOD]	0.0100	0.0100
VFA sequestration half sat. [mgCOD/L]	5.0000	5.0000
P uptake half sat. [mgP/L]	0.1500	0.1500
P nutrient half sat. [mgP/L]	1.000E-3	1.000E-3
Autotrophic CO2 half sat. [mmol/L]	0.1000	0.1000
H2 low/high half sat. [mgCOD/L]	1.0000	1.0000
Propionic acetogenic H2 inhibition [mgCOD/L]	5.0000	5.0000
Synthesis anion/cation half sat. [meq/L]	0.0100	0.0100

Common

Name	Default	Value
Biomass/Endog Ca content (gCa/gCOD)	3.912E-3	3.912E-3
Biomass/Endog Mg content (gMg/gCOD)	3.912E-3	3.912E-3
Biomass/Endog other cations content (mol/gCOD)	5.115E-4	5.115E-4
Biomass/Endog other Anions content (mol/gCOD)	1.410E-4	1.410E-4
N in endogenous residue [mgN/mgCOD]	0.0700	0.0700
P in endogenous residue [mgP/mgCOD]	0.0220	0.0220
Ca content of slowly biodegradable (gCa/gCOD)	3.912E-3	3.912E-3
Mg content of slowly biodegradable (gMg/gCOD)	3.700E-4	3.700E-4
Endogenous residue COD:VSS ratio [mgCOD/mgVSS]	1.4200	1.4200
Particulate substrate COD:VSS ratio [mgCOD/mgVSS]	1.6327	1.4200
Particulate inert COD:VSS ratio [mgCOD/mgVSS]	1.6000	1.4200
Cellulose COD:VSS ratio [mgCOD/mgVSS]	1.4000	1.4000
External organic COD:VSS ratio [mgCOD/mgVSS]	1.6000	1.6000
Molecular weight of other anions [mg/mmol]	35.5000	35.5000
Molecular weight of other cations [mg/mmol]	39.0983	39.1000

Ammonia oxidizing

Name	Default	Value
Yield [mgCOD/mgN]	0.1500	0.1500
Denite NO2 fraction as TEA [-]	0.5000	0.5000
Byproduct NH4 fraction to N2O [-]	2.500E-3	2.500E-3
N in biomass [mgN/mgCOD]	0.0700	0.0700
P in biomass [mgP/mgCOD]	0.0220	0.0220
Fraction to endogenous residue [-]	0.0800	0.0800
COD:VSS ratio [mgCOD/mgVSS]	1.4200	1.4200

Nitrite oxidizing

Name	Default	Value
Yield [mgCOD/mgN]	0.0900	0.0900
N in biomass [mgN/mgCOD]	0.0700	0.0700
P in biomass [mgP/mgCOD]	0.0220	0.0220
Fraction to endogenous residue [-]	0.0800	0.0800
COD:VSS ratio [mgCOD/mgVSS]	1.4200	1.4200

Anaerobic ammonia oxidizing

Name	Default	Value
Yield [mgCOD/mgN]	0.1140	0.1140
Nitrate production [mgN/mgBiomassCOD]	2.2800	2.2800
N in biomass [mgN/mgCOD]	0.0700	0.0700
P in biomass [mgP/mgCOD]	0.0220	0.0220
Fraction to endogenous residue [-]	0.0800	0.0800
COD:VSS ratio [mgCOD/mgVSS]	1.4200	1.4200

Ordinary heterotrophic

Name	Default	Value
Yield (aerobic) [-]	0.6660	0.6660
Yield (fermentation, low H2) [-]	0.1000	0.1000
Yield (fermentation, high H2) [-]	0.1000	0.1000
H2 yield (fermentation low H2) [-]	0.3500	0.3500
H2 yield (fermentation high H2) [-]	0	0
Propionate yield (fermentation, low H2) [-]	0	0
Propionate yield (fermentation, high H2) [-]	0.7000	0.7000
CO2 yield (fermentation, low H2) [-]	0.7000	0.7000
CO2 yield (fermentation, high H2) [-]	0	0
N in biomass [mgN/mgCOD]	0.0700	0.0700

P in biomass [mgP/mgCOD]	0.0220	0.0220
Endogenous fraction - aerobic [-]	0.0800	0.0800
Endogenous fraction - anoxic [-]	0.1030	0.1030
Endogenous fraction - anaerobic [-]	0.1840	0.1840
COD:VSS ratio [mgCOD/mgVSS]	1.4200	1.4200
Yield (anoxic) [-]	0.5400	0.5400
Yield propionic (aerobic) [-]	0.6400	0.6400
Yield propionic (anoxic) [-]	0.4600	0.4600
Yield acetic (aerobic) [-]	0.6000	0.6000
Yield acetic (anoxic) [-]	0.4300	0.4300
Yield methanol (aerobic) [-]	0.5000	0.5000
Adsorp. max. [-]	1.0000	1.0000
Max fraction to N2O at high FNA over nitrate [-]	0.0500	0.0500
Max fraction to N2O at high FNA over nitrite [-]	0.1000	0.1000

Ordinary heterotrophic on industrial COD

Name	Default	Value
Yield Ind #1 COD (Aerobic) [-]	0.5000	0.5000
Yield Ind #1 COD (Anoxic) [-]	0.4000	0.4000
Yield Ind #1 COD (Anaerobic) [-]	0.0400	0.0400
COD:Mole ratio - Ind #1 COD [gCOD/Mol]	224.0000	224.0000
Yield Ind #2 COD (Aerobic) [-]	0.5000	0.5000
Yield Ind #2 COD (Anoxic) [-]	0.4000	0.4000
Yield Ind #2 COD (Anaerobic) [-]	0.0500	0.0500
COD:Mole ratio - Ind #2 COD [gCOD/Mol]	240.0000	240.0000
Yield on Ind #3 COD (Aerobic) [-]	0.5000	0.5000
Yield on Ind #3 COD (Anoxic) [-]	0.4000	0.4000
Yield on Ind #3 COD (Anaerobic) [-]	0.0400	0.0400
COD:Mole ratio - Ind #3 COD [gCOD/Mol]	288.0000	288.0000
Yield enmeshed hydrocarbons (Aerobic) [-]	0.5000	0.5000
Yield enmeshed hydrocarbons (Anoxic) [-]	0.4000	0.4000
Yield enmeshed hydrocarbons (Anaerobic) [-]	0.0400	0.0400

COD:Mole ratio - Hydrocarbon COD [gCOD/Mol]	336.0000	336.0000
Hydrocarbon COD:VSS ratio [mgCOD/mgVSS]	3.2000	3.2000
Max. hydrocarbon adsorp. ratio [-]	1.0000	1.0000
Yield of Ind #1 on Ind #3 COD (Aerobic) [-]	0	0
Yield of Ind #1 on Ind #3 COD (Anoxic) [-]	0	0
Hydrocarbon Yield on Ind #3 COD (Aerobic) [-]	0	0
Hydrocarbon Yield on Ind #3 COD (Anoxic) [-]	0	0

Methylotrophic

Name	Default	Value
Yield (anoxic) [-]	0.4000	0.4000
N in biomass [mgN/mgCOD]	0.0700	0.0700
P in biomass [mgP/mgCOD]	0.0220	0.0220
Fraction to endogenous residue [-]	0.0800	0.0800
COD:VSS ratio [mgCOD/mgVSS]	1.4200	1.4200
Max fraction to N2O at high FNA over nitrate [-]	0.1000	0.1000
Max fraction to N2O at high FNA over nitrite [-]	0.1500	0.1500

Phosphorus accumulating

Name	Default	Value
Yield (aerobic) [-]	0.6390	0.6390
Yield (anoxic) [-]	0.5200	0.5200
Aerobic P/PHA uptake [mgP/mgCOD]	0.9300	0.9300
Anoxic P/PHA uptake [mgP/mgCOD]	0.3500	0.3500
Yield of PHA on Ac sequestration [-]	0.8890	0.8890
N in biomass [mgN/mgCOD]	0.0700	0.0700
N in sol. inert [mgN/mgCOD]	0.0700	0.0700
P in biomass [mgP/mgCOD]	0.0220	0.0220
Fraction to endogenous part. [-]	0.2500	0.2500

Inert fraction of endogenous sol. [-]	0.2000	0.2000
P/Ac release ratio [mgP/mgCOD]	0.5100	0.5100
COD:VSS ratio [mgCOD/mgVSS]	1.4200	1.4200
Yield of low PP [-]	0.9400	0.9400
Mg to P mole ratio in polyphosphate [mmolMg/mmolP]	0.3000	0.3000
Cation to P mole ratio in polyphosphate [meq/mmolP]	0.1500	0.1500
Ca to P mole ratio in polyphosphate [mmolCa/mmolP]	0.0500	0.0500

Propionic acetogenic

Name	Default	Value
Yield [-]	0.1000	0.1000
H2 yield [-]	0.4000	0.4000
CO2 yield [-]	1.0000	1.0000
N in biomass [mgN/mgCOD]	0.0700	0.0700
P in biomass [mgP/mgCOD]	0.0220	0.0220
Fraction to endogenous residue [-]	0.0800	0.0800
COD:VSS ratio [mgCOD/mgVSS]	1.4200	1.4200

Methanogenic

Name	Default	Value
Acetoclastic yield [-]	0.1000	0.1000
Acetoclastic yield on methanol[-]	0.1000	0.1000
H2-utilizing yield [-]	0.1000	0.1000
H2-utilizing yield on methanol [-]	0.1000	0.1000
N in acetoclastic biomass [mgN/mgCOD]	0.0700	0.0700
N in H2-utilizing biomass [mgN/mgCOD]	0.0700	0.0700
P in acetoclastic biomass [mgP/mgCOD]	0.0220	0.0220
P in H2-utilizing biomass [mgP/mgCOD]	0.0220	0.0220
Acetoclastic fraction to endog. residue [-]	0.0800	0.0800

H2-utilizing fraction to endog. residue [-]	0.0800	0.0800
Acetoclastic COD:VSS ratio [mgCOD/mgVSS]	1.4200	1.4200
H2-utilizing COD:VSS ratio [mgCOD/mgVSS]	1.4200	1.4200

Sulfur oxidizing

Name	Default	Value
Yield (aerobic) [mgCOD/mgS]	0.5000	0.5000
Yield (Anoxic) [mgCOD/mgS]	0.3500	0.3500
N in biomass [mgN/mgCOD]	0.0700	0.0700
P in biomass [mgP/mgCOD]	0.0220	0.0220
Fraction to endogenous residue [-]	0.0800	0.0800
COD:VSS ratio [mgCOD/mgVSS]	1.4200	1.4200

Sulfur reducing

Name	Default	Value
Yield [mgCOD/mg H2 COD]	0.0712	0.0712
Yield [mgCOD/mg Ac COD]	0.0470	0.0470
Yield [mgCOD/mg Pr COD]	0.0384	0.0384
N in biomass [mgN/mgCOD]	0.0700	0.0700
P in biomass [mgP/mgCOD]	0.0220	0.0220
Fraction to endogenous residue [-]	0.0800	0.0800
COD:VSS ratio [mgCOD/mgVSS]	1.4200	1.4200

General

Name	Default	Value
Tank head loss per metre of length (from flow) [m/m]	2.500E-3	2.500E-3

BOD calculation rate constant for X _{sc} degradation [1/d]	0.5000	0.5000
BOD calculation rate constant for X _{sp} (and hydrocarbon) degradation [1/d]	0.5000	0.5000
BOD calculation rate constant for X _{eo} degradation [1/d]	0.5000	0.5000

Heating fuel/Chemical Costs

Name	Default	Value
Methanol [\$/gal]	1.6656	1.6656
Ferric chloride [\$/lb Fe]	0.5307	0.5307
Ferric sulfate [\$/lb Fe]	0.3583	0.3583
Ferrous chloride [\$/lb Fe]	0.2767	0.2767
Ferrous sulfate [\$/lb Fe]	1.0750	1.0750
Aluminum sulfate [\$/lb Al]	0.7666	0.7666
Aluminum chloride [\$/lb Al]	0.8981	0.8981
Poly Aluminum Chloride (PAC) [\$/lb Al]	0.5307	0.5307
Natural gas [\$/MMBTU]	3.1652	3.1652
Heating oil [\$/gal]	1.8927	1.8927
Diesel [\$/gal]	2.6498	2.6498
Custom fuel [\$/gal]	3.7854	3.7854
Biogas sale price [\$/MMBTU]	2.1101	2.1101

Anaerobic digester

Name	Default	Value
Bubble rise velocity (anaerobic digester) [cm/s]	23.9000	23.9000
Bubble Sauter mean diameter (anaerobic digester) [cm]	0.3500	0.3500
Anaerobic digester gas hold-up factor []	1.0000	1.0000

Combined Heat and Power (CHP) engine

Name	Default	Value
Methane heat of combustion [kJ/mole]	800.0000	800.0000
Hydrogen heat of combustion [kJ/mole]	240.0000	240.0000
CHP engine heat price [\$/kWh]	0	0
CHP engine power price [\$/kWh]	0.1500	0.1500

Calorific values of heating fuels

Name	Default	Value
Calorific value of natural gas [BTU/lb]	20636	20636
Calorific value of heating fuel oil [BTU/lb]	18057	18057
Calorific value of diesel [BTU/lb]	19776	19776
Calorific value of custom fuel [BTU/lb]	13758	13758

Density of liquid heating fuels

Name	Default	Value
Density of heating fuel oil [lb/ft3]	56	56
Density of diesel [lb/ft3]	55	55
Density of custom fuel [lb/ft3]	49	49

Mass transfer

Name	Default	Value
Kl for H2 [m/d]	17.0000	17.0000 1.0240
Kl for CO2 [m/d]	10.0000	10.0000 1.0240
Kl for NH3 [m/d]	1.0000	1.0000 1.0240

KI for CH4 [m/d]	8.0000	8.0000	1.0240
KI for N2 [m/d]	15.0000	15.0000	1.0240
KI for N2O [m/d]	8.0000	8.0000	1.0240
KI for H2S [m/d]	1.0000	1.0000	1.0240
KI for Ind #1 COD [m/d]	0	0	1.0240
KI for Ind #2 COD [m/d]	0.5000	0.5000	1.0240
KI for Ind #3 COD [m/d]	0	0	1.0240
KI for O2 [m/d]	13.0000	13.0000	1.0240

Henry's law constants

Name	Default	Value	
CO2 [M/atm]	3.4000E-2	3.4000E-2	2400.0000
O2 [M/atm]	1.3000E-3	1.3000E-3	1500.0000
N2 [M/atm]	6.5000E-4	6.5000E-4	1300.0000
N2O [M/atm]	2.5000E-2	2.5000E-2	2600.0000
NH3 [M/atm]	5.8000E+1	5.8000E+1	4100.0000
CH4 [M/atm]	1.4000E-3	1.4000E-3	1600.0000
H2 [M/atm]	7.8000E-4	7.8000E-4	500.0000
H2S [M/Atm]	1.0000E-1	1.0000E-1	2200.0000
Ind 1 [M/Atm]	1.9000E+3	1.9000E+3	7300.0000
Ind 2 [M/Atm]	1.8000E-1	1.8000E-1	2200.0000
Ind 3 [M/Atm]	1.5000E-1	1.5000E-1	1900.0000

Properties constants

Name	Default	Value
K in Viscosity = $K e^{-(Ea/RT)}$ [Pa s]	6.849E-7	6.849E-7
Ea in Viscosity = $K e^{-(Ea/RT)}$ [J/mol]	1.780E+4	1.780E+4
Y in ML Viscosity = H2O viscosity * (1+A*MLSS^Y) [-]	1.0000	1.0000
A in ML Viscosity = H2O viscosity * (1+A*MLSS^Y) [m3/g]	1.000E-7	1.000E-7

A in ML Density = H2O density + A*MLSS [(kg/m3)/(g/m3)]	3.248E-4	3.248E-4
A in Antoine eqn. [T in K, P in Bar {NIST}]	5.2000	5.2039
B in Antoine eqn. [T in K, P in Bar {NIST}]	1734.0000	1733.9260
C in Antoine eqn. [T in K, P in Bar {NIST}]	-39.5000	-39.4800

Metal salt solution densities

Name	Default	Value
Ferric chloride solution density [kg/m3]	3820.0000	3820.0000
Ferric sulfate solution density [kg/m3]	4800.0000	4800.0000
Ferrous chloride solution density [kg/m3]	3160.0000	3160.0000
Ferrous sulfate solution density [kg/m3]	1150.0000	1150.0000
Aluminum sulfate solution density [kg/m3]	1950.0000	1950.0000
Aluminum chloride solution density [kg/m3]	2480.0000	2480.0000

Mineral precipitation rates

Name	Default	Value	
Vivianite precipitation rate [L/(mol d)]	1.000E+5	1.000E+5	1.0240
Vivianite redissolution rate [L/(mol d)]	1.000E+5	1.000E+5	1.0240
Vivianite half sat. [mgTSS/L]	0.0100	0.0100	1.0000
FeS precipitation rate [L/(mol d)]	1000.0000	1000.0000	1.0240
FeS redissolution rate [L/(mol d)]	10.0000	10.0000	1.0240
FeS half sat. [mgTSS/L]	0.1000	0.1000	1.0000
Struvite precipitation rate [L ² /(mol ² d)]	3.000E+10	3.000E+10	1.0240
Struvite redissolution rate [L ² /(mol ² d)]	3.000E+11	3.000E+11	1.0240
Struvite half sat. [mgTSS/L]	1.0000	1.0000	1.0000
Brushite precipitation rate [L/(mol d)]	1.000E+6	1.000E+6	1.0000
Brushite redissolution rate [L/(mol d)]	10000.0000	10000.0000	1.0000
Brushite half sat. [mgTSS/L]	1.0000	1.0000	1.0000
HAP precipitation rate [g/d]	5.000E-4	5.000E-4	1.0000

Mineral precipitation constants

Name	Default	Value
Vivianite solubility product [mol/L] ⁵	1.710E-36	1.710E-36
FeS solubility product [mol/L] ²	4.258E-4	4.258E-4
Struvite solubility product [mol/L] ³	6.918E-14	6.918E-14
Brushite solubility product [mol/L] ²	2.490E-7	2.490E-7

Fe rates

Name	Default	Value	
A in aging rate = $A * \exp(-G/B)$ [1/d]	16.1550	16.1550	1.0000
B in aging rate = $A * \exp(-G/B)$ [1/s]	57.3000	57.3000	1.0000
HFO(L) aging rate factor	2.500E-4	2.500E-4	1.0000
HFO(H) with H ₂ PO ₄ ⁻ bound aging factor []	1.000E-5	1.000E-5	1.0000
HFO(L) with H ₂ PO ₄ ⁻ bound aging factor []	0.4000	0.4000	1.0000
H ₂ PO ₄ ⁻ coprecipitation rate [mol/(L d)]	1.500E-9	1.500E-9	1.0000
H ₂ PO ₄ ⁻ Adsorption rate [mol/(L d)]	2.000E-11	2.000E-11	1.0000
H ⁺ competition for HFO(H) protonation sites [L/(mmol . d)]	1000.0000	1000.0000	1.0000
H ⁺ competition for HFO(L) protonation sites [L/(mmol . d)]	100.0000	100.0000	1.0000

Fe constants

Name	Default	Value
Ferric active site factor(high) [{mol Sites}/{mol HFO(H)}]	4.0000	2.0000
Ferric active site factor(low) [{mol Sites}/{mol HFO(L)}]	2.4000	1.2000
H ⁺ competition level for Fe(OH) ₃ [mol/L]	7.000E-7	7.000E-7
Equilibrium constant for FeOH ₃ -H ₂ PO ₄ ⁻ [{mf HFO(H).H ₂ PO ₄ }/({mol H ₂ PO ₄ ⁻ }{mf HFO(H)} ²)]	2.000E-9	2.000E-9

Colloidal COD removed with Ferric [gCOD/Fe active site]	80.0000	130.0000
Minimum residual P level with iron addition [mgP/L]	0.0150	0.0150
HFO(H) with H2PO4- P release factor	10000.0000	10000.0000
HFO(L) with H2PO4- P release factor	10000.0000	10000.0000

Fe RedOx rates

Name	Default	Value	
Iron reduction using acetic acid	1.000E-7	1.000E-7	1.0000
Half Sat. acetic acid	0.5000	0.5000	1.0000
Iron reduction using propionic acid	1.000E-7	1.000E-7	1.0000
Half Sat. propionic acid	0.5000	0.5000	1.0000
Iron reduction using dissolved hydrogen gas	1.000E-7	1.000E-7	1.0000
Half Sat. dissolved hydrogen gas	0.5000	0.5000	1.0000
Iron reduction using hydrogen sulfide	5.000E-5	5.000E-5	1.0000
Half Sat. hydrogen sulfide	0.5000	0.5000	1.0000
Iron oxidation rate (aerobic)	1.000E-3	1.000E-3	1.0000
Abiotic iron reduction using acetic acid	2.000E-5	2.000E-5	1.0000
Abiotic iron reduction using propionic acid	2.000E-5	2.000E-5	1.0000
Abiotic iron reduction using dissolved hydrogen gas	2.000E-5	2.000E-5	1.0000
Abiotic iron reduction using hydrogen sulfide	2.000E-5	2.000E-5	1.0000
Abiotic iron oxidation rate (aerobic)	1.0000	1.0000	1.0000

Project details

Project name: Unknown Project ref.: BW1

Plant name: Unknown

User name: Jason.Flowers

Created: 5/18/2018

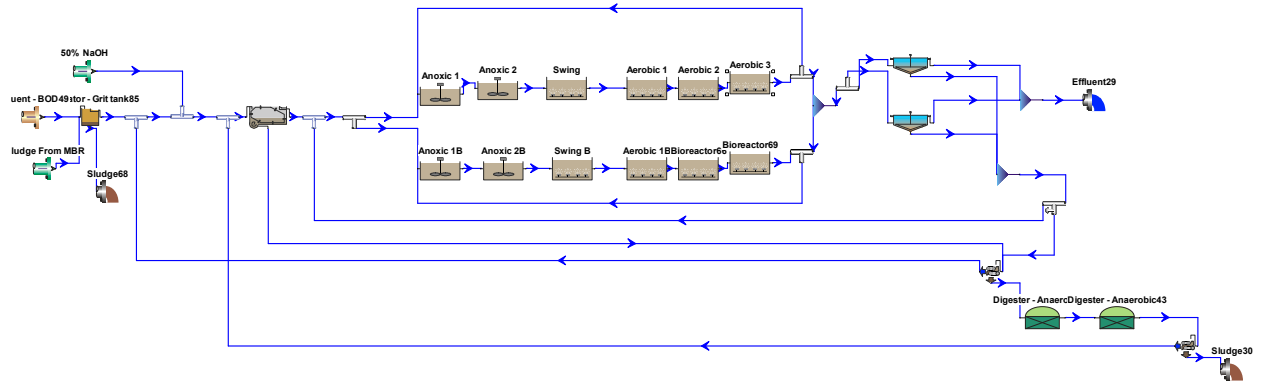
Saved: 9/16/2020

Steady state solution

Target SRT: 7.00 days SRT #0: 6.96 days

Temperature: 22.0°C

Flowsheet



Element name	Volume [Mil. Gal]	Area [ft2]	Depth [ft]
Settler - Ideal primary46	0.3723	3318.0000	15.000

Operating data Average (flow/time weighted as required)

Element name	Split method	Average Split specification
Settler - Ideal primary46	Flowrate [Under]	0.0164

Element name	Percent removal	Blanket fraction
Settler - Ideal primary46	45.00	0.10

Configuration information for all Digester - Anaerobic units

Physical data

Element name	Volume [Mil. Gal]	Area [ft2]	Depth [ft]	Head space volume
Digester - Anaerobic37	0.2500	1671.0070	20.000	0.1
Digester - Anaerobic43	0.4470	3734.7007	16.000	0.1

Operating data Average (flow/time weighted as required)

Element name	Pressure [psi]	pH
Digester - Anaerobic37	14.9	-
Digester - Anaerobic43	14.9	-

Element name	Average Temperature
Digester - Anaerobic37	35.0
Digester - Anaerobic43	35.0

Configuration information for all Bioreactor units

Physical data

Element name	Volume [Mil. Gal]	Area [ft2]	Depth [ft]	# of diffusers
Anoxic 1	0.0377	278.7476	18.080	Un-aerated
Anoxic 2	0.0377	278.7476	18.080	Un-aerated
Swing	0.0377	278.7476	18.080	63
Aerobic 1	0.0858	634.3912	18.080	144
Anoxic 1B	0.0377	278.7476	18.080	Un-aerated
Anoxic 2B	0.0377	278.7476	18.080	Un-aerated
Swing B	0.0377	278.7476	18.080	63
Aerobic 1B	0.0858	634.3912	18.080	144
Aerobic 2	0.0858	634.3912	18.080	144
Bioreactor66	0.0858	634.3912	18.080	144
Aerobic 3	0.0858	634.3912	18.080	144
Bioreactor69	0.0858	634.3912	18.080	144

Operating data Average (flow/time weighted as required)

Aeration equipment parameters

Element name	k_1 in C = $k_1(PC)^{0.25 + k_2}$	k_2 in C = $k_2(PC)^{0.25 + k_2}$	Y in $Kla = C Usg \cdot Y$ in [m ³ /(m ² d)]	Area of one diffuser	Diffuser mounting height	Min. air flow rate per diffuser (20C, 1 atm)	Max. air flow rate per diffuser (20C, 1 atm)	'A' in diffuser pressure drop = $A + B^*(Qa/Diff) + C^*(Qa/Diff)^2$	'B' in diffuser pressure drop = $A + B^*(Qa/Diff) + C^*(Qa/Diff)^2$	'C' in diffuser pressure drop = $A + B^*(Qa/Diff) + C^*(Qa/Diff)^2$
Anoxic 1	1.2400	0.8960	0.8880	0.4413	0.2500	0.2943	5.8858	3.0000	0	0
Anoxic 2	1.2400	0.8960	0.8880	0.4413	0.2500	0.2943	5.8858	3.0000	0	0
Swing	1.2400	0.8960	0.8880	0.4413	0.2500	0.2943	5.8858	3.0000	0	0
Aerobic 1	1.2400	0.8960	0.8880	0.4413	0.2500	0.2943	5.8858	3.0000	0	0
Anoxic 1B	1.2400	0.8960	0.8880	0.4413	0.2500	0.2943	5.8858	3.0000	0	0
Anoxic 2B	1.2400	0.8960	0.8880	0.4413	0.2500	0.2943	5.8858	3.0000	0	0
Swing B	1.2400	0.8960	0.8880	0.4413	0.2500	0.2943	5.8858	3.0000	0	0
Aerobic 1B	1.2400	0.8960	0.8880	0.4413	0.2500	0.2943	5.8858	3.0000	0	0
Aerobic 2	1.2400	0.8960	0.8880	0.4413	0.2500	0.2943	5.8858	3.0000	0	0
Bioreactor66	1.2400	0.8960	0.8880	0.4413	0.2500	0.2943	5.8858	3.0000	0	0
Aerobic 3	1.2400	0.8960	0.8880	0.4413	0.2500	0.2943	5.8858	3.0000	0	0
Bioreactor69	1.2400	0.8960	0.8880	0.4413	0.2500	0.2943	5.8858	3.0000	0	0

Configuration information for all Influent - BOD units

Operating data Average (flow/time weighted as required)

Element name	Influent - BOD49
Flow	1.21
BOD - Total Carbonaceous mgBOD/L	339.38
Volatile suspended solids mg/L	303.90
Total suspended solids mg/L	327.14
N - Total Kjeldahl Nitrogen mgN/L	56.50

P - Total P mgP/L	5.10
S - Total S mgS/L	0
N - Nitrate mgN/L	0
pH	7.10
Alkalinity mmol/L	4.00
Metal soluble - Calcium mg/L	11.10
Metal soluble - Magnesium mg/L	3.20
Gas - Dissolved oxygen mg/L	0

Element name	Influent - BOD49
Fbs - Readily biodegradable (including Acetate) [gCOD/g of total COD]	0.1410
Fac - Acetate [gCOD/g of readily biodegradable COD]	0.1418
Fxsp - Non-colloidal slowly biodegradable [gCOD/g of slowly degradable COD]	0.7115
Fus - Unbiodegradable soluble [gCOD/g of total COD]	0.0650
Fup - Unbiodegradable particulate [gCOD/g of total COD]	0.1300
Fcel - Cellulose fraction of unbiodegradable particulate [gCOD/gCOD]	0.5000
Fna - Ammonia [gNH3-N/gTKN]	0.7353
Fnox - Particulate organic nitrogen [gN/g Organic N]	0.5000
Fnus - Soluble unbiodegradable TKN [gN/gTKN]	0.0200
FupN - N:COD ratio for unbiodegradable part. COD [gN/gCOD]	0.0700
Fpo4 - Phosphate [gPO4-P/gTP]	0.4717
FupP - P:COD ratio for unbiodegradable part. COD [gP/gCOD]	0.0220
Fsr - Reduced sulfur [H2S] [gS/gS]	0
FZbh - Ordinary heterotrophic COD fraction [gCOD/g of total COD]	0.0200
FZbm - Methyloctrophic COD fraction [gCOD/g of total COD]	1.000E-4
FZao - Ammonia oxidizing COD fraction [gCOD/g of total COD]	1.000E-4
FZno - Nitrite oxidizing COD fraction [gCOD/g of total COD]	1.000E-4
FZaao - Anaerobic ammonia oxidizing COD fraction [gCOD/g of total COD]	1.000E-4
FZppa - Phosphorus accumulating COD fraction [gCOD/g of total COD]	1.000E-4
FZpa - Propionic acetogenic COD fraction [gCOD/g of total COD]	1.000E-4
FZam - Acetoclastic methanogenic COD fraction [gCOD/g of total COD]	1.000E-4
FZhm - Hydrogenotrophic methanogenic COD fraction [gCOD/g of total COD]	1.000E-4
FZso - Sulfur oxidizing COD fraction [gCOD/g of total COD]	1.000E-4
FZsrpa - Sulfur reducing propionic acetogenic COD fraction [gCOD/g of total COD]	1.000E-4

FZsra - Sulfur reducing acetotrophic COD fraction [gCOD/g of total COD]	1.000E-4
FZsrh - Sulfur reducing hydrogenotrophic COD fraction [gCOD/g of total COD]	1.000E-4
FZe - Endogenous products COD fraction [gCOD/g of total COD]	0

Configuration information for all Clarifier - Model units

Physical data

Element name	Volume[Mil. Gal]	Area[ft2]	Depth[ft]	Number of layers	Top feed layer	Feed Layers
Model clarifier5	0.2570	2290.0000	15.000	10	6	1
Model clarifier70	0.2570	2290.0000	15.000	10	6	1

Operating data Average (flow/time weighted as required)

Element name	Split method	Average Split specification
Model clarifier5	Flow paced	50.00 %
Model clarifier70	Flow paced	50.00 %

Element name	Average Temperature	Reactive
Model clarifier5	Uses global setting	No
Model clarifier70	Uses global setting	No

Configuration information for all Separator - Grit tank units

Element name	Volume [Mil. Gal]	Area [ft2]	Depth [ft]
Separator - Grit tank85	4.000E-3	89.1204	6.000

Operating data Average (flow/time weighted as required)

Element name	Split method	Average Split specification
Separator - Grit tank85	Flowrate [Under]	0.0002642

Element name	Percent removal	Blanket fraction
Separator - Grit tank85	65.00	0.10

Configuration information for all Separator - Dewatering unit units

Operating data Average (flow/time weighted as required)

Element name	Split method	Average Split specification
Separator - Dewatering unit83	Fraction	0.11
Separator - Dewatering unit48	Fraction	0.17

Element name	Percent removal
Separator - Dewatering unit83	90.00
Separator - Dewatering unit48	90.00

Configuration information for all Splitter units

Operating data Average (flow/time weighted as required)

Element name	Split method	Average Split specification
Splitter11	Flow paced	100.00 %
Splitter12	Flow paced	100.00 %
Splitter13	Fraction	0.50
Splitter40	Flowrate [Side]	0.0529285713907653
Splitter32	Fraction	0.50

Configuration information for all Influent - State variable units

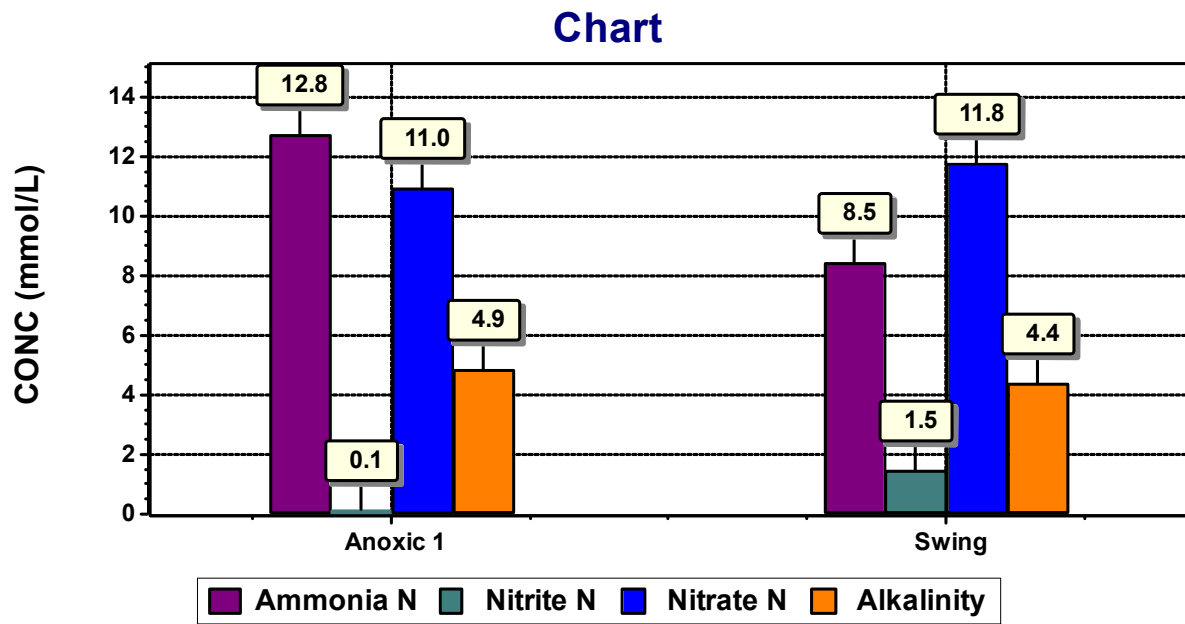
Operating data Average (flow/time weighted as required)

Element name	50% NaOH	Sludge From MBR
Biomass - Ordinary heterotrophic [mgCOD/L]	0	3337.76
Biomass - Methylotrophic [mgCOD/L]	0	1.70
Biomass - Ammonia oxidizing [mgCOD/L]	0	48.02
Biomass - Nitrite oxidizing [mgCOD/L]	0	28.69
Biomass - Anaerobic ammonia oxidizing [mgCOD/L]	0	2.36
Biomass - Phosphorus accumulating [mgCOD/L]	0	11.15
Biomass - Propionic acetogenic [mgCOD/L]	0	0.35
Biomass - Acetoclastic methanogenic [mgCOD/L]	0	0.30
Biomass - Hydrogenotrophic methanogenic [mgCOD/L]	0	0.08
Biomass - Endogenous products [mgCOD/L]	0	2379.38
CODp - Slowly degradable particulate [mgCOD/L]	0	186.16
CODp - Slowly degradable colloidal [mgCOD/L]	0	0.02
CODp - Degradable external organics [mgCOD/L]	0	0
CODp - Undegradable non-cellulose [mgCOD/L]	0	1872.51
CODp - Undegradable cellulose [mgCOD/L]	0	1872.51

N - Particulate degradable organic [mgN/L]	0	8.06
P - Particulate degradable organic [mgP/L]	0	2.73
N - Particulate degradable external organics [mgN/L]	0	0
P - Particulate degradable external organics [mgP/L]	0	0
N - Particulate undegradable [mgN/L]	0	131.08
P - Particulate undegradable [mgP/L]	0	41.20
CODp - Stored PHA [mgCOD/L]	0	0.27
P - Releasable stored polyP [mgP/L]	0	3.62
P - Unreleasable stored polyP [mgP/L]	0	0.81
CODs - Complex readily degradable [mgCOD/L]	0	1.43
CODs - Acetate [mgCOD/L]	0	0
CODs - Propionate [mgCOD/L]	0	0
CODs - Methanol [mgCOD/L]	0	0
Gas - Dissolved hydrogen [mgCOD/L]	0	0.03
Gas - Dissolved methane [mg/L]	0	0
N - Ammonia [mgN/L]	0	0.15
N - Soluble degradable organic [mgN/L]	0	0.53
Gas - Dissolved nitrous oxide [mgN/L]	0	0
N - Nitrite [mgN/L]	0	0.07
N - Nitrate [mgN/L]	0	4.19
Gas - Dissolved nitrogen [mgN/L]	0	15.70
P - Soluble phosphate [mgP/L]	0	1.94
CODs - Undegradable [mgCOD/L]	0	47.53
N - Soluble undegradable organic [mgN/L]	0	0.80
Influent inorganic suspended solids [mgISS/L]	0	1314.50
Precipitate - Struvite [mgISS/L]	0	0
Precipitate - Brushite [mgISS/L]	0	0
Precipitate - Hydroxy - apatite [mgISS/L]	0	0
Precipitate - Vivianite [mgISS/L]	0	0
HFO - High surface [mg/L]	0	0
HFO - Low surface [mg/L]	0	0
HFO - High with H ₂ PO ₄ - adsorbed [mg/L]	0	0
HFO - Low with H ₂ PO ₄ - adsorbed [mg/L]	0	0
HFO - Aged [mg/L]	0	0
HFO - Low with H ⁺ adsorbed [mg/L]	0	0

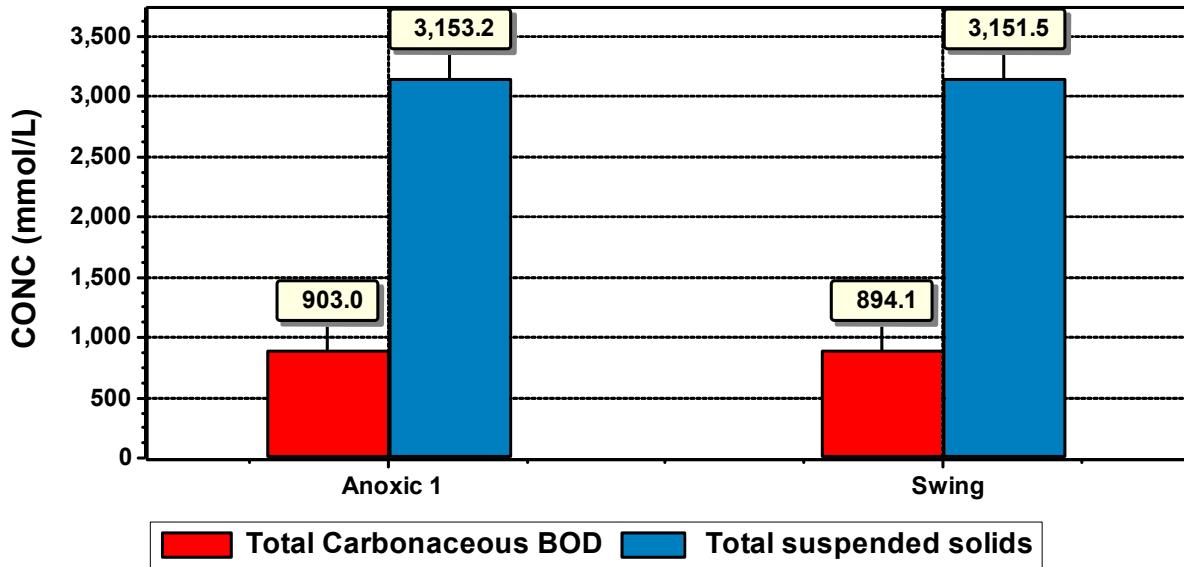
HFO - High with H+ adsorbed [mg/L]	0	0
HAO - High surface [mg/L]	0	0
HAO - Low surface [mg/L]	0	0
HAO - High with H2PO4- adsorbed [mg/L]	0	0
HAO - Low with H2PO4- adsorbed [mg/L]	0	0
HAO - Aged [mg/L]	0	0
P - Bound on aged HMO [mgP/L]	0	0
Metal soluble - Magnesium [mg/L]	0	14.64
Metal soluble - Calcium [mg/L]	0	81.20
Metal soluble - Ferric [mg/L]	0	0
Metal soluble - Ferrous [mg/L]	0	0
Metal soluble - Aluminum [mg/L]	0	0
Other Cations (strong bases) [meq/L]	12500.00	147.74
Other Anions (strong acids) [meq/L]	0	4.98
Gas - Dissolved total CO2 [mmol/L]	0	145.75
User defined - UD1 [mg/L]	0	0
User defined - UD2 [mg/L]	0	0
User defined - UD3 [mgVSS/L]	0	0
User defined - UD4 [mgSS/L]	0	0
Biomass - Sulfur oxidizing [mgCOD/L]	0	1.76
Biomass - Sulfur reducing propionic acetogenic [mgCOD/L]	0	2.22
Biomass - Sulfur reducing acetotrophic [mgCOD/L]	0	2.00
Biomass - Sulfur reducing hydrogenotrophic [mgCOD/L]	0	1.47
Gas - Dissolved total sulfides [mgS/L]	0	0
S - Soluble sulfate [mgS/L]	0	0
S - Particulate elemental sulfur [mgS/L]	0	0
Precipitate - Ferrous sulfide [mgSS/L]	0	0
CODp - Adsorbed hydrocarbon [mgCOD/L]	0	0
CODs - Degradable volatile ind. #1 [mgCOD/L]	0	0
CODs - Degradable volatile ind. #2 [mgCOD/L]	0	0
CODs - Degradable volatile ind. #3 [mgCOD/L]	0	0
CODs - Soluble hydrocarbon [mgCOD/L]	0	0
Gas - Dissolved oxygen [mg/L]	0	2.00
Flow	0	0.0304

Album page - Nitrogen species



Album page - BOD_TSS

Chart

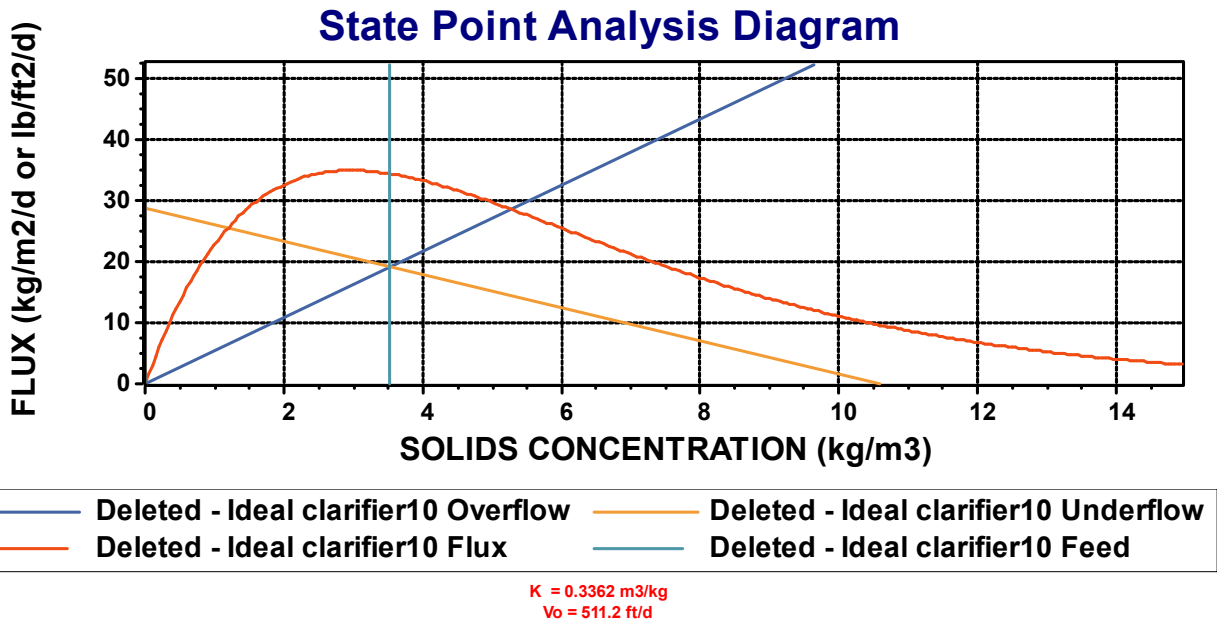


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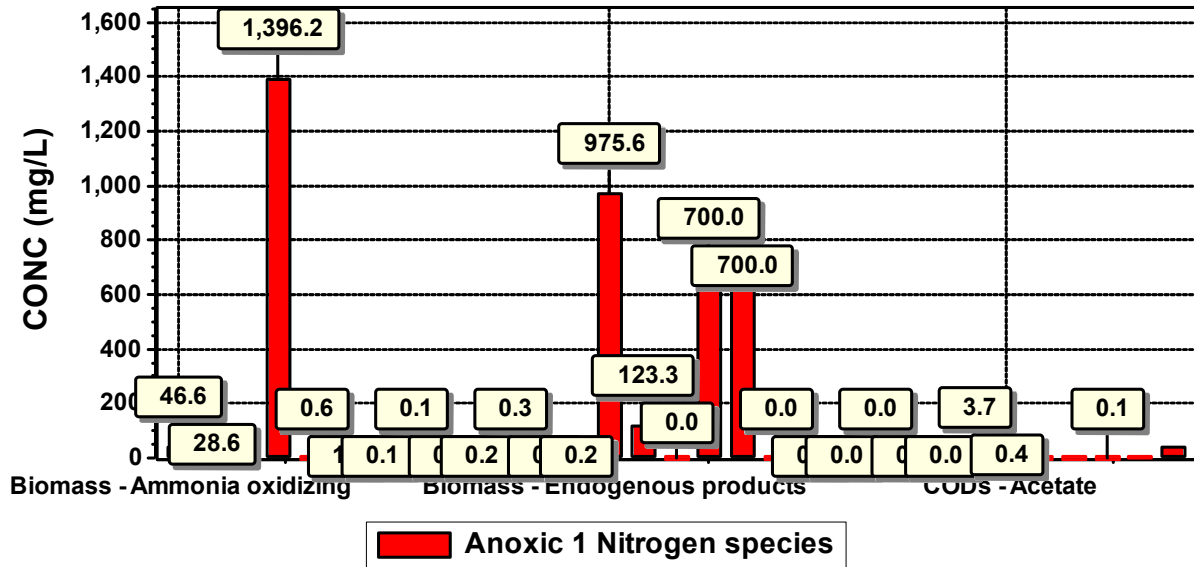
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Album page - Page 4

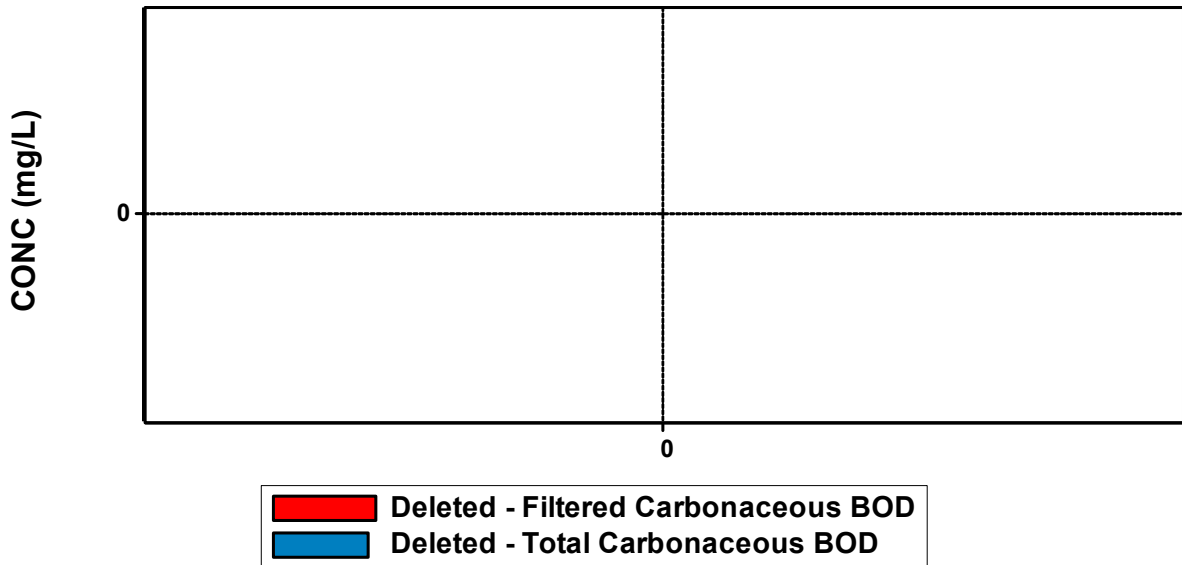


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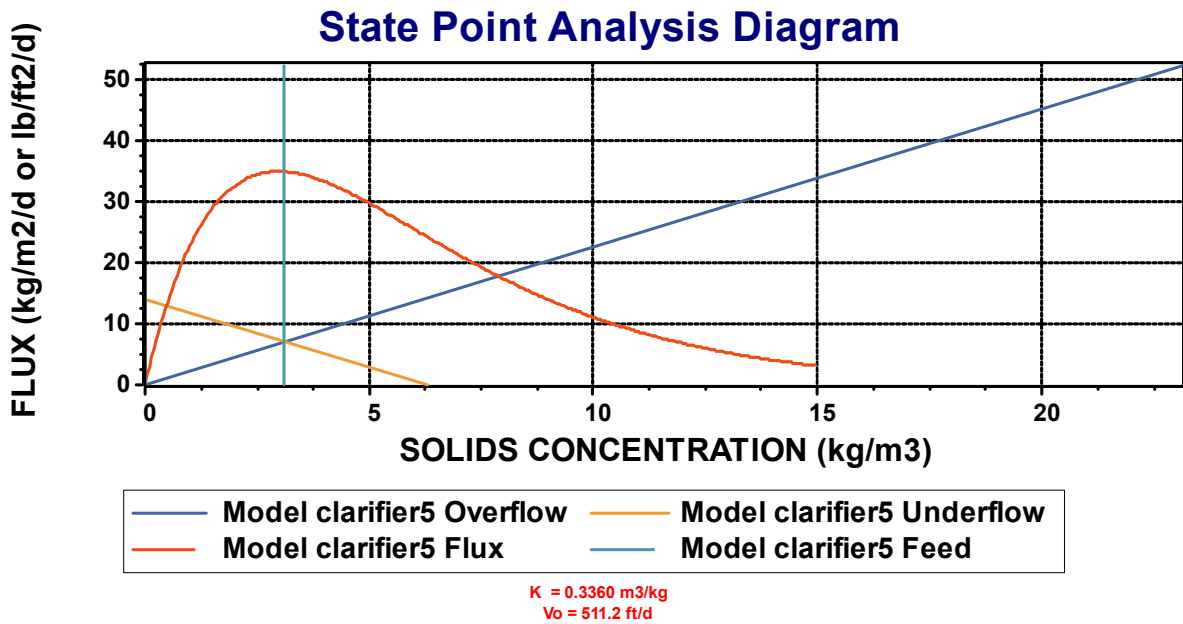


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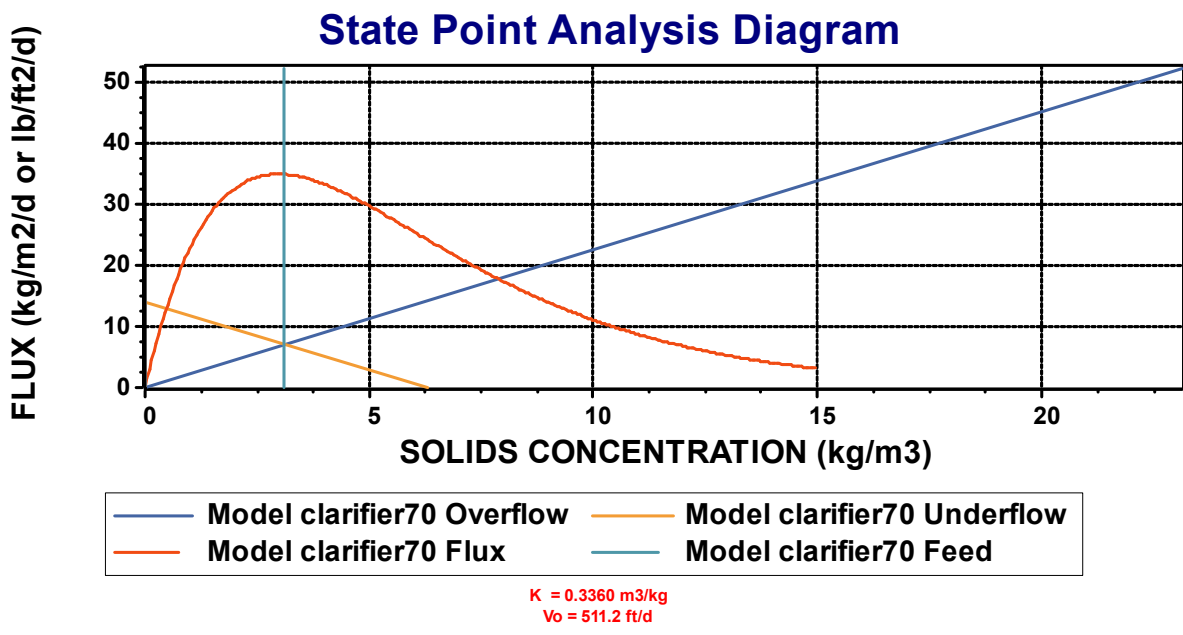
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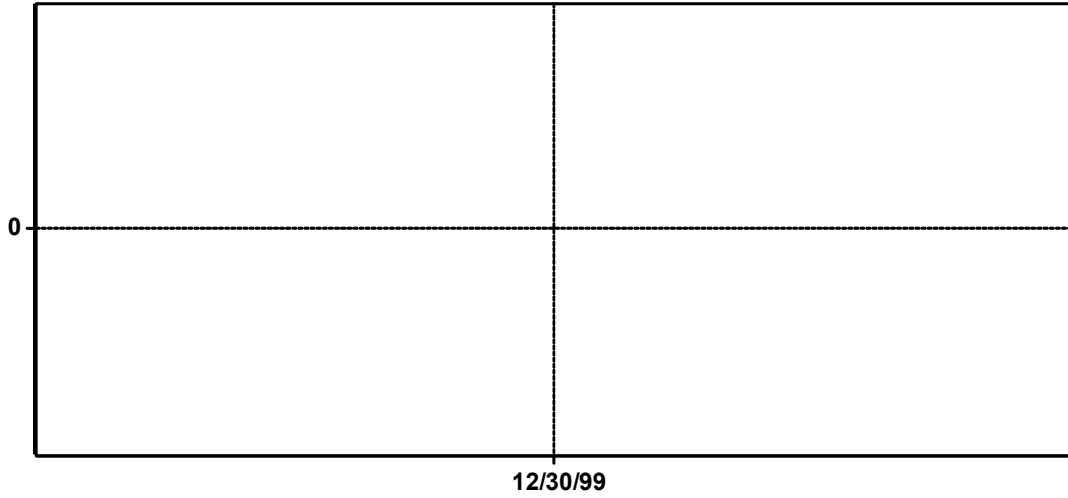
Album page - Page 9



Album page - Page 10

HEIGHT OF SPECIFIED CONCENTRATION

Chart



Deleted - Ideal primary settling tank57 Height of specified concentration

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Album page - Page 12

Elements	Liquid volume [Mil. Gal]
Anoxic 1	0.04
Anoxic 2	0.04
Swing	0.04
Aerobic 1	0.09
Anoxic 1B	0.04
Anoxic 2B	0.04
Swing B	0.04
Aerobic 1B	0.09

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Elements	Air flow rate [ft3/min (20C, 1 atm)]
Anoxic 1	0
Anoxic 2	0
Swing	334.58
Aerobic 1	504.54
Anoxic 1B	0
Anoxic 2B	0
Swing B	334.57
Aerobic 1B	406.46

Album page - Existing Plant Summary

Elements	Flow [mgd]	Temperature [deg. C]	CO D - Tot [mg/L]	CO D - Filt [mg/L]	BO D - Tot [mg/L]	BO D - Filt [mg/L]	Tot al sus pe nd ed sol ds [mg/L]	Volatil sus pe nd ed sol ds [mg/L]	pH []	Alkalinity [mg/L]	N - Total Kjeldahl Nitr ogen [mg/L]	N - Ammonia [mg/L]	N - Nitrite [mg/L]	N - Nitrate [mg/L]	Air flow rate [ft3/min (20 C, 1 atm)]	OT R [lb/hr]	OU R - Total [mgO/L/hr]	SO TR [lb/hr]	Alp ha []
Influent - BO D4 9	1.21	22.00	70.89	27.1	33.4	14.0	32.71	30.39	7.10	4.00	56.50	41.54	0	0	----	----	----	----	----
Settler - Ideal primary 4 6	1.29	22.00	66.58	26.28	27.26	13.66	30.58	28.41	7.38	8.01	67.57	47.61	0.00	0.87	----	----	----	----	----
Settler - Ideal	0.02	22.00	26.96	26.28	88.09	13.66	19.71	18.31	7.38	8.01	97.63	47.61	0.00	0.87	----	----	----	----	----

primary46 (U)																				
Anoxic 1	2.43	22.00	40.33	58.75	90.30	7.66	31.53	28.05	7.03	4.87	23.89	12.79	0.13	10.99	0	0	0	0	0.50	
Anoxic 2	2.43	22.00	40.28	49.54	89.93	1.94	31.56	28.20	7.05	5.01	23.89	12.96	0.16	9.19	0	0	0	0	0.50	
Swing	2.43	22.00	40.19	48.39	89.40	1.50	31.51	28.03	6.94	4.42	23.49	8.47	1.48	11.80	33.45	22.59	66.41	11.51	0.29	
Aerobic 1	2.43	22.00	40.02	47.70	88.26	1.11	31.40	27.92	6.82	3.45	22.84	1.41	1.77	17.96	50.45	39.42	55.05	18.18	0.33	
Aerobic 2	2.43	22.00	39.86	47.47	87.18	0.96	31.29	27.80	6.81	3.27	22.70	0.12	0.09	20.89	18.30	20.44	28.54	73.87	0.42	
Aerobic 3	2.43	22.00	39.70	47.35	86.16	0.87	31.18	27.70	6.81	3.23	22.65	0.05	0.01	21.36	11.60	14.66	20.47	49.30	0.45	
Modeler5	0.62	22.00	53.50	47.35	2.22	0.87	4.89	4.34	6.81	3.23	2.10	0.05	0.01	21.36	----	----	----	----	----	
Modeler5 (U)	0.60	22.00	79.81	47.35	17.41	0.87	63.06	56.01	6.81	3.23	45.63	0.05	0.01	21.36	----	----	----	----	----	
Modeler70	0.62	22.00	53.50	47.35	2.22	0.87	4.89	4.34	6.81	3.23	2.10	0.05	0.01	21.36	----	----	----	----	----	
Modeler70 (U)	0.60	22.00	79.81	47.35	17.41	0.87	63.06	56.01	6.81	3.23	45.63	0.05	0.01	21.36	----	----	----	----	----	
Effluent29	1.24	22.00	53.50	47.35	2.22	0.87	4.89	4.34	6.81	3.23	2.10	0.05	0.01	21.36	----	----	----	----	----	
Digester - An	0.01	35.00	58.94	25.90	28.55	77.71	46.91	41.48	7.24	11.39	44.77	14.65	0.00	0.00	----	----	----	----	----	

aerobioc37			1.3					5.2	2.8										
			2					0	8										
Digester - Aerobioc43	0.0	35.00	55.19	13.0	30.7	18.1.3	44.72	38.06	7.3	13.8	44.2.7	17.16	0.0	0.0	----	----	----	----	----
			3.9	0	5		9.1	4.2		0	96	79			-	-	-	-	-
			2				2	4											
Separator - Dewatering unit48	0.0	22.00	67.25	13.0	52.7	18.57	52.72	46.77	7.5	13.0	20.48	17.16	0.0	0.0	----	----	----	----	----
			10	0			74	78		9	91	79			-	-	-	-	-
Separator - Dewatering unit48 (U)	0.0	22.00	30.04	13.0	15.7	18.60	24.72	21.03	7.5	13.0	16.77	17.16	0.0	0.0	----	----	----	----	----
			75.51	0	32		77.02	68.59		9	0.4	79			-	-	-	-	-
											3								
Separator - Dewatering unit83	0.0	22.00	14.74	98.33	41.6.9	33.00	10.69	97.1.5	6.9	4.3	77.6	11.30	0.0	16.51	----	----	----	----	----
			77		4		70	7		9	75	30			-	-	-	-	-
Separator - Dewatering unit83 (U)	0.0	22.00	96.37	98.33	26.8.4	33.00	74.82	67.95	6.9	4.3	44.78	11.30	0.0	16.51	----	----	----	----	----
			6.8		3		2.9	9.1		6	02				-	-	-	-	-
			4				5	0											

Album page - New Plant Summary

Elements	BOD - Total Carbonaceous [mg/L]	COD - Filtered [mg/L]	Total suspended solids [mg/L]	Volatile suspended solids [mg/L]	pH []	Alkalinity [mmol/L]	N - Total Kjeldahl Nitrogen [mgN/L]	N - Ammonia [mgN/L]	N - Nitrite [mgN/L]	N - Nitrate [mgN/L]	Air flow rate [ft ³ /min (20C, 1 atm)]	OTR [lb/hr]	OUR - Total [mgO/L/hr]	SOTR [lb/hr]
Influent - BOD49	339.34	277.31	327.14	303.90	7.10	4.00	56.50	41.54	0	0	-----	-----	-----	-----
Anoxic 1B	903.01	58.75	3153.22	2805.97	7.03	4.87	238.99	12.79	0.13	10.99	0	0	0	0
Anoxic 2B	899.30	49.54	3156.20	2808.85	7.05	5.01	238.99	12.96	0.16	9.19	0	0	0	0
Swing B	894.06	48.39	3151.55	2803.80	6.94	4.42	234.99	8.47	1.48	11.80	334.57	22.59	66.41	115.12
Aerobic 1B	882.67	47.70	3140.53	2792.17	6.82	3.45	228.40	1.41	1.77	17.96	406.46	39.42	55.05	150.04
Model clarifier5	2.22	47.35	4.89	4.34	6.81	3.23	2.10	0.05	0.01	21.36	-----	-----	-----	-----
Model clarifier5 (U)	1741.54	47.35	6306.17	5601.82	6.81	3.23	456.38	0.05	0.01	21.36	-----	-----	-----	-----
Model clarifier70	2.22	47.35	4.89	4.34	6.81	3.23	2.10	0.05	0.01	21.36	-----	-----	-----	-----
Model clarifier70 (U)	1741.54	47.35	6306.17	5601.82	6.81	3.23	456.38	0.05	0.01	21.36	-----	-----	-----	-----
Effluent29	2.22	47.35	4.89	4.34	6.81	3.23	2.10	0.05	0.01	21.36	-----	-----	-----	-----

Global Parameters

Common

Name	Default	Value	
Hydrolysis rate [1/d]	2.1000	2.1000	1.0290
Hydrolysis half sat. [-]	0.0600	0.0600	1.0000
External organics hydrolysis rate [1/d]	2.1000	2.1000	1.0290
External organics hydrolysis half sat. [-]	0.0600	0.0600	1.0000
Anoxic hydrolysis factor [-]	0.2800	0.2800	1.0000
Anaerobic hydrolysis factor (AS) [-]	0.0400	0.0400	1.0000
Anaerobic hydrolysis factor (AD) [-]	0.5000	0.5000	1.0000
Adsorption rate of colloids [L/(mgCOD d)]	0.1500	0.1500	1.0290
Ammonification rate [L/(mgCOD d)]	0.0800	0.0800	1.0290
Assimilative nitrate/nitrite reduction rate [1/d]	0.5000	0.5000	1.0000
Endogenous products decay rate [1/d]	0	0	1.0000

Ammonia oxidizing

Name	Default	Value	
Max. spec. growth rate [1/d]	0.9000	0.9000	1.0720
Substrate (NH4) half sat. [mgN/L]	0.7000	0.7000	1.0000
Byproduct NH4 logistic slope [-]	50.0000	50.0000	1.0000
Byproduct NH4 inflection point [mgN/L]	1.4000	1.4000	1.0000
Denite DO half sat. [mg/L]	0.1000	0.1000	1.0000
Denite HNO2 half sat. [mgN/L]	5.000E-6	5.000E-6	1.0000
Aerobic decay rate [1/d]	0.1700	0.1700	1.0290
Anoxic/anaerobic decay rate [1/d]	0.0800	0.0800	1.0290
KiHNO2 [mmol/L]	5.000E-3	5.000E-3	1.0000

Nitrite oxidizing

Name	Default	Value	
Max. spec. growth rate [1/d]	0.7000	0.7000	1.0600
Substrate (NO2) half sat. [mgN/L]	0.1000	0.1000	1.0000

Aerobic decay rate [1/d]	0.1700	0.1700	1.0290
Anoxic/anaerobic decay rate [1/d]	0.0800	0.0800	1.0290
KiNH3 [mmol/L]	0.0750	0.0750	1.0000

Anaerobic ammonia oxidizing

Name	Default	Value	
Max. spec. growth rate [1/d]	0.2000	0.2000	1.1000
Substrate (NH4) half sat. [mgN/L]	2.0000	2.0000	1.0000
Substrate (NO2) half sat. [mgN/L]	1.0000	1.0000	1.0000
Aerobic decay rate [1/d]	0.0190	0.0190	1.0290
Anoxic/anaerobic decay rate [1/d]	9.500E-3	9.500E-3	1.0290
Ki Nitrite [mgN/L]	1000.0000	1000.0000	1.0000
Nitrite sensitivity constant [L / (d mgN)]	0.0160	0.0160	1.0000

Ordinary heterotrophic

Name	Default	Value	
Max. spec. growth rate [1/d]	3.2000	3.2000	1.0290
Substrate half sat. [mgCOD/L]	5.0000	5.0000	1.0000
Anoxic growth factor [-]	0.5000	0.5000	1.0000
Denite N2 producers (NO3 or NO2) [-]	0.5000	0.5000	1.0000
Aerobic decay rate [1/d]	0.6200	0.6200	1.0290
Anoxic decay rate [1/d]	0.2330	0.2330	1.0290
Anaerobic decay rate [1/d]	0.1310	0.1310	1.0290
Fermentation rate [1/d]	1.6000	1.6000	1.0290
Fermentation half sat. [mgCOD/L]	5.0000	5.0000	1.0000
Fermentation growth factor (AS) [-]	0.2500	0.2500	1.0000
Free nitrous acid inhibition [mol/L]	1.000E-7	1.000E-7	1.0000

Heterotrophic on industrial COD

Name	Default	Value	
Maximum specific growth rate on Ind #1 COD [1/d]	4.3000	4.3000	1.0290
Substrate (Ind #1) half sat. [mgCOD/L]	1.0000	1.0000	1.0000
Inhibition coefficient for Ind #1 [mgCOD/L]	60.0000	60.0000	1.0000
Anaerobic growth factor for Ind #1 [mgCOD/L]	0.0500	0.0500	1.0000
Maximum specific growth rate on Ind #2 COD [1/d]	1.5000	1.5000	1.0290
Substrate (Ind #2) half sat. [mgCOD/L]	30.0000	30.0000	1.0000
Inhibition coefficient for Ind #2 [mgCOD/L]	3000.0000	3000.0000	1.0000
Anaerobic growth factor for Ind #2 [mgCOD/L]	0.0500	0.0500	1.0000
Maximum specific growth rate on Ind #3 COD [1/d]	4.3000	4.3000	1.0290
Substrate (Ind #3) half sat. [mgCOD/L]	1.0000	1.0000	1.0000
Inhibition coefficient for Ind #3 COD [mgCOD/L]	60.0000	60.0000	1.0000
Anaerobic growth factor for Ind #3 [mgCOD/L]	0.0500	0.0500	1.0000
Maximum specific growth rate on adsorbed hydrocarbon COD [1/d]	2.0000	2.0000	1.0290
Substrate (adsorbed hydrocarbon) half sat. [-]	0.1500	0.1500	1.0000
Anaerobic growth factor for adsorbed hydrocarbons [mgCOD/L]	0.0100	0.0100	1.0000
Adsorption rate of soluble hydrocarbons [l/(mgCOD d)]	0.2000	0.2000	1.0000

Methylotrophic

Name	Default	Value	
Max. spec. growth rate [1/d]	1.3000	1.3000	1.0720
Methanol half sat. [mgCOD/L]	0.5000	0.5000	1.0000
Denite N2 producers (NO3 or NO2) [-]	0.5000	0.5000	1.0000
Aerobic decay rate [1/d]	0.0400	0.0400	1.0290
Anoxic/anaerobic decay rate [1/d]	0.0300	0.0300	1.0290
Free nitrous acid inhibition [mmol/L]	1.000E-7	1.000E-7	1.0000

Project details

Project name: Unknown Project ref.: BW1

Plant name: Unknown

User name: Jason.Flowers

Created: 5/18/2018

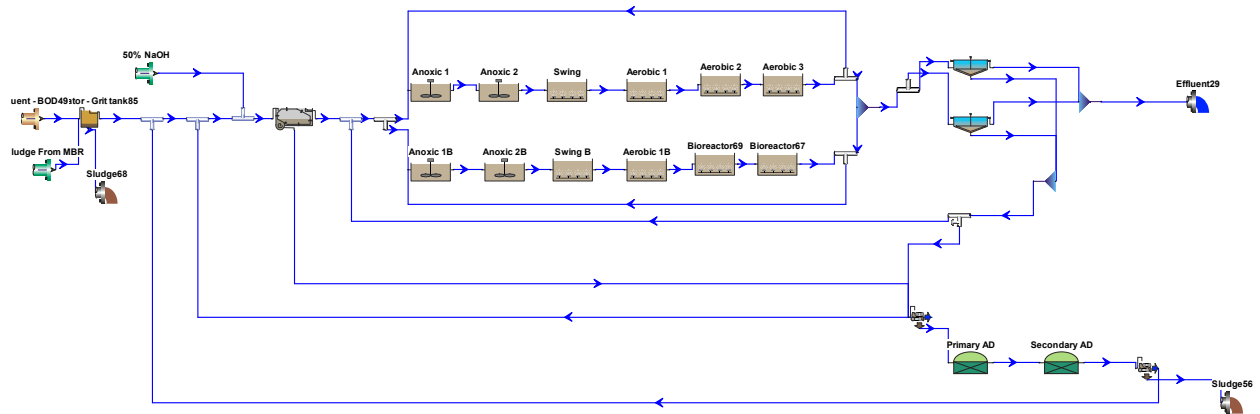
Saved: 9/16/2020

Steady state solution

Target SRT: 8.00 days SRT #0: 7.98 days

Temperature: 11.0°C

Flowsheet



Configuration information for all Settler - Ideal primary units

Physical data

Element name	Volume [Mil. Gal]	Area [ft2]	Depth [ft]
Settler - Ideal primary46	0.3723	3318.0000	15.000

Operating data Average (flow/time weighted as required)

Element name	Split method	Average Split specification
Settler - Ideal primary46	Flowrate [Under]	0.0159

Element name	Percent removal	Blanket fraction
Settler - Ideal primary46	45.00	0.10

Configuration information for all Digester - Anaerobic units

Physical data

Element name	Volume [Mil. Gal]	Area [ft2]	Depth [ft]	Head space volume
Primary AD	0.2500	1591.4353	21.000	0.1
Secondary AD	0.4470	3734.7007	16.000	0.1

Operating data Average (flow/time weighted as required)

Element name	Pressure [psi]	pH
Primary AD	14.9	-
Secondary AD	14.9	-

Element name	Average Temperature
Primary AD	35.0
Secondary AD	35.0

Configuration information for all Bioreactor units

Physical data

Element name	Volume [Mil. Gal]	Area [ft2]	Depth [ft]	# of diffusers
Anoxic 1	0.0377	278.7476	18.080	Un-aerated
Anoxic 2	0.0377	278.7476	18.080	Un-aerated
Swing	0.0377	278.7476	18.080	63
Aerobic 1	0.0858	634.3912	18.080	144
Anoxic 1B	0.0377	278.7476	18.080	Un-aerated
Anoxic 2B	0.0377	278.7476	18.080	Un-aerated
Swing B	0.0377	278.7476	18.080	63
Aerobic 1B	0.2574	1903.1735	18.080	431
Aerobic 3	0.0858	634.3912	18.080	144
Aerobic 2	0.0858	634.3912	18.080	144
Bioreactor67	0.0858	634.3912	18.080	144
Bioreactor69	0.0858	634.3912	18.080	144

Operating data Average (flow/time weighted as required)

Element name	Average DO Setpoint [mg/L]
Anoxic 1	0
Anoxic 2	0
Swing	2.0
Aerobic 1	2.0
Anoxic 1B	0

Anoxic 2B	0
Swing B	2.0
Aerobic 1B	2.0
Aerobic 3	2.0
Aerobic 2	2.0
Bioreactor67	2.0
Bioreactor69	2.0

Aeration equipment parameters

Element name	k_1 in C = $k_1(PC)^{0.25} + k_2$	k_2 in C = $k_1(PC)^{0.25} + k_2$	Y in $Kla = C Usg - Usg$ in $[m^3/(m^2 d)]$	Area of one diffuser	Diffuser mounting height	Min. air flow rate per diffuser ft^3/min (20C, 1 atm)	Max. air flow rate per diffuser ft^3/min (20C, 1 atm)	'A' in diffuser pressure drop = $A + B*(Qa/Diff) + C*(Qa/Diff)^2$	'B' in diffuser pressure drop = $A + B*(Qa/Diff) + C*(Qa/Diff)^2$	'C' in diffuser pressure drop = $A + B*(Qa/Diff) + C*(Qa/Diff)^2$
Anoxic 1	1.2400	0.8960	0.8880	0.4413	0.2500	0.2943	5.8858	3.0000	0	0
Anoxic 2	1.2400	0.8960	0.8880	0.4413	0.2500	0.2943	5.8858	3.0000	0	0
Swing	1.2400	0.8960	0.8880	0.4413	0.2500	0.2943	5.8858	3.0000	0	0
Aerobic 1	1.2400	0.8960	0.8880	0.4413	0.2500	0.2943	5.8858	3.0000	0	0
Anoxic 1B	1.2400	0.8960	0.8880	0.4413	0.2500	0.2943	5.8858	3.0000	0	0
Anoxic 2B	1.2400	0.8960	0.8880	0.4413	0.2500	0.2943	5.8858	3.0000	0	0
Swing B	1.2400	0.8960	0.8880	0.4413	0.2500	0.2943	5.8858	3.0000	0	0
Aerobic 1B	1.2400	0.8960	0.8880	0.4413	0.2500	0.2943	5.8858	3.0000	0	0
Aerobic 3	1.2400	0.8960	0.8880	0.4413	0.2500	0.2943	5.8858	3.0000	0	0
Aerobic 2	1.2400	0.8960	0.8880	0.4413	0.2500	0.2943	5.8858	3.0000	0	0
Bioreactor67	1.2400	0.8960	0.8880	0.4413	0.2500	0.2943	5.8858	3.0000	0	0
Bioreactor69	1.2400	0.8960	0.8880	0.4413	0.2500	0.2943	5.8858	3.0000	0	0

Configuration information for all Influent - BOD units

Operating data Average (flow/time weighted as required)

Element name	Influent - BOD49
Flow	2.27
BOD - Total Carbonaceous mgBOD/L	173.66
Volatile suspended solids mg/L	182.72
Total suspended solids mg/L	196.69
N - Total Kjeldahl Nitrogen mgN/L	30.00
P - Total P mgP/L	5.10
S - Total S mgS/L	0
N - Nitrate mgN/L	0
pH	7.10
Alkalinity mmol/L	2.00
Metal soluble - Calcium mg/L	11.10
Metal soluble - Magnesium mg/L	3.20
Gas - Dissolved oxygen mg/L	0

Element name	Influent - BOD49
Fbs - Readily biodegradable (including Acetate) [gCOD/g of total COD]	0.1410
Fac - Acetate [gCOD/g of readily biodegradable COD]	0.1418
Fxsp - Non-colloidal slowly biodegradable [gCOD/g of slowly degradable COD]	0.8773
Fus - Unbiodegradable soluble [gCOD/g of total COD]	0.0650
Fup - Unbiodegradable particulate [gCOD/g of total COD]	0.1300
Fcel - Cellulose fraction of unbiodegradable particulate [gCOD/gCOD]	0.5000
Fna - Ammonia [gNH3-N/gTKN]	0.7353
Fnox - Particulate organic nitrogen [gN/g Organic N]	0.5000
Fnus - Soluble unbiodegradable TKN [gN/gTKN]	0.0200
FupN - N:COD ratio for unbiodegradable part. COD [gN/gCOD]	0.0700
Fpo4 - Phosphate [gPO4-P/gTP]	0.4717

FupP - P:COD ratio for unbiodegradable part. COD [gP/gCOD]	0.0220
Fsr - Reduced sulfur [H2S] [gS/gS]	0
FZbh - Ordinary heterotrophic COD fraction [gCOD/g of total COD]	0.0200
FZbm - Methyloctrophic COD fraction [gCOD/g of total COD]	1.000E-4
FZao - Ammonia oxidizing COD fraction [gCOD/g of total COD]	1.000E-4
FZno - Nitrite oxidizing COD fraction [gCOD/g of total COD]	1.000E-4
FZaao - Anaerobic ammonia oxidizing COD fraction [gCOD/g of total COD]	1.000E-4
FZppa - Phosphorus accumulating COD fraction [gCOD/g of total COD]	1.000E-4
FZpa - Propionic acetogenic COD fraction [gCOD/g of total COD]	1.000E-4
FZam - Acetoclastic methanogenic COD fraction [gCOD/g of total COD]	1.000E-4
FZhm - Hydrogenotrophic methanogenic COD fraction [gCOD/g of total COD]	1.000E-4
FZso - Sulfur oxidizing COD fraction [gCOD/g of total COD]	1.000E-4
FZsrpa - Sulfur reducing propionic acetogenic COD fraction [gCOD/g of total COD]	1.000E-4
FZsra - Sulfur reducing acetotrophic COD fraction [gCOD/g of total COD]	1.000E-4
FZsrh - Sulfur reducing hydrogenotrophic COD fraction [gCOD/g of total COD]	1.000E-4
FZe - Endogenous products COD fraction [gCOD/g of total COD]	0

Configuration information for all Clarifier - Model units

Physical data

Element name	Volume[Mil. Gal]	Area[ft2]	Depth[ft]	Number of layers	Top feed layer	Feed Layers
Model clarifier5	0.2570	2290.0000	15.000	10	6	1
Model clarifier70	0.2570	2290.0000	15.000	10	6	1

Operating data Average (flow/time weighted as required)

Element name	Split method	Average Split specification
Model clarifier5	Flow paced	50.00 %
Model clarifier70	Flow paced	50.00 %

Element name	Average Temperature	Reactive
Model clarifier5	Uses global setting	No
Model clarifier70	Uses global setting	No

Configuration information for all Separator - Grit tank units

Physical data

Element name	Volume [Mil. Gal]	Area [ft2]	Depth [ft]
Separator - Grit tank85	4.000E-3	89.1204	6.000

Operating data Average (flow/time weighted as required)

Element name	Split method	Average Split specification
Separator - Grit tank85	Flowrate [Under]	0.0002642

Element name	Percent removal	Blanket fraction
Separator - Grit tank85	65.00	0.10

Configuration information for all Separator - Dewatering unit units

Operating data Average (flow/time weighted as required)

Element name	Split method	Average Split specification
Separator - Dewatering unit83	Fraction	0.14
Separator - Dewatering unit51	Fraction	0.15

Element name	Percent removal
Separator - Dewatering unit83	90.00
Separator - Dewatering unit51	90.00

Configuration information for all Splitter units

Operating data Average (flow/time weighted as required)

Element name	Split method	Average Split specification
Splitter11	Flow paced	100.00 %
Splitter12	Flow paced	100.00 %
Splitter13	Fraction	0.50
Splitter40	Flowrate [Side]	0.0570374999643516
Splitter32	Fraction	0.50

Configuration information for all Influent - State variable units

Operating data Average (flow/time weighted as required)

Element name	50% NaOH	Sludge From MBR
Biomass - Ordinary heterotrophic [mgCOD/L]	0	4118.29

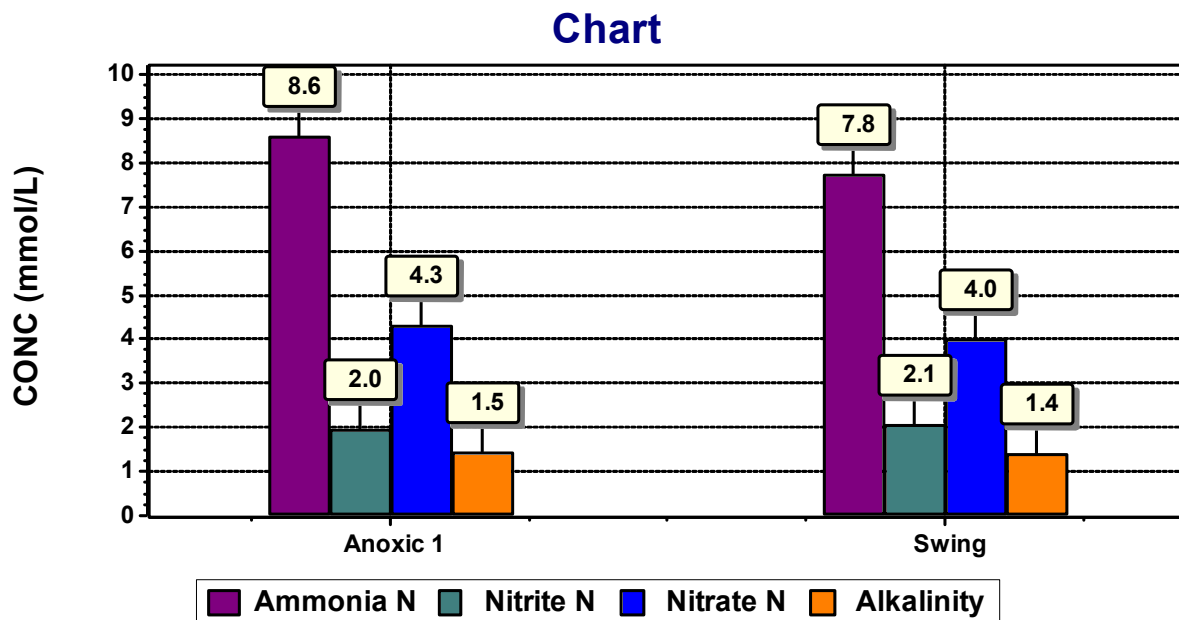
Biomass - Methyilotrophic [mgCOD/L]	0	1.92
Biomass - Ammonia oxidizing [mgCOD/L]	0	51.22
Biomass - Nitrite oxidizing [mgCOD/L]	0	28.63
Biomass - Anaerobic ammonia oxidizing [mgCOD/L]	0	2.37
Biomass - Phosphorus accumulating [mgCOD/L]	0	5.40
Biomass - Propionic acetogenic [mgCOD/L]	0	0.45
Biomass - Acetoclastic methanogenic [mgCOD/L]	0	0.39
Biomass - Hydrogenotrophic methanogenic [mgCOD/L]	0	0.10
Biomass - Endogenous products [mgCOD/L]	0	2142.58
CODp - Slowly degradable particulate [mgCOD/L]	0	243.55
CODp - Slowly degradable colloidal [mgCOD/L]	0	0.04
CODp - Degradable external organics [mgCOD/L]	0	0
CODp - Undegradable non-cellulose [mgCOD/L]	0	1819.21
CODp - Undegradable cellulose [mgCOD/L]	0	1819.21
N - Particulate degradable organic [mgN/L]	0	10.25
P - Particulate degradable organic [mgP/L]	0	4.22
N - Particulate degradable external organics [mgN/L]	0	0
P - Particulate degradable external organics [mgP/L]	0	0
N - Particulate undegradable [mgN/L]	0	127.35
P - Particulate undegradable [mgP/L]	0	40.02
CODp - Stored PHA [mgCOD/L]	0	0.11
P - Releasable stored polyP [mgP/L]	0	1.74
P - Unreleasable stored polyP [mgP/L]	0	0.35
CODs - Complex readily degradable [mgCOD/L]	0	1.41
CODs - Acetate [mgCOD/L]	0	0
CODs - Propionate [mgCOD/L]	0	0
CODs - Methanol [mgCOD/L]	0	0
Gas - Dissolved hydrogen [mgCOD/L]	0	0.08
Gas - Dissolved methane [mg/L]	0	0
N - Ammonia [mgN/L]	0	1.12
N - Soluble degradable organic [mgN/L]	0	0.51
Gas - Dissolved nitrous oxide [mgN/L]	0	0
N - Nitrite [mgN/L]	0	0.34
N - Nitrate [mgN/L]	0	1.29
Gas - Dissolved nitrogen [mgN/L]	0	18.83

P - Soluble phosphate [mgP/L]	0	3.91
CODs - Undegradable [mgCOD/L]	0	24.30
N - Soluble undegradable organic [mgN/L]	0	0.42
Influent inorganic suspended solids [mgISS/L]	0	1499.26
Precipitate - Struvite [mgISS/L]	0	0
Precipitate - Brushite [mgISS/L]	0	0
Precipitate - Hydroxy - apatite [mgISS/L]	0	0
Precipitate - Vivianite [mgISS/L]	0	0
HFO - High surface [mg/L]	0	0
HFO - Low surface [mg/L]	0	0
HFO - High with H2PO4- adsorbed [mg/L]	0	0
HFO - Low with H2PO4- adsorbed [mg/L]	0	0
HFO - Aged [mg/L]	0	0
HFO - Low with H+ adsorbed [mg/L]	0	0
HFO - High with H+ adsorbed [mg/L]	0	0
HAO - High surface [mg/L]	0	0
HAO - Low surface [mg/L]	0	0
HAO - High with H2PO4- adsorbed [mg/L]	0	0
HAO - Low with H2PO4- adsorbed [mg/L]	0	0
HAO - Aged [mg/L]	0	0
P - Bound on aged HMO [mgP/L]	0	0
Metal soluble - Magnesium [mg/L]	0	14.79
Metal soluble - Calcium [mg/L]	0	80.58
Metal soluble - Ferric [mg/L]	0	0
Metal soluble - Ferrous [mg/L]	0	0
Metal soluble - Aluminum [mg/L]	0	0
Other Cations (strong bases) [meq/L]	12500.00	4.96
Other Anions (strong acids) [meq/L]	0	9.17
Gas - Dissolved total CO2 [mmol/L]	0	2.14
User defined - UD1 [mg/L]	0	0
User defined - UD2 [mg/L]	0	0
User defined - UD3 [mgVSS/L]	0	0
User defined - UD4 [mgISS/L]	0	0
Biomass - Sulfur oxidizing [mgCOD/L]	0	1.91
Biomass - Sulfur reducing propionic acetogenic [mgCOD/L]	0	2.33

Biomass - Sulfur reducing acetotrophic [mgCOD/L]	0	2.15
Biomass - Sulfur reducing hydrogenotrophic [mgCOD/L]	0	1.69
Gas - Dissolved total sulfides [mgS/L]	0	0
S - Soluble sulfate [mgS/L]	0	0
S - Particulate elemental sulfur [mgS/L]	0	0
Precipitate - Ferrous sulfide [mgISS/L]	0	0
CODp - Adsorbed hydrocarbon [mgCOD/L]	0	0
CODs - Degradable volatile ind. #1 [mgCOD/L]	0	0
CODs - Degradable volatile ind. #2 [mgCOD/L]	0	0
CODs - Degradable volatile ind. #3 [mgCOD/L]	0	0
CODs - Soluble hydrocarbon [mgCOD/L]	0	0
Gas - Dissolved oxygen [mg/L]	0	2.00
Flow	0.00015	0.0304

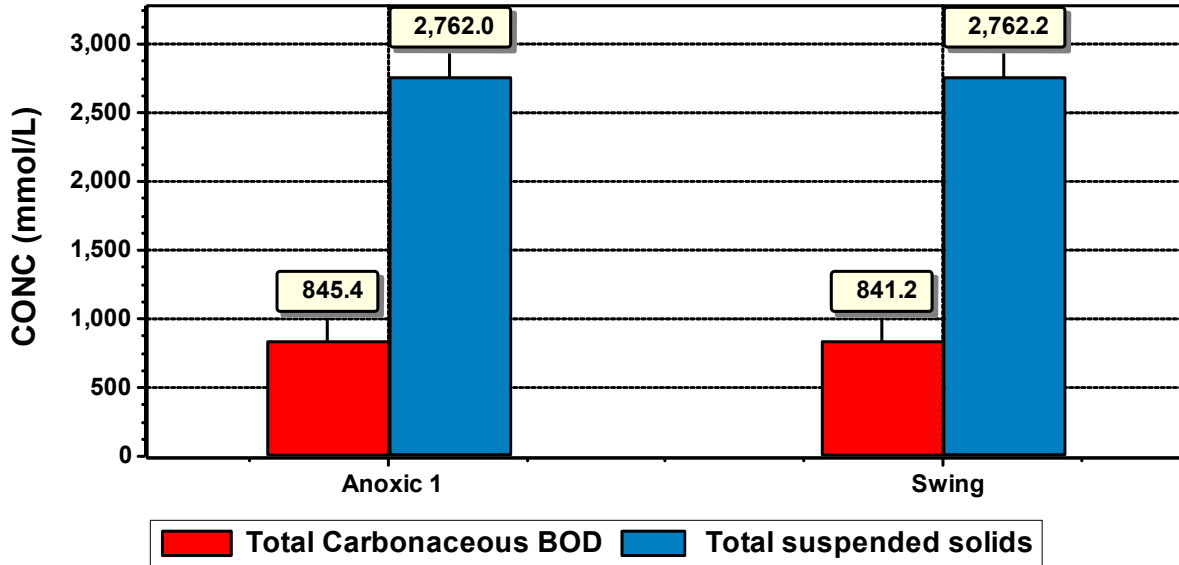
BioWin Album

Album page - Nitrogen species



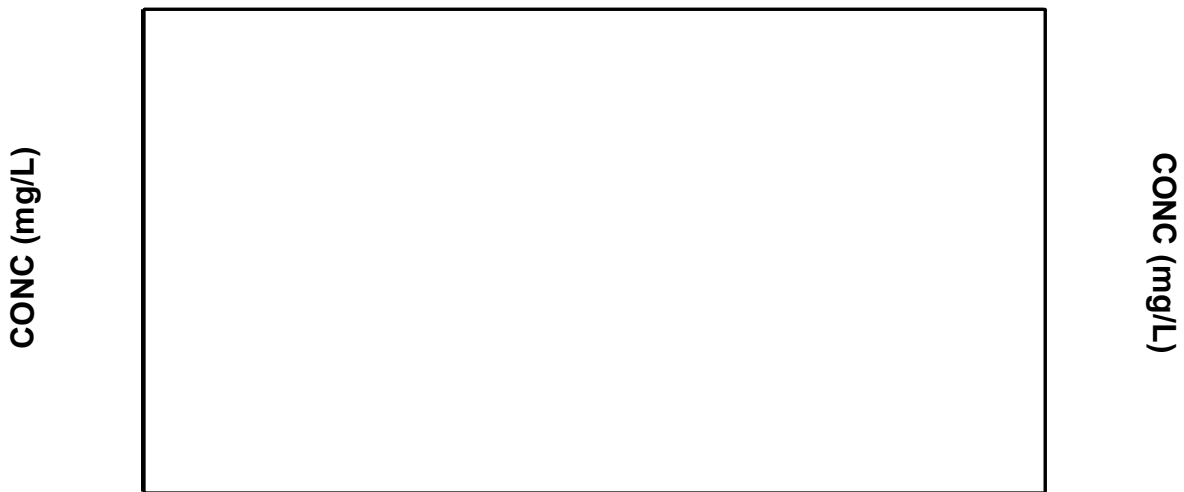
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Chart



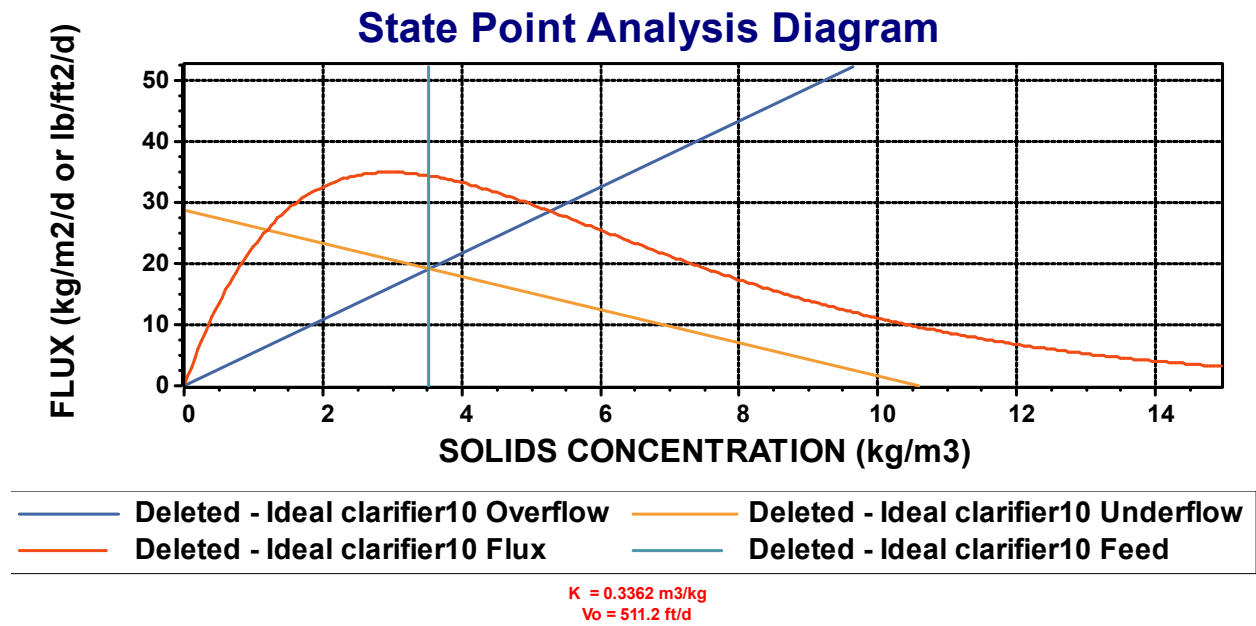
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Chart



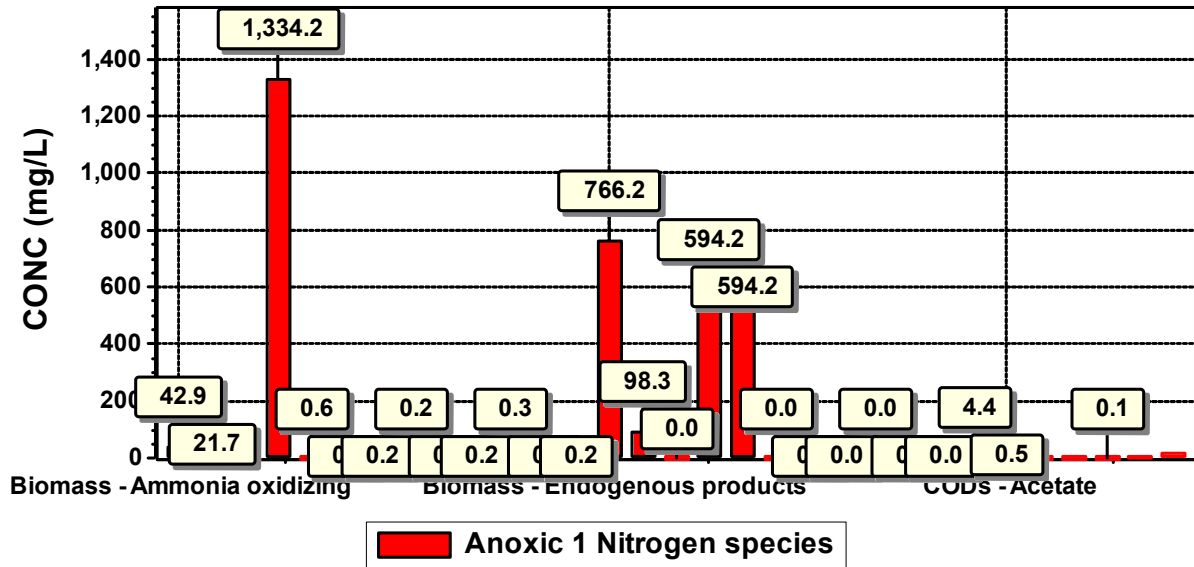
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Album page - Page 5



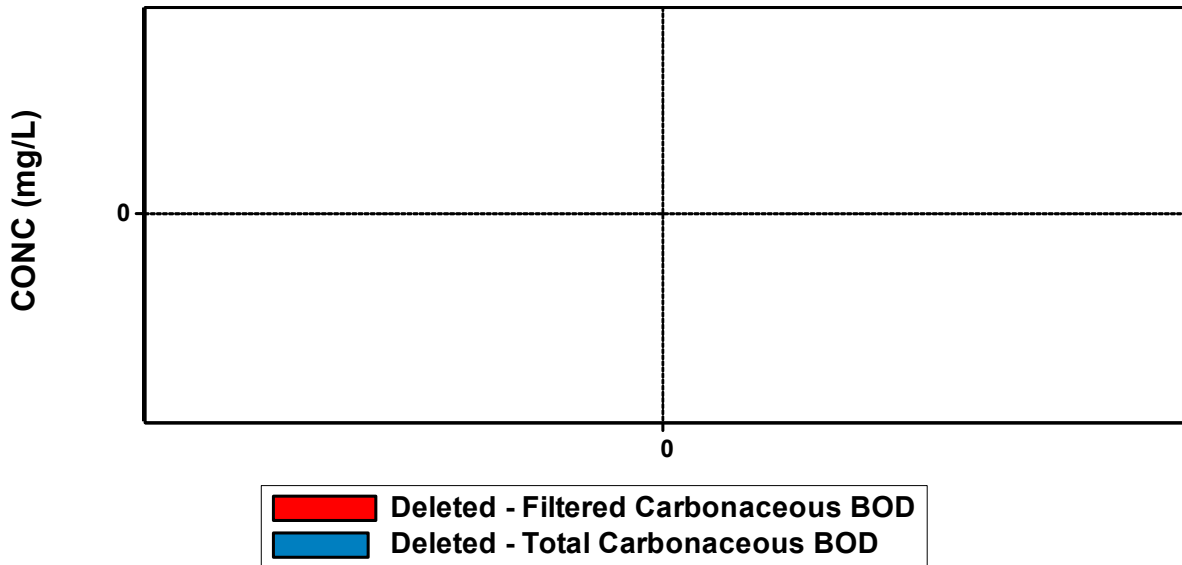
Album page - Page 6

Chart

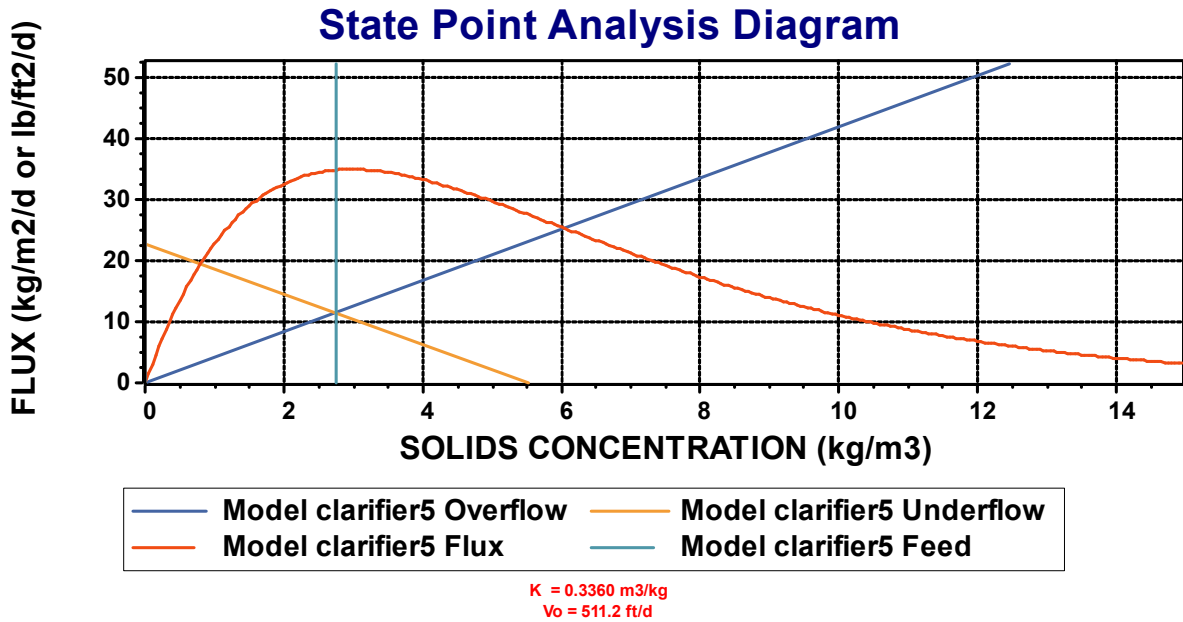


Album page - Page 7

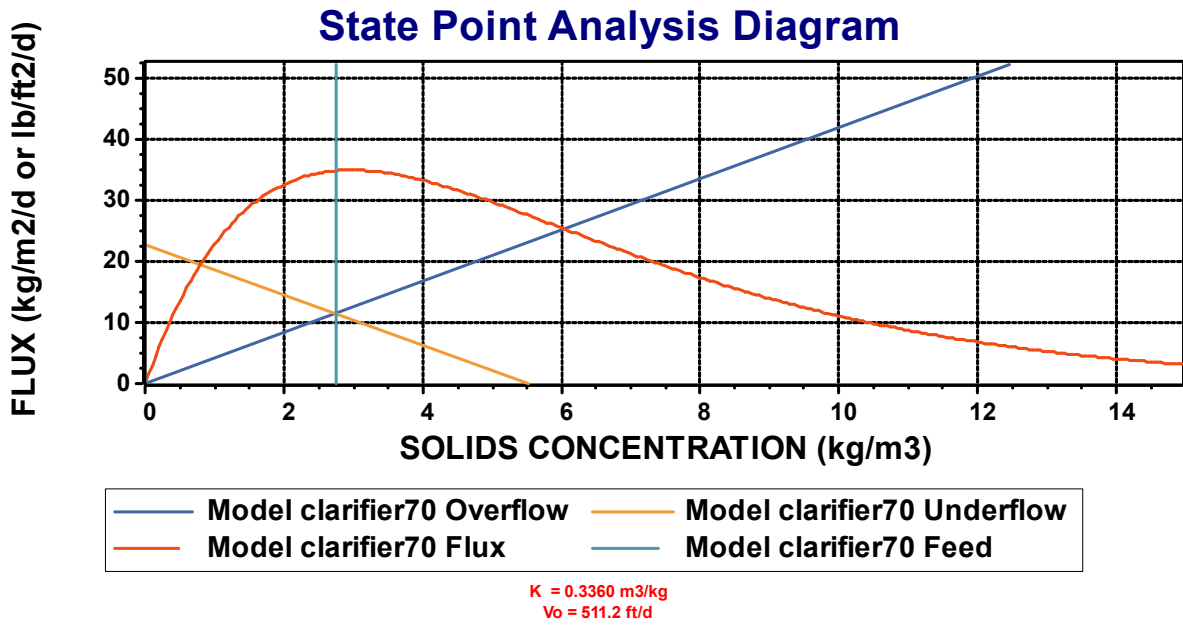
Chart



Album page - Page 8

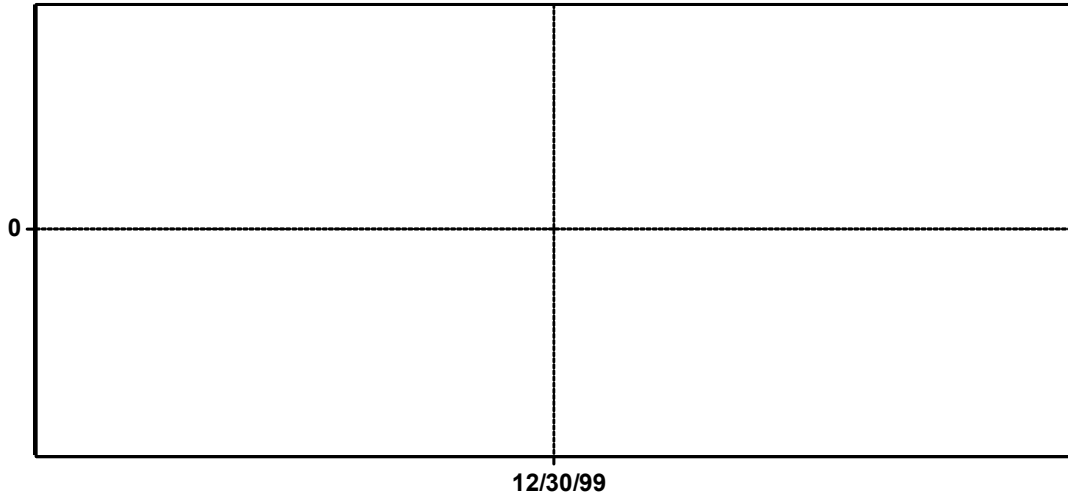


Album page - Page 9



HEIGHT OF SPECIFIED CONCENTRATION

Chart



Deleted - Ideal primary settling tank57 Height of specified concentration

Album page - Page 11

Album page - Page 12

Elements	Liquid volume [Mil. Gal]
Anoxic 1	0.04
Anoxic 2	0.04
Swing	0.04
Aerobic 1	0.09
Anoxic 1B	0.04
Anoxic 2B	0.04
Swing B	0.04
Aerobic 1B	0.26

Album page - Page 13

Elements	Air flow rate [ft3/min (20C, 1 atm)]
Anoxic 1	0
Anoxic 2	0
Swing	130.81
Aerobic 1	202.29
Anoxic 1B	0
Anoxic 2B	0
Swing B	122.74
Aerobic 1B	461.29

Album page - Existing Plant Summary

Elements	Flow [mgd]	Temperature [deg. C]	BO D - Total Ca carbonate [mg/L]	BO D - Filtered Ca carbonate [mg/L]	CO D - Total [mg/L]	CO D - Filtered [mg/L]	Total suspended solids [mg/L]	Volatiles [mg/L]	pH	Alkalinity [mg/L]	N - Total Kjeldahl Nitrogen [mg/L]	N - Ammonia [mg/L]	N - Nitrite [mg/L]	N - Nitrate [mg/L]	Air flow rate [ft3/min (20 C, 1 atm)]	OTR [lb/hr]	OUR [mg/L/hr]	SO ₂ TR [lb/hr]	Alpha []
Influent - BO D49	2.27	11.00	17.364	52.63	36.237	10.325	19.669	18.272	7.10	2.00	30.00	22.06	0	0	----	----	----	----	----
Settler - Ideal primary46	2.36	11.00	13.886	50.77	34.02	10.063	18.197	16.890	8.84	3.11	37.44	26.32	0.06	0.21	----	----	----	----	----
Settler - Ideal	0.02	11.00	10.925	50.77	29.915	10.063	22.057	20.476	8.84	3.11	10.0143	26.32	0.06	0.21	----	----	----	----	----

pri ma ry4 6 (U)																				
An oxi c 1	4.5 5	11. 00	84 5.4 2	5.3 9	34 87. 08	31. 99	27 61. 97	24 39. 14	6.6 0	1.4 5	20 6.9 1	8.6 2	1.9 9	4.3 3	0	0	0	0	0.5 0	
An oxi c 2	4.5 5	11. 00	84 3.2 5	2.1 2	34 84. 35	27. 10	27 63. 60	24 40. 66	6.6 3	1.5 3	20 6.9 0	8.7 2	1.8 0	3.4 8	0	0	0	0	0.5 0	
Sw ing	4.5 5	11. 00	84 1.2 2	1.5 9	34 81. 16	26. 06	27 62. 20	24 39. 14	6.5 0	1.4 1	20 6.0 6	7.7 6	2.0 8	4.0 2	13 0.8 1	13. 50	32. 84	50. 00	0.4 0	
Aer obi c 1	4.5 5	11. 00	83 6.8 3	1.2 1	34 74. 44	25. 36	27 58. 20	24 34. 91	6.3 5	1.1 5	20 4.2 9	5.8 1	2.6 0	5.2 2	20 2.2 9	22. 18	30. 98	80. 74	0.4 1	
Aer obi c 2	4.5 5	11. 00	83 2.6 3	1.0 5	34 68. 09	25. 09	27 54. 08	24 30. 63	6.2 3	0.9 2	20 2.6 8	4.1 1	3.0 0	6.3 8	18 3.8 9	20. 73	28. 96	74. 19	0.4 1	
Aer obi c 3	4.5 5	11. 00	82 8.6 2	0.9 6	34 62. 06	24. 95	27 50. 05	24 26. 48	6.1 2	0.7 2	20 1.2 8	2.6 9	3.2 4	7.5 0	16 3.0 2	19. 04	26. 59	66. 66	0.4 2	
Mo del cla rifi er5	1.1 5	11. 00	3.9 7	0.9 0	37. 67	24. 85	10. 26	9.0 5	6.0 1	0.5 6	3.6 5	1.7 5	2.8 3	9.1 9	----	----	----	----	----	
Mo del cla rifi er5 (U)	1.1 4	11. 00	16 50. 76	0.9 0	69 10. 76	24. 85	55 10. 79	48 61. 24	6.0 1	0.5 6	39 8.8 5	1.7 5	2.8 3	9.1 9	----	----	----	----	----	
Mo del cla rifi er7 0	1.1 5	11. 00	3.9 7	0.9 0	37. 67	24. 85	10. 26	9.0 5	6.0 1	0.5 6	3.6 5	1.7 5	2.8 3	9.1 9	----	----	----	----	----	
Mo del cla rifi er7 0 (U)	1.1 4	11. 00	16 50. 76	0.9 0	69 10. 76	24. 85	55 10. 79	48 61. 24	6.0 1	0.5 6	39 8.8 5	1.7 5	2.8 3	9.1 9	----	----	----	----	----	
Eff ue nt2 9	2.3 0	11. 00	3.9 7	0.9 0	37. 67	24. 85	10. 26	9.0 5	6.0 1	0.5 6	3.6 5	1.7 5	2.8 3	9.1 9	----	----	----	----	----	
Pri ma	0.0 1	35. 00	29 12. 29	85. 01	42 06	24 9.2	33 80	29 55	7.0 6	78. 72	32 45. 65	10 82. 56	0.0 0	0.0 0	----	----	----	----	----	

ry AD					5.0 6		7.9 6	7.3 1											
Se co nd ary AD	0.0 1	35. 00	38 5.4 6	18. 46	38 35 3.9 8	10 5.3 0	31 00 4.4 8	27 04 5.2 4	7.2 4	97. 20	32 45. 65	13 29. 74	0.0 0	0.0 0	----	----	----	----	----
Se par ato r - De wat eri ng uni t51	0.0 1	11. 00	61. 89	18. 46	46 31. 77	10 5.3 0	36 69. 17	32 00. 62	7.3 3	97. 10	15 57. 25	13 29. 74	0.0 0	0.0 0	----	----	----	----	----
Se par ato r - De wat eri ng uni t51 (U)	0.0 0	11. 00	21 49. 41	18. 46	22 21 94. 41	10 5.3 0	18 00 26. 00	15 70 36. 90	7.3 3	97. 10	12 45 0.1 6	13 29. 74	0.0 0	0.0 0	----	----	----	----	----
Se par ato r - De wat eri ng uni t83	0.0 6	11. 00	43 4.9 3	11. 77	14 11. 04	41. 37	10 66. 44	96 6.6 2	6.3 7	1.1 1	69. 69	7.1 1	2.2 3	7.2 3	----	----	----	----	----
Se par ato r - De wat eri ng uni t83 (U)	0.0 1	11. 00	22 46 8.6 8	11. 77	72 72 8.4 7	41. 37	56 59 4.8 4	51 29 7.6 6	6.3 7	1.1 1	32 45. 70	7.1 1	2.2 3	7.2 3	----	----	----	----	----

Album page - New Plant Summary

Elements	BOD - Total Carbonaceous [mg/L]	COD - Filtered [mg/L]	Total suspended solids [mg/L]	Volatile suspended solids [mg/L]	pH []	Alkalinity [mmol/L]	N - Total Kjeldahl Nitrogen [mgN/L]	N - Ammonia [mgN/L]	N - Nitrite [mgN/L]	N - Nitrate [mgN/L]	Air flow rate [ft ³ /min (20C, 1 atm)]	OTR [lb/hr]	OUR - Total [mgO/L/hr]	SOTR [lb/hr]
Influent - BOD49	173.64	103.25	196.69	182.72	7.10	2.00	30.00	22.06	0	0	-----	-----	-----	-----
Anoxic 1B	839.02	31.80	2755.29	2432.68	6.55	1.29	205.64	7.69	1.68	5.95	0	0	0	0
Anoxic 2B	836.90	26.96	2756.92	2434.21	6.58	1.37	205.64	7.79	1.56	5.09	0	0	0	0
Swing B	834.95	25.97	2755.57	2432.74	6.45	1.25	204.82	6.87	1.83	5.62	122.74	13.21	31.90	47.25
Aerobic 1B	823.17	25.00	2744.06	2420.95	6.09	0.66	200.65	2.60	2.57	8.91	461.29	56.15	26.14	189.87
Model clarifier5	3.97	24.85	10.26	9.05	6.01	0.56	3.65	1.75	2.83	9.19	-----	-----	-----	-----
Model clarifier5 (U)	1650.76	24.85	5510.79	4861.24	6.01	0.56	398.85	1.75	2.83	9.19	-----	-----	-----	-----
Model clarifier70	3.97	24.85	10.26	9.05	6.01	0.56	3.65	1.75	2.83	9.19	-----	-----	-----	-----
Model clarifier70 (U)	1650.76	24.85	5510.79	4861.24	6.01	0.56	398.85	1.75	2.83	9.19	-----	-----	-----	-----
Effluent29	3.97	24.85	10.26	9.05	6.01	0.56	3.65	1.75	2.83	9.19	-----	-----	-----	-----

Global Parameters

Common

Name	Default	Value	
Hydrolysis rate [1/d]	2.1000	2.1000	1.0290
Hydrolysis half sat. [-]	0.0600	0.0600	1.0000
External organics hydrolysis rate [1/d]	2.1000	2.1000	1.0290
External organics hydrolysis half sat. [-]	0.0600	0.0600	1.0000
Anoxic hydrolysis factor [-]	0.2800	0.2800	1.0000
Anaerobic hydrolysis factor (AS) [-]	0.0400	0.0400	1.0000
Anaerobic hydrolysis factor (AD) [-]	0.5000	0.5000	1.0000
Adsorption rate of colloids [L/(mgCOD d)]	0.1500	0.1500	1.0290
Ammonification rate [L/(mgCOD d)]	0.0800	0.0800	1.0290
Assimilative nitrate/nitrite reduction rate [1/d]	0.5000	0.5000	1.0000
Endogenous products decay rate [1/d]	0	0	1.0000

Ammonia oxidizing

Name	Default	Value	
Max. spec. growth rate [1/d]	0.9000	0.9000	1.0720
Substrate (NH4) half sat. [mgN/L]	0.7000	0.7000	1.0000
Byproduct NH4 logistic slope [-]	50.0000	50.0000	1.0000
Byproduct NH4 inflection point [mgN/L]	1.4000	1.4000	1.0000
Denite DO half sat. [mg/L]	0.1000	0.1000	1.0000
Denite HNO2 half sat. [mgN/L]	5.000E-6	5.000E-6	1.0000
Aerobic decay rate [1/d]	0.1700	0.1700	1.0290
Anoxic/anaerobic decay rate [1/d]	0.0800	0.0800	1.0290
KiHNO2 [mmol/L]	5.000E-3	5.000E-3	1.0000

Nitrite oxidizing

Name	Default	Value	
Max. spec. growth rate [1/d]	0.7000	0.7000	1.0600
Substrate (NO2) half sat. [mgN/L]	0.1000	0.1000	1.0000

Aerobic decay rate [1/d]	0.1700	0.1700	1.0290
Anoxic/anaerobic decay rate [1/d]	0.0800	0.0800	1.0290
KiNH3 [mmol/L]	0.0750	0.0750	1.0000

Anaerobic ammonia oxidizing

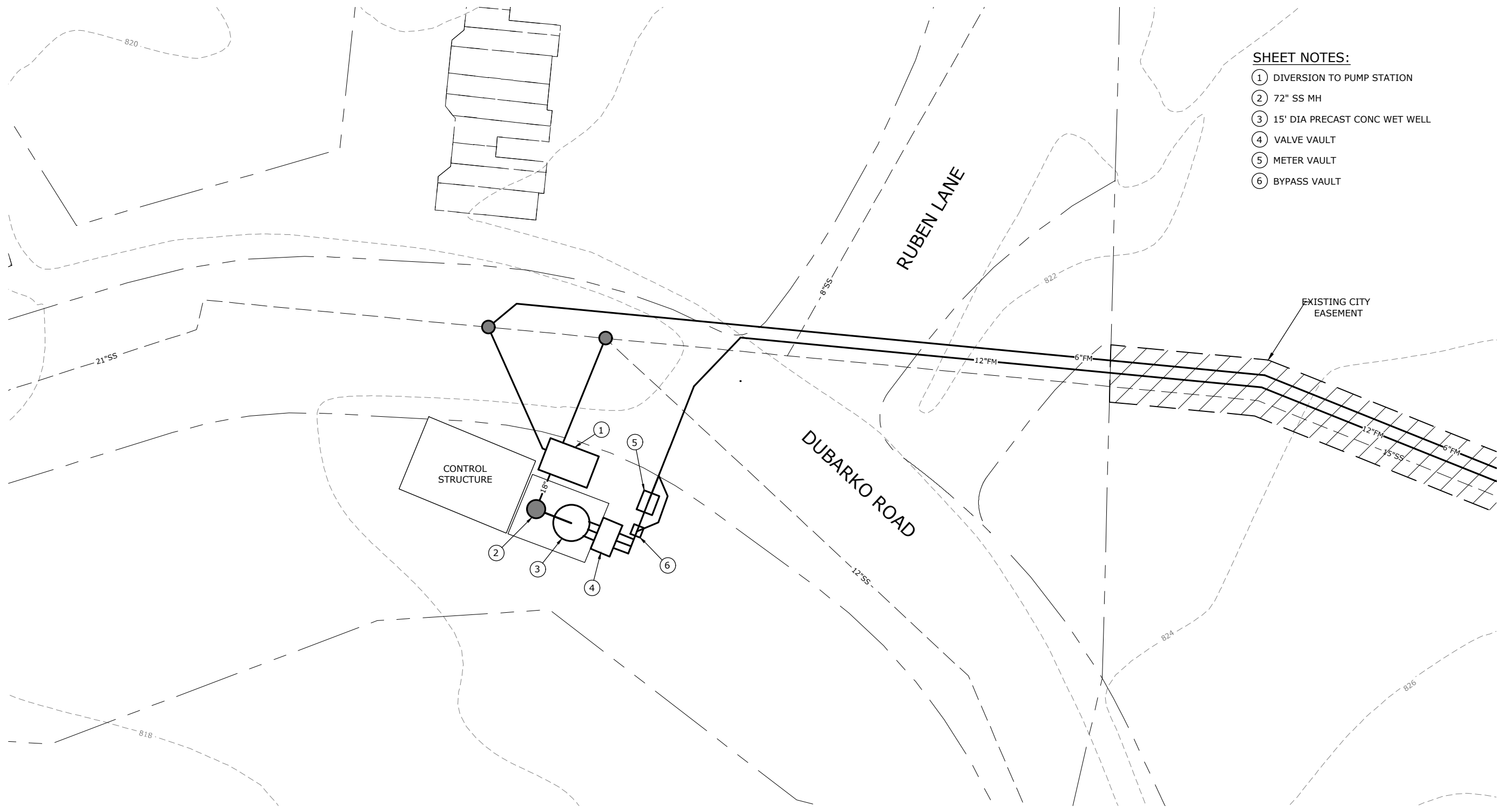
Name	Default	Value	
Max. spec. growth rate [1/d]	0.2000	0.2000	1.1000
Substrate (NH4) half sat. [mgN/L]	2.0000	2.0000	1.0000
Substrate (NO2) half sat. [mgN/L]	1.0000	1.0000	1.0000
Aerobic decay rate [1/d]	0.0190	0.0190	1.0290
Anoxic/anaerobic decay rate [1/d]	9.500E-3	9.500E-3	1.0290
Ki Nitrite [mgN/L]	1000.0000	1000.0000	1.0000
Nitrite sensitivity constant [L / (d mgN)]	0.0160	0.0160	1.0000

Ordinary heterotrophic

Name	Default	Value	
Max. spec. growth rate [1/d]	3.2000	3.2000	1.0290
Substrate half sat. [mgCOD/L]	5.0000	5.0000	1.0000
Anoxic growth factor [-]	0.5000	0.5000	1.0000
Denite N2 producers (NO3 or NO2) [-]	0.5000	0.5000	1.0000
Aerobic decay rate [1/d]	0.6200	0.6200	1.0290
Anoxic decay rate [1/d]	0.2330	0.2330	1.0290
Anaerobic decay rate [1/d]	0.1310	0.1310	1.0290
Fermentation rate [1/d]	1.6000	1.6000	1.0290
Fermentation half sat. [mgCOD/L]	5.0000	5.0000	1.0000
Fermentation growth factor (AS) [-]	0.2500	0.2500	1.0000
Free nitrous acid inhibition [mol/L]	1.000E-7	1.000E-7	1.0000

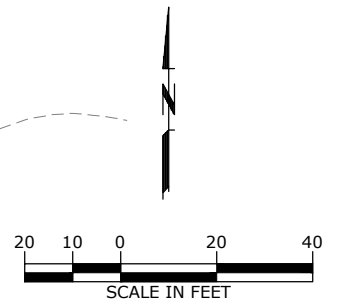
Heterotrophic on industrial COD

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SHEET NOTES:

- ① DIVERSION TO PUMP STATION
- ② 72" SS MH
- ③ 15' DIA PRECAST CONC WET WELL
- ④ VALVE VAULT
- ⑤ METER VAULT
- ⑥ BYPASS VAULT



NO.	DATE	BY	REVISION

NOTICE

IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO SCALE

DESIGNED _____

DRAWN _____

CHECKED _____

PRELIMINARY ONLY
DO NOT USE FOR CONSTRUCTION

NOVEMBER 2020

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**EASTSIDE
SATELLITE
TREATMENT
FACILITY
BASIS OF
DESIGN**

**PRELIMINARY CONCEPTUAL
DIVERSION PUMP STATION
SITE PLAN**

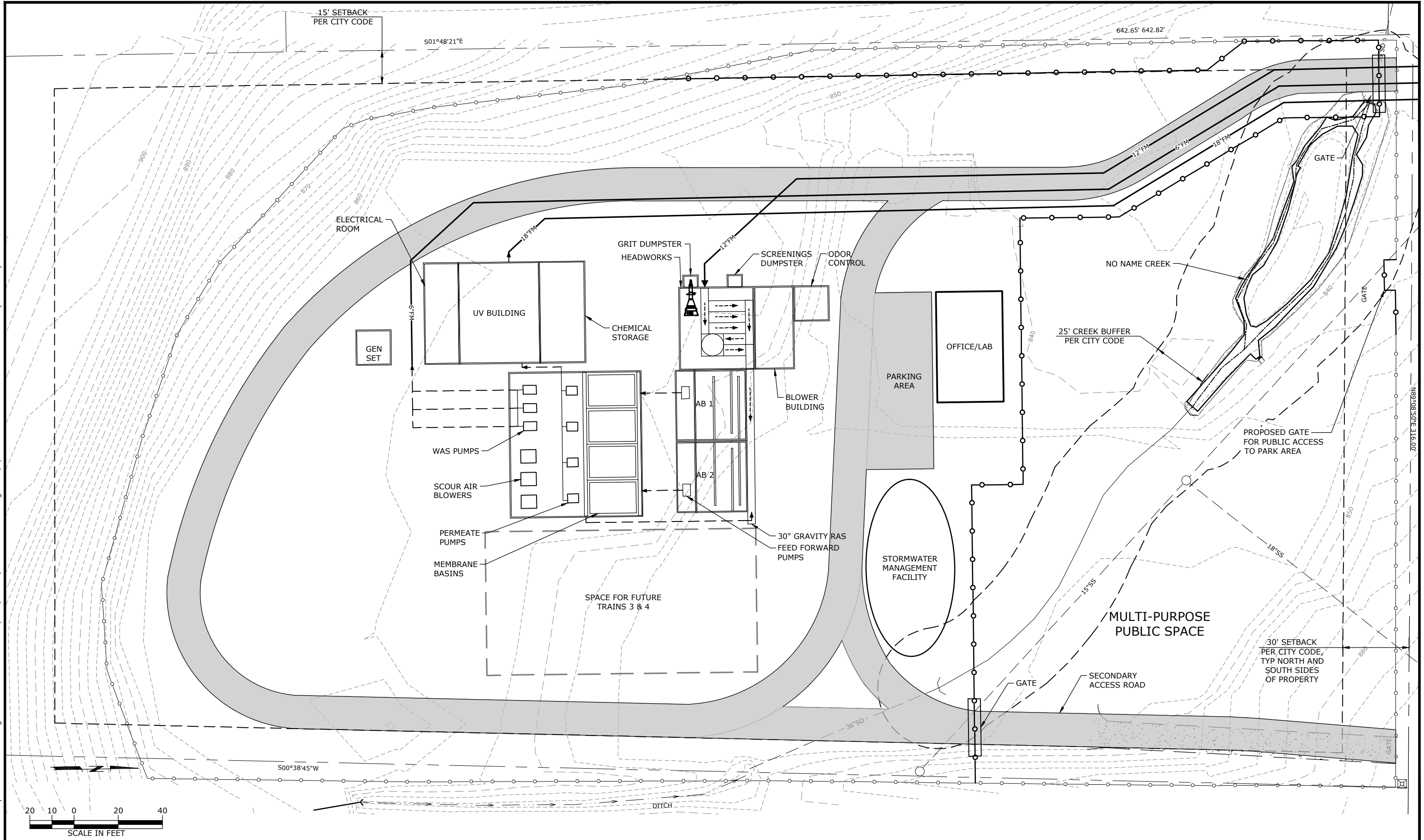
PROJECT NO.: 20-2776 SCALE: AS SHOWN DATE: NOVEMBER 2020

SHEET

C-1

1 of 2

G:\PDX_Projects\20\2776 - Detailed Discharge Alternatives Evaluation\CAD\Sheets\20-2776-OR-C1.dwg C-2 1/5/2021 1:44 PM JESSICA.CAWLEY 23.05 (LMS Tech)



NO.	DATE	BY	REVISION

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 0 1/2 1
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EASTSIDE SATELLITE TREATMENT FACILITY BASIS OF DESIGN

PRELIMINARY CONCEPTUAL EASTSIDE SATELLITE TREATMENT FACILITY SITE PLAN

PROJECT NO.: 20-2776 SCALE: AS SHOWN DATE: NOVEMBER 2020

SHEET
C-2
 2 of 2



APPENDIX D
PROPOSED EASTSIDE SATELLITE
TREATMENT FACILITY
PROCESS MODEL REPORT

Appendix D

New Eastside Satellite Treatment Facility – Biowin Process Model Simulation Results

Parameter	2026 ADWF	2026 MMWWF	2026 MMDWF	2040 MMWWF	2040 MMDWF
Influent					
Flow, MGD	0.46	1.14	0.6	2.27	1.21
Temperature, °C	22	11	22	11	22
MBR Operation					
No. of AB Trains	1	1	1	2	2
SRT, days	25	15	15	15	15
MLSS, mg/L	8,300	9,300	8,700	8,700	8,300
RAS ratio, %	400%	400%	400%	400%	400%
50% Caustic Soda Addition, gpd	0	100	100	100	100
Air Demand, Each AB					
Air Demand per train, scfm	650	900	1,200	800	950
Total Air Demand , scfm	1,300	1,800	2,400	3,200	3,800
Effluent Performance					
Effluent TSS, mg/L	< 1	< 1	< 1	< 1	< 1
Effluent BOD, mg/L	< 1	< 1	< 1	< 1	< 1
Effluent Ammonia-N, mg/L	0.06	0.3	0.05	0.65	0.06
Effluent Total Nitrogen, mg/L	11	8	13	8	13
Effluent pH	6.3	6.4	6.8	6.1	6.5
Solids Processing					
WAS TSS, mg/L	8,300	9,300	8,600	8,700	8,300
WAS Solids, ppd	600	1,200	1,100	2,100	2,000
WAS Flow, gpm	6	11	11	21	20

BioWin user and configuration data

Project details

Project name: Unknown Project ref.: BW1

Plant name: Unknown

User name: Jason.Flowers

Created: 5/18/2018

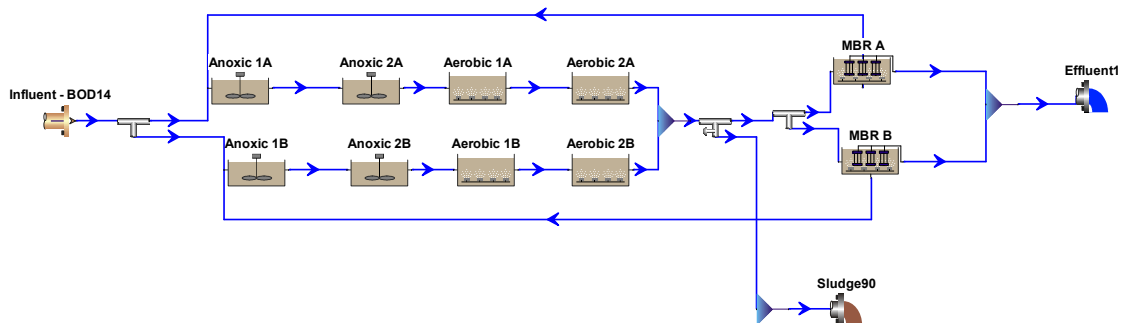
Saved: 6/14/2020

Steady state solution

Target SRT: 25.00 days SRT #0: 24.99 days

Temperature: 22.0°C

Flowsheet



Configuration information for all Bioreactor units

Physical data

Element name	Volume [Mil. Gal]	Area [ft2]	Depth [ft]	# of diffusers
Anoxic 1A	0.0100	102.8312	13.000	Un-aerated
Aerobic 1A	0.0300	308.4936	13.000	70
Aerobic 2A	0.0300	308.4936	13.000	70
Anoxic 2A	0.0100	102.8312	13.000	Un-aerated
Anoxic 1B	0.0100	102.8312	13.000	Un-aerated
Aerobic 1B	0.0300	308.4936	13.000	70
Aerobic 2B	0.0300	308.4936	13.000	70
Anoxic 2B	0.0100	102.8312	13.000	Un-aerated

Operating data Average (flow/time weighted as required)

Element name	Average DO Setpoint [mg/L]
Anoxic 1A	0
Aerobic 1A	2.0
Aerobic 2A	2.0
Anoxic 2A	0
Anoxic 1B	0
Aerobic 1B	2.0
Aerobic 2B	2.0
Anoxic 2B	0

Aeration equipment parameters

Element name	k_1 in C = $k_1(PC)^{0.25} + k_2$	k_2 in C = $k_1(PC)^{0.25} + k_2$	Y in $Kla = C Usg \wedge Y - Usg$ in $[m^3/(m^2 d)]$	Area of one diffuser	Diffuser mounting height	Min. air flow rate per diffuser (20C, 1 atm)	Max. air flow rate per diffuser (20C, 1 atm)	'A' in diffuser pressure drop = $A + B*(Qa/Diff) + C*(Qa/Diff)^2$	'B' in diffuser pressure drop = $A + B*(Qa/Diff) + C*(Qa/Diff)^2$	'C' in diffuser pressure drop = $A + B*(Qa/Diff) + C*(Qa/Diff)^2$
Anoxic 1A	1.2400	0.8960	0.8880	0.4413	0.2500	0.2943	5.8858	3.0000	0	0
Aerobic 1A	1.2400	0.8960	0.8880	0.4413	0.2500	0.2943	5.8858	3.0000	0	0
Aerobic 2A	1.2400	0.8960	0.8880	0.4413	0.2500	0.2943	5.8858	3.0000	0	0
Anoxic 2A	1.2400	0.8960	0.8880	0.4413	0.2500	0.2943	5.8858	3.0000	0	0
Anoxic 1B	1.2400	0.8960	0.8880	0.4413	0.2500	0.2943	5.8858	3.0000	0	0
Aerobic 1B	1.2400	0.8960	0.8880	0.4413	0.2500	0.2943	5.8858	3.0000	0	0
Aerobic 2B	1.2400	0.8960	0.8880	0.4413	0.2500	0.2943	5.8858	3.0000	0	0
Anoxic 2B	1.2400	0.8960	0.8880	0.4413	0.2500	0.2943	5.8858	3.0000	0	0

Configuration information for all Bioreactor - MBR units

Physical data

Element name	Volume [Mil. Gal]	Area [ft ²]	Depth [ft]	# of diffusers	# of cassettes	Displaced volume / cassette [ft ³ /cassette]	Membrane area / cassette [ft ² /cassette]	Total displaced volume [Mil. Gal]	Membrane surface area [ft ²]
MBR A	0.0300	308.4936	13.000	57	6.00	59.682	16320.03	0.00	97920.18
MBR B	0.0300	308.4936	13.000	57	6.00	59.682	16320.03	0.00	97920.18

Operating data Average (flow/time weighted as required)

Element name	Average DO Setpoint [mg/L]
MBR A	2.0
MBR B	2.0

Element name	Split method	Average Split specification
MBR A	Flow paced	200.00 %
MBR B	Flow paced	200.00 %

Aeration equipment parameters

Element name	k_1 in C = $k_1(PC)^{0.25} + k_2$	k_2 in C = $k_1(PC)^{0.25} + k_2$	Y in $Kla = C U_{sg} Y - U_{sg}$ in [m ³ /(m ² d)]	Area of one diffuser	Diffuser mounting height	Min. air flow rate per diffuser (20C, 1 atm)	Max. air flow rate per diffuser (20C, 1 atm)	'A' in diffuser pressure drop = A + $B^*(Qa/Diff)^2$	'B' in diffuser pressure drop = A + $B^*(Qa/Diff)^2$	'C' in diffuser pressure drop = A + $C^*(Qa/Diff)^2$
MBR A	0.0500	0.3800	1.0000	0.5382	0.2500	1.1772	29.4289	1.0000	0	0
MBR B	0.0500	0.3800	1.0000	0.5382	0.2500	1.1772	29.4289	1.0000	0	0

Element name	Surface pressure [kPa]	Fractional effective saturation depth (Fed) [-]
MBR A	101.3250	0.3000
MBR B	101.3250	0.3000

Element name	Supply gas CO ₂ content [vol. %]	Supply gas O ₂ [vol. %]	Off-gas CO ₂ [vol. %]	Off-gas O ₂ [vol. %]	Off-gas H ₂ [vol. %]	Off-gas NH ₃ [vol. %]	Off-gas CH ₄ [vol. %]	Off-gas N ₂ O [vol. %]	Surface turbulence factor [-]
MBR A	0.0350	20.9500	1.2000	19.9000	0	0	0	0	2.0000
MBR B	0.0350	20.9500	1.2000	19.9000	0	0	0	0	2.0000

Configuration information for all Influent - BOD units

Operating data Average (flow/time weighted as required)

Element name	Influent - BOD14
Flow	0.46
BOD - Total Carbonaceous mgBOD/L	313.00
Volatile suspended solids mg/L	280.00
Total suspended solids mg/L	301.00
N - Total Kjeldahl Nitrogen mgN/L	50.90
P - Total P mgP/L	5.30
S - Total S mgS/L	0
N - Nitrate mgN/L	0
pH	7.20
Alkalinity mmol/L	4.00
Metal soluble - Calcium mg/L	80.00
Metal soluble - Magnesium mg/L	15.00
Gas - Dissolved oxygen mg/L	0

Element name	Influent - BOD14
Fbs - Readily biodegradable (including Acetate) [gCOD/g of total COD]	0.1600
Fac - Acetate [gCOD/g of readily biodegradable COD]	0.1500
Fxsp - Non-colloidal slowly biodegradable [gCOD/g of slowly degradable COD]	0.7373
Fus - Unbiodegradable soluble [gCOD/g of total COD]	0.0500
Fup - Unbiodegradable particulate [gCOD/g of total COD]	0.1300
Fcel - Cellulose fraction of unbiodegradable particulate [gCOD/gCOD]	0.5000
Fna - Ammonia [gNH3-N/gTKN]	0.7500
Fnox - Particulate organic nitrogen [gN/g Organic N]	0.5000
Fnus - Soluble unbiodegradable TKN [gN/gTKN]	0.0200
FupN - N:COD ratio for unbiodegradable part. COD [gN/gCOD]	0.0700
Fpo4 - Phosphate [gPO4-P/gTP]	0.5000

FupP - P:COD ratio for unbiodegradable part. COD [gP/gCOD]	0.0220
Fsr - Reduced sulfur [H2S] [gS/gS]	0.1500
FZbh - Ordinary heterotrophic COD fraction [gCOD/g of total COD]	0.0200
FZbm - Methylotrophic COD fraction [gCOD/g of total COD]	1.000E-4
FZao - Ammonia oxidizing COD fraction [gCOD/g of total COD]	1.000E-4
FZno - Nitrite oxidizing COD fraction [gCOD/g of total COD]	1.000E-4
FZaao - Anaerobic ammonia oxidizing COD fraction [gCOD/g of total COD]	1.000E-4
FZppa - Phosphorus accumulating COD fraction [gCOD/g of total COD]	1.000E-4
FZpa - Propionic acetogenic COD fraction [gCOD/g of total COD]	1.000E-4
FZam - Acetoclastic methanogenic COD fraction [gCOD/g of total COD]	1.000E-4
FZhm - Hydrogenotrophic methanogenic COD fraction [gCOD/g of total COD]	1.000E-4
FZso - Sulfur oxidizing COD fraction [gCOD/g of total COD]	1.000E-4
FZsrpa - Sulfur reducing propionic acetogenic COD fraction [gCOD/g of total COD]	1.000E-4
FZsra - Sulfur reducing acetotrophic COD fraction [gCOD/g of total COD]	1.000E-4
FZsrh - Sulfur reducing hydrogenotrophic COD fraction [gCOD/g of total COD]	1.000E-4
FZe - Endogenous products COD fraction [gCOD/g of total COD]	0

Configuration information for all Splitter units

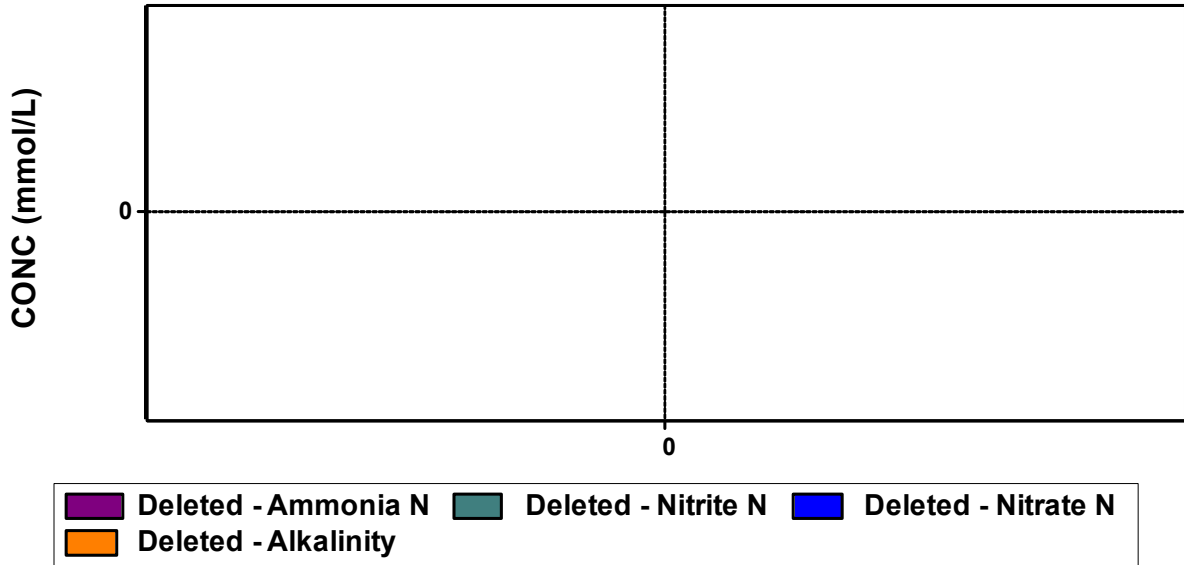
Operating data Average (flow/time weighted as required)

Element name	Split method	Average Split specification
Splitter66	Fraction	0.50
Splitter7	Flowrate [Side]	0.00912947584143462
Splitter8	Fraction	0.50

BioWin Album

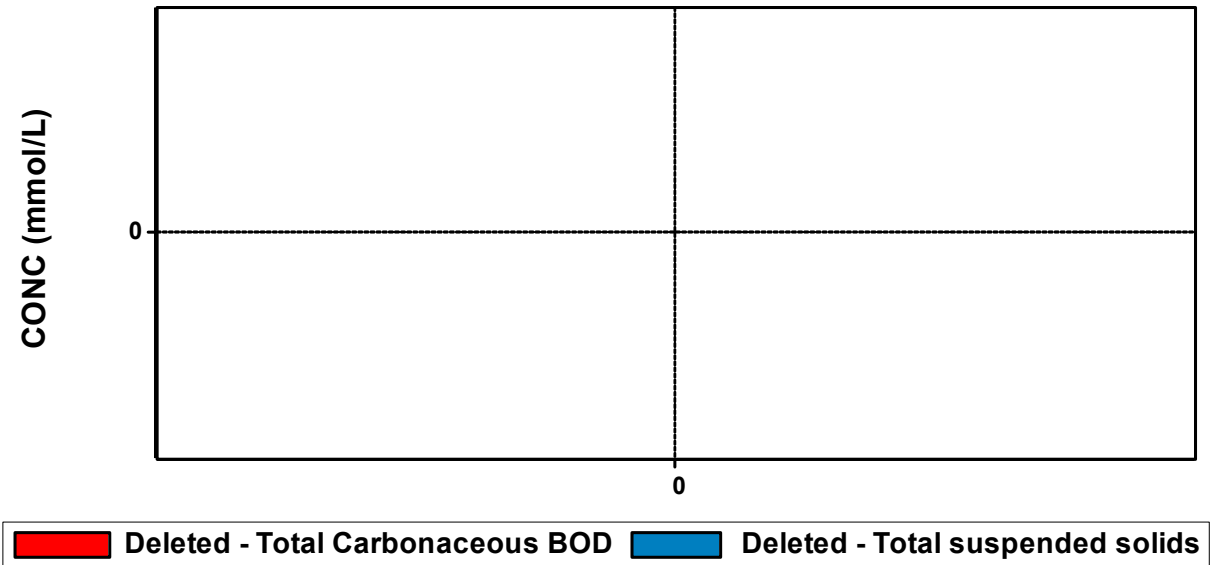
Album page - Nitrogen species

Chart



Album page - BOD_TSS

Chart



Album page - Page 3

Chart

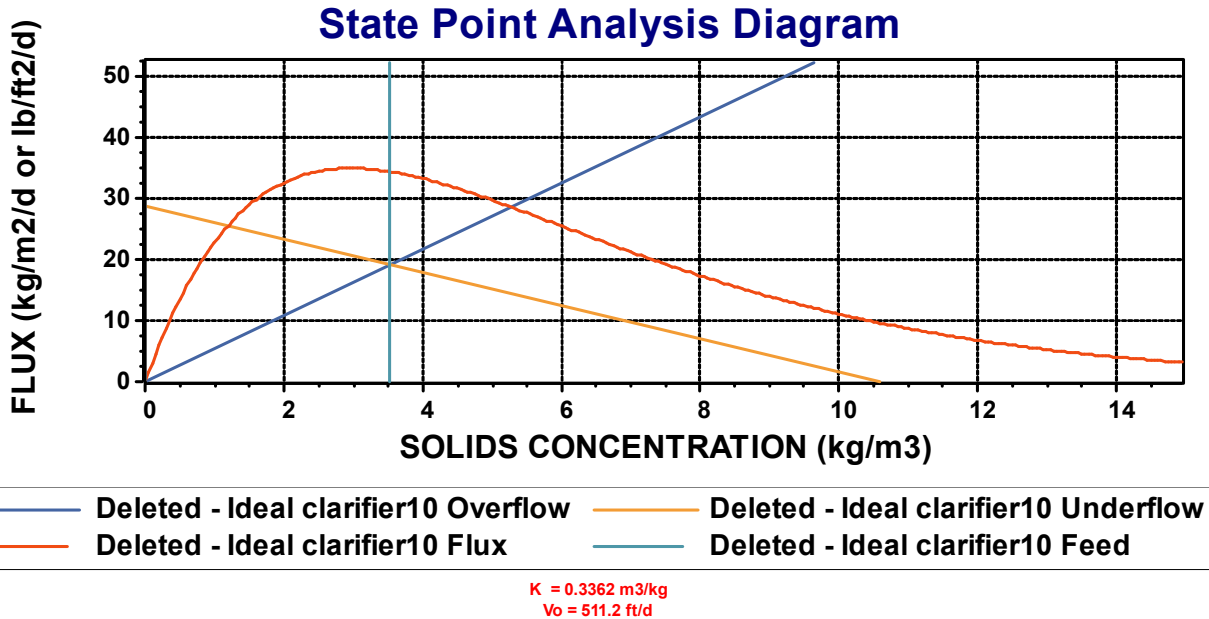
CONC (mg/L)



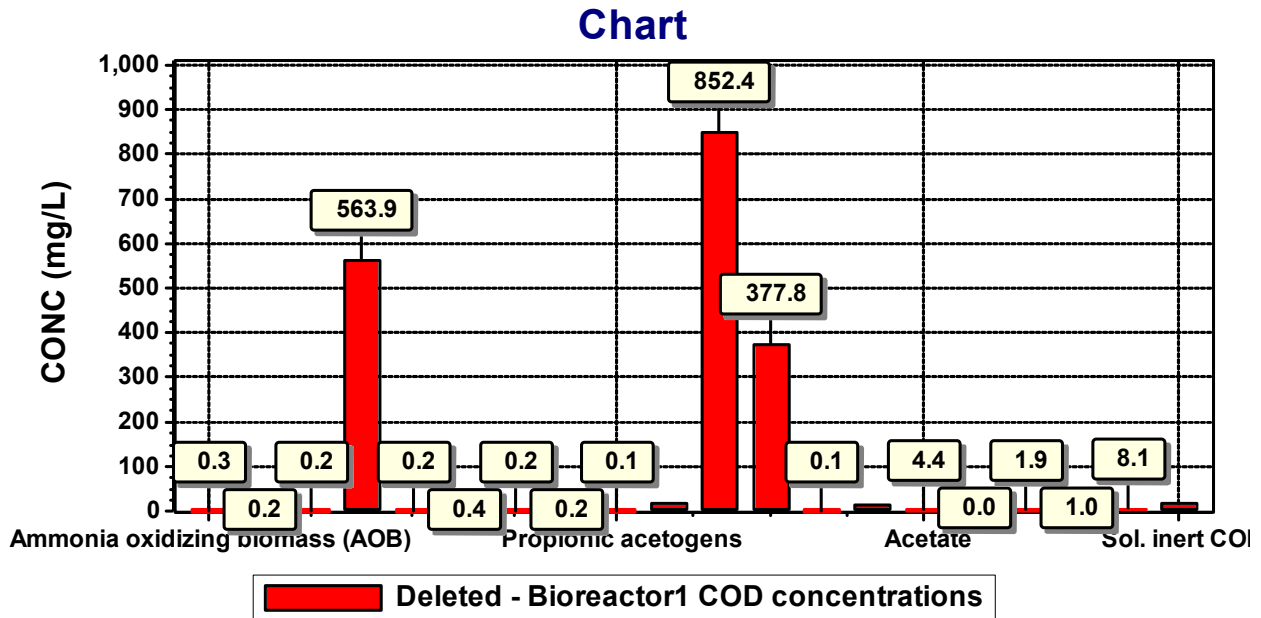
CONC (mg/L)

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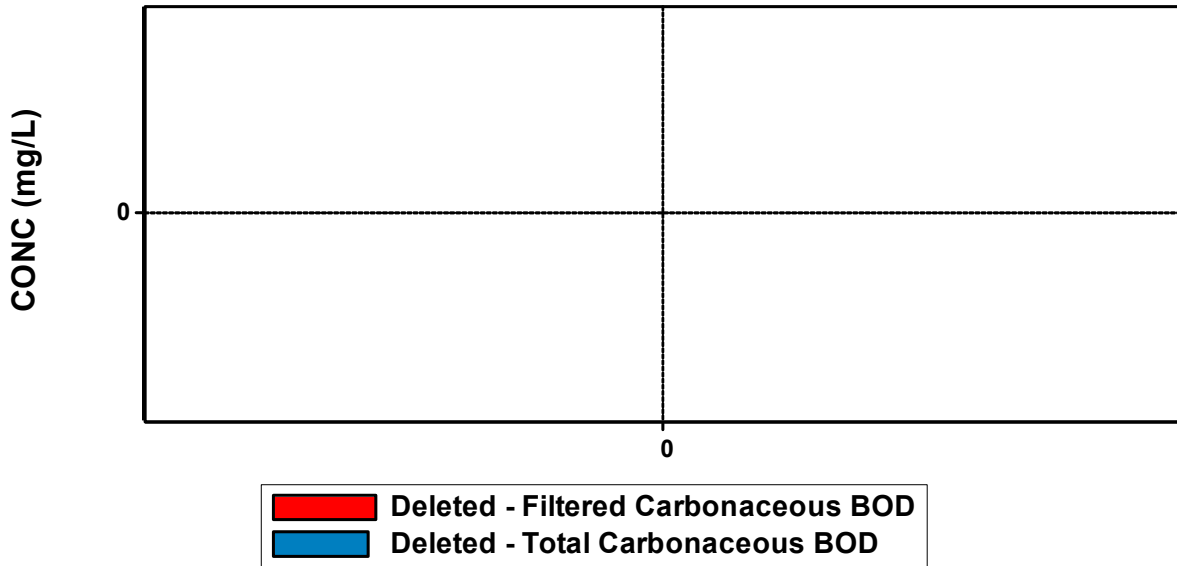


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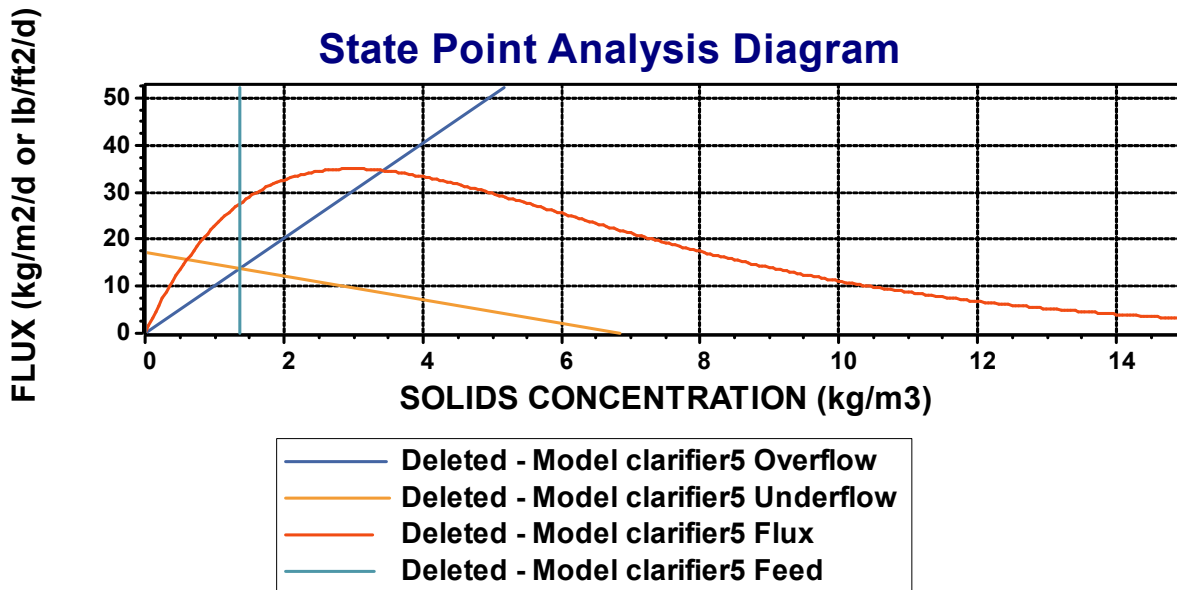
Album page - Page 7

Chart



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State Point Analysis Diagram



K = 0.3360 m³/kg
 Vo = 511.2 ft/d

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Sludge90			
State variable	Conc. (mg/L)	Mass rate (lb/d)	Notes
Biomass - Acetoclastic methanogenic	0.19	0.01	
Biomass - Ammonia oxidizing	63.92	4.87	
Biomass - Anaerobic ammonia oxidizing	2.45	0.19	
Biomass - Endogenous products	2923.70	222.75	
Biomass - Hydrogenotrophic methanogenic	0.04	0.00	
Biomass - Methylophilic	1.48	0.11	
Biomass - Nitrite oxidizing	39.29	2.99	
Biomass - Ordinary heterotrophic	2453.23	186.91	
Biomass - Phosphorus accumulating	1.05	0.08	
Biomass - Propionic acetogenic	0.22	0.02	
Biomass - Sulfur oxidizing	0	0	
Biomass - Sulfur reducing acetotrophic	0.00	0.00	
Biomass - Sulfur reducing hydrogenotrophic	0.00	0.00	
Biomass - Sulfur reducing propionic acetogenic	0.00	0.00	
CODp - Adsorbed hydrocarbon	0	0	
CODp - Degradable external organics	0	0	
CODp - Slowly degradable colloidal	0.01	0.00	
CODp - Slowly degradable particulate	121.63	9.27	
CODp - Stored PHA	0.00	0.00	
CODp - Undegradable cellulose	2090.05	159.24	
CODp - Undegradable non-cellulose	2090.05	159.24	
CODs - Acetate	0.00	0.00	
CODs - Complex readily degradable	1.31	0.10	
CODs - Degradable volatile ind. #1	0	0	
CODs - Degradable volatile ind. #2	0	0	
CODs - Degradable volatile ind. #3	0	0	
CODs - Methanol	0.00	0.00	
CODs - Propionate	0.00	0.00	
CODs - Soluble hydrocarbon	0	0	
CODs - Undegradable	31.92	2.43	
Gas - Dissolved hydrogen	0.01	0.00	

Gas - Dissolved methane	0.00	0.00	
Gas - Dissolved nitrogen	15.67	1.19	
Gas - Dissolved nitrous oxide	0	0	
Gas - Dissolved oxygen	2.00	0.15	
Gas - Dissolved total CO2	1.79	0.06	mmol/L and kmol/d
Gas - Dissolved total sulfides	0.00	0.00	
HAO - Aged	0	0	
HAO - High surface	0	0	
HAO - High with H2PO4- adsorbed	0	0	
HAO - Low surface	0	0	
HAO - Low with H2PO4- adsorbed	0	0	
HFO - Aged	0	0	
HFO - High surface	0	0	
HFO - High with H+ adsorbed	0	0	
HFO - High with H2PO4- adsorbed	0	0	
HFO - Low surface	0	0	
HFO - Low with H+ adsorbed	0	0	
HFO - Low with H2PO4- adsorbed	0	0	
Influent inorganic suspended solids	936.65	71.36	
Metal soluble - Aluminum	0	0	
Metal soluble - Calcium	81.13	6.18	
Metal soluble - Ferric	0	0	
Metal soluble - Ferrous	0	0	
Metal soluble - Magnesium	14.76	1.12	
N - Ammonia	0.13	0.01	
N - Nitrate	8.38	0.64	
N - Nitrite	0.05	0.00	
N - Particulate degradable external organics	0	0	
N - Particulate degradable organic	5.79	0.44	
N - Particulate undegradable	146.30	11.15	
N - Soluble degradable organic	0.55	0.04	
N - Soluble undegradable organic	1.02	0.08	
Other Anions (strong acids)	8.78	0.30	meq/L and keq/d
Other Cations (strong bases)	4.95	0.17	meq/L and keq/d
P - Bound on aged HMO	0	0	

P - Particulate degradable external organics	0	0
P - Particulate degradable organic	1.84	0.14
P - Particulate undegradable	45.98	3.50
P - Releasable stored polyP	0.12	0.01
P - Soluble phosphate	1.79	0.14
P - Unreleasable stored polyP	0.01	0.00
Precipitate - Brushite	0	0
Precipitate - Ferrous sulfide	0	0
Precipitate - Hydroxy - apatite	0	0
Precipitate - Struvite	0	0
Precipitate - Vivianite	0	0
S - Particulate elemental sulfur	0	0
S - Soluble sulfate	0	0
User defined - UD1	0	0
User defined - UD2	0	0
User defined - UD3	0	0
User defined - UD4	0	0

Parameter	Value	Units
Cost (Sludge)	0	\$/hour
Power	0	kW
Power cost (Excl. heating)	0	\$/hour

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El	Fl	Te	B	B	C	C	To	Vo	N -	N -	N -	N -	N -	pH	Al	Air	O	O	O	S	Al
m	ow	m	O	O	O	O	tal	lati	To	To	A	Nit	Nit	[]	kal	flo	U	U	U	O	ph
en	gd	rat	D -	D -	D -	D -	su	le	tal	Kj	m	rat	rit		init	w	R -	R -	R -	TR	a
ts]	ur	Ca	Ca	g/	g/	de	de	gN	ahl	a	gN	gN		[m	rat	Ca	Nit	To	[lb/	[[]
		e	rb	rb	L]	L]	sol	sol	/L]	Nit	[m	/L]	/L]		ol/	3/	on	cat	[m	hr]	
		eg	on	on		L]	ids	ids	/L]	ro	gN	/L]	/L]		L]	mi	eo	ion	gO		
		.	ac	ac		L]	ids	ids	/L]	ge	n	/L]	/L]		L]	n	us	[m	/L/	hr]	
		C]	eo	eo		L]	ids	ids	/L]	n	[m	/L]	/L]		L]	(2	[m	/L/	hr]		
			us	us		L]	ids	ids	/L]	n	[m	/L]	/L]		L]	0C	gO	hr]			
			[m	us		L]	ids	ids	/L]	n	[m	/L]	/L]		L]	, 1	at				

			g/ L]	g/ L]				g/ L]	gN /L]						m)]	/L/ hr]						
Influent	0.46	22.00	31.96	13.76	63.16	24.15	30.00	28.00	50.00	38.00	0.00	0.00	7.20	4.00	----	----	----	----	----	----	----	----
-																						
BO D14																						
Anoxic 1A	1.15	22.00	15.34	5.29	98.68	40.78	83.35	69.41	54.77	54.41	7.72	2.92	0.09	6.67	1.71	0.00	0.00	0.00	0.00	0.00	0.00	0.50
Anoxic 2A	1.15	22.00	15.31	1.35	98.64	34.64	83.36	69.43	54.66	54.41	7.89	1.50	0.08	6.70	1.82	0.00	0.00	0.00	0.00	0.00	0.00	0.50
Aerobic 1A	1.15	22.00	15.16	1.06	98.41	33.52	83.22	69.28	54.69	53.99	1.39	6.66	0.63	6.30	0.96	47.73	36.31	39.77	76.08	10.99	0.28	
Aerobic 2A	1.15	22.00	15.02	0.93	98.20	33.24	83.07	69.13	54.67	53.77	0.13	8.38	0.05	6.21	0.79	17.51	33.30	10.47	43.77	46.11	0.36	
MBRA	0.23	22.00	0.85	0.85	33.12	33.12	0.00	0.00	10.51	1.64	0.06	8.85	0.01	6.30	0.75	53.78	37.25	6.24	43.49	35.17	0.40	
MBRA (U)	0.92	22.00	18.51	0.85	12.19	33.12	10.32	85.87	67.77	66.82	0.06	8.85	0.01	6.29	0.75	----	----	----	----	----	----	----
Effluent 1	0.45	22.00	0.85	0.85	33.12	33.12	0.00	0.00	10.51	1.64	0.06	8.85	0.01	6.29	0.75	----	----	----	----	----	----	----
Sludge 90	0.01	22.00	15.02	0.93	98.20	33.24	83.07	69.13	54.67	53.77	0.13	8.38	0.05	6.21	0.79	----	----	----	----	----	----	----

Global Parameters

Common

Name	Default	Value	
Hydrolysis rate [1/d]	2.1000	2.1000	1.0290
Hydrolysis half sat. [-]	0.0600	0.0600	1.0000
External organics hydrolysis rate [1/d]	2.1000	2.1000	1.0290
External organics hydrolysis half sat. [-]	0.0600	0.0600	1.0000
Anoxic hydrolysis factor [-]	0.2800	0.2800	1.0000
Anaerobic hydrolysis factor (AS) [-]	0.0400	0.0400	1.0000
Anaerobic hydrolysis factor (AD) [-]	0.5000	0.5000	1.0000
Adsorption rate of colloids [L/(mgCOD d)]	0.1500	0.1500	1.0290
Ammonification rate [L/(mgCOD d)]	0.0800	0.0800	1.0290
Assimilative nitrate/nitrite reduction rate [1/d]	0.5000	0.5000	1.0000
Endogenous products decay rate [1/d]	0	0	1.0000

Ammonia oxidizing

Name	Default	Value	
Max. spec. growth rate [1/d]	0.9000	0.9000	1.0720
Substrate (NH4) half sat. [mgN/L]	0.7000	0.7000	1.0000
Byproduct NH4 logistic slope [-]	50.0000	50.0000	1.0000
Byproduct NH4 inflection point [mgN/L]	1.4000	1.4000	1.0000
Denite DO half sat. [mg/L]	0.1000	0.1000	1.0000
Denite HNO2 half sat. [mgN/L]	5.000E-6	5.000E-6	1.0000
Aerobic decay rate [1/d]	0.1700	0.1700	1.0290
Anoxic/anaerobic decay rate [1/d]	0.0800	0.0800	1.0290
KiHNO2 [mmol/L]	5.000E-3	5.000E-3	1.0000

Nitrite oxidizing

Name	Default	Value	
Max. spec. growth rate [1/d]	0.7000	0.7000	1.0600
Substrate (NO2) half sat. [mgN/L]	0.1000	0.1000	1.0000

Aerobic decay rate [1/d]	0.1700	0.1700	1.0290
Anoxic/anaerobic decay rate [1/d]	0.0800	0.0800	1.0290
KiNH3 [mmol/L]	0.0750	0.0750	1.0000

Anaerobic ammonia oxidizing

Name	Default	Value	
Max. spec. growth rate [1/d]	0.2000	0.2000	1.1000
Substrate (NH4) half sat. [mgN/L]	2.0000	2.0000	1.0000
Substrate (NO2) half sat. [mgN/L]	1.0000	1.0000	1.0000
Aerobic decay rate [1/d]	0.0190	0.0190	1.0290
Anoxic/anaerobic decay rate [1/d]	9.500E-3	9.500E-3	1.0290
Ki Nitrite [mgN/L]	1000.0000	1000.0000	1.0000
Nitrite sensitivity constant [L / (d mgN)]	0.0160	0.0160	1.0000

Ordinary heterotrophic

Name	Default	Value	
Max. spec. growth rate [1/d]	3.2000	3.2000	1.0290
Substrate half sat. [mgCOD/L]	5.0000	5.0000	1.0000
Anoxic growth factor [-]	0.5000	0.5000	1.0000
Denite N2 producers (NO3 or NO2) [-]	0.5000	0.5000	1.0000
Aerobic decay rate [1/d]	0.6200	0.6200	1.0290
Anoxic decay rate [1/d]	0.2330	0.2330	1.0290
Anaerobic decay rate [1/d]	0.1310	0.1310	1.0290
Fermentation rate [1/d]	1.6000	1.6000	1.0290
Fermentation half sat. [mgCOD/L]	5.0000	5.0000	1.0000
Fermentation growth factor (AS) [-]	0.2500	0.2500	1.0000
Free nitrous acid inhibition [mol/L]	1.000E-7	1.000E-7	1.0000

Heterotrophic on industrial COD

Name	Default	Value	
Maximum specific growth rate on Ind #1 COD [1/d]	4.3000	4.3000	1.0290
Substrate (Ind #1) half sat. [mgCOD/L]	1.0000	1.0000	1.0000
Inhibition coefficient for Ind #1 [mgCOD/L]	60.0000	60.0000	1.0000
Anaerobic growth factor for Ind #1 [mgCOD/L]	0.0500	0.0500	1.0000
Maximum specific growth rate on Ind #2 COD [1/d]	1.5000	1.5000	1.0290
Substrate (Ind #2) half sat. [mgCOD/L]	30.0000	30.0000	1.0000
Inhibition coefficient for Ind #2 [mgCOD/L]	3000.0000	3000.0000	1.0000
Anaerobic growth factor for Ind #2 [mgCOD/L]	0.0500	0.0500	1.0000
Maximum specific growth rate on Ind #3 COD [1/d]	4.3000	4.3000	1.0290
Substrate (Ind #3) half sat. [mgCOD/L]	1.0000	1.0000	1.0000
Inhibition coefficient for Ind #3 COD [mgCOD/L]	60.0000	60.0000	1.0000
Anaerobic growth factor for Ind #3 [mgCOD/L]	0.0500	0.0500	1.0000
Maximum specific growth rate on adsorbed hydrocarbon COD [1/d]	2.0000	2.0000	1.0290
Substrate (adsorbed hydrocarbon) half sat. [-]	0.1500	0.1500	1.0000
Anaerobic growth factor for adsorbed hydrocarbons [mgCOD/L]	0.0100	0.0100	1.0000
Adsorption rate of soluble hydrocarbons [l/(mgCOD d)]	0.2000	0.2000	1.0000

Methylotrophic

Name	Default	Value	
Max. spec. growth rate [1/d]	1.3000	1.3000	1.0720
Methanol half sat. [mgCOD/L]	0.5000	0.5000	1.0000
Denite N2 producers (NO3 or NO2) [-]	0.5000	0.5000	1.0000
Aerobic decay rate [1/d]	0.0400	0.0400	1.0290
Anoxic/anaerobic decay rate [1/d]	0.0300	0.0300	1.0290
Free nitrous acid inhibition [mmol/L]	1.000E-7	1.000E-7	1.0000

Phosphorus accumulating

Name	Default	Value	
Max. spec. growth rate [1/d]	0.9500	0.9500	1.0000
Max. spec. growth rate, P-limited [1/d]	0.4200	0.4200	1.0000
Substrate half sat. [mgCOD(PHB)/mgCOD(Zbp)]	0.1000	0.1000	1.0000
Substrate half sat., P-limited [mgCOD(PHB)/mgCOD(Zbp)]	0.0500	0.0500	1.0000
Magnesium half sat. [mgMg/L]	0.1000	0.1000	1.0000
Cation half sat. [mmol/L]	0.1000	0.1000	1.0000
Calcium half sat. [mgCa/L]	0.1000	0.1000	1.0000
Aerobic/anoxic decay rate [1/d]	0.1000	0.1000	1.0000
Aerobic/anoxic maintenance rate [1/d]	0	0	1.0000
Anaerobic decay rate [1/d]	0.0400	0.0400	1.0000
Anaerobic maintenance rate [1/d]	0	0	1.0000
Sequestration rate [1/d]	4.5000	4.5000	1.0000
Anoxic growth factor [-]	0.3300	0.3300	1.0000

Propionic acetogenic

Name	Default	Value	
Max. spec. growth rate [1/d]	0.2500	0.2500	1.0290
Substrate half sat. [mgCOD/L]	10.0000	10.0000	1.0000
Acetate inhibition [mgCOD/L]	10000.0000	10000.0000	1.0000
Anaerobic decay rate [1/d]	0.0500	0.0500	1.0290
Aerobic/anoxic decay rate [1/d]	0.5200	0.5200	1.0290

Methanogenic

Name	Default	Value	
Acetoclastic max. spec. growth rate [1/d]	0.3000	0.3000	1.0290
H ₂ -utilizing max. spec. growth rate [1/d]	1.4000	1.4000	1.0290
Acetoclastic substrate half sat. [mgCOD/L]	100.0000	100.0000	1.0000

Acetoclastic methanol half sat. [mgCOD/L]	0.5000	0.5000	1.0000
H2-utilizing CO2 half sat. [mmol/L]	0.1000	0.1000	1.0000
H2-utilizing substrate half sat. [mgCOD/L]	1.0000	1.0000	1.0000
H2-utilizing methanol half sat. [mgCOD/L]	0.5000	0.5000	1.0000
Acetoclastic propionic inhibition [mgCOD/L]	10000.0000	10000.0000	1.0000
Acetoclastic anaerobic decay rate [1/d]	0.1300	0.1300	1.0290
Acetoclastic aerobic/anoxic decay rate [1/d]	0.6000	0.6000	1.0290
H2-utilizing anaerobic decay rate [1/d]	0.1300	0.1300	1.0290
H2-utilizing aerobic/anoxic decay rate [1/d]	2.8000	2.8000	1.0290

Sulfur oxidizing

Name	Default	Value	
Maximum specific growth rate (sulfide) [1/d]	0.7500	0.7500	1.0290
Maximum specific growth rate (sulfur) [1/d]	0.1000	0.1000	1.0290
Substrate (H2S) half sat. [mgS/L]	1.0000	1.0000	1.0000
Substrate (sulfur) half sat. [mgS/L]	1.0000	1.0000	1.0000
Anoxic growth factor [-]	0.5000	0.5000	1.0000
Decay rate [1/d]	0.0400	0.0400	1.0290

Sulfur reducing

Name	Default	Value	
Propionic max. spec. growth rate [1/d]	0.5830	0.5830	1.0350
Propionic acid half sat. [mgCOD/L]	295.0000	295.0000	1.0000
Hydrogen sulfide inhibition coefficient [mgS/L]	185.0000	185.0000	1.0000
Sulfate (SO4=) half sat. [mgS/L]	2.4700	2.4700	1.0000
Decay rate [1/d]	0.0185	0.0185	1.0350
Acetotrophic max. spec. growth rate [1/d]	0.6120	0.6120	1.0350
Acetic acid half sat. [mgCOD/L]	24.0000	24.0000	1.0000
Hydrogen sulfide inhibition coefficient [mgS/L]	164.0000	164.0000	1.0000

Sulfate (SO4=) half sat. [mgS/L]	6.4100	6.4100	1.0000
Decay rate [1/d]	0.0275	0.0275	1.0350
Hydrogenotrophic max. spec. growth rate with SO4= [1/d]	2.8000	2.8000	1.0350
Hydrogenotrophic max. spec. growth rate with S [1/d]	0.1000	0.1000	1.0350
Hydrogen half sat. [mgCOD/L]	0.0700	0.0700	1.0000
Hydrogen sulfide inhibition coefficient [mgS/L]	550.0000	550.0000	1.0000
Sulfate (SO4=) half sat. [mgS/L]	6.4100	6.4100	1.0000
Sulfur (S) half sat. [mgS/L]	50.0000	50.0000	1.0000
Decay rate [1/d]	0.0600	0.0600	1.0350

pH

Name	Default	Value
Ordinary heterotrophic low pH limit [-]	4.0000	4.0000
Ordinary heterotrophic high pH limit [-]	10.0000	10.0000
Methylotrophic low pH limit [-]	4.0000	4.0000
Methylotrophic high pH limit [-]	10.0000	10.0000
Autotrophic low pH limit [-]	5.5000	5.5000
Autotrophic high pH limit [-]	9.5000	9.5000
Phosphorus accumulating low pH limit [-]	4.0000	4.0000
Phosphorus accumulating high pH limit [-]	10.0000	10.0000
Ordinary heterotrophic low pH limit (anaerobic) [-]	5.5000	5.5000
Ordinary heterotrophic high pH limit (anaerobic) [-]	8.5000	8.5000
Propionic acetogenic low pH limit [-]	4.0000	4.0000
Propionic acetogenic high pH limit [-]	10.0000	10.0000
Acetoclastic methanogenic low pH limit [-]	5.0000	5.0000
Acetoclastic methanogenic high pH limit [-]	9.0000	9.0000
H2-utilizing methanogenic low pH limit [-]	5.0000	5.0000
H2-utilizing methanogenic high pH limit [-]	9.0000	9.0000

Switches

Name	Default	Value
Ordinary heterotrophic DO half sat. [mgO2/L]	0.1500	0.0500
Phosphorus accumulating DO half sat. [mgO2/L]	0.0500	0.0500
Anoxic/anaerobic NOx half sat. [mgN/L]	0.1500	0.1500
Ammonia oxidizing DO half sat. [mgO2/L]	0.2500	0.2500
Nitrite oxidizing DO half sat. [mgO2/L]	0.5000	0.5000
Anaerobic ammonia oxidizing DO half sat. [mgO2/L]	0.0100	0.0100
Sulfur oxidizing sulfate pathway DO half sat. [mgO2/L]	0.2500	0.2500
Sulfur oxidizing sulfur pathway DO half sat. [mgO2/L]	0.0500	0.0500
Anoxic NO3(->NO2) half sat. [mgN/L]	0.1000	0.1000
Anoxic NO3(->N2) half sat. [mgN/L]	0.0500	0.0500
Anoxic NO2(->N2) half sat. (mgN/L)	0.0100	0.0100
NH3 nutrient half sat. [mgN/L]	5.000E-3	5.000E-3
PolyP half sat. [mgP/mgCOD]	0.0100	0.0100
VFA sequestration half sat. [mgCOD/L]	5.0000	5.0000
P uptake half sat. [mgP/L]	0.1500	0.1500
P nutrient half sat. [mgP/L]	1.000E-3	1.000E-3
Autotrophic CO2 half sat. [mmol/L]	0.1000	0.1000
H2 low/high half sat. [mgCOD/L]	1.0000	1.0000
Propionic acetogenic H2 inhibition [mgCOD/L]	5.0000	5.0000
Synthesis anion/cation half sat. [meq/L]	0.0100	0.0100

Common

Name	Default	Value
Biomass/Endog Ca content (gCa/gCOD)	3.912E-3	3.912E-3
Biomass/Endog Mg content (gMg/gCOD)	3.912E-3	3.912E-3
Biomass/Endog other cations content (mol/gCOD)	5.115E-4	5.115E-4
Biomass/Endog other Anions content (mol/gCOD)	1.410E-4	1.410E-4
N in endogenous residue [mgN/mgCOD]	0.0700	0.0700
P in endogenous residue [mgP/mgCOD]	0.0220	0.0220
Ca content of slowly biodegradable (gCa/gCOD)	3.912E-3	3.912E-3
Mg content of slowly biodegradable (gMg/gCOD)	3.700E-4	3.700E-4

Endogenous residue COD:VSS ratio [mgCOD/mgVSS]	1.4200	1.4200
Particulate substrate COD:VSS ratio [mgCOD/mgVSS]	1.6327	1.4200
Particulate inert COD:VSS ratio [mgCOD/mgVSS]	1.6000	1.4200
Cellulose COD:VSS ratio [mgCOD/mgVSS]	1.4000	1.4000
External organic COD:VSS ratio [mgCOD/mgVSS]	1.6000	1.6000
Molecular weight of other anions [mg/mmol]	35.5000	35.5000
Molecular weight of other cations [mg/mmol]	39.0983	39.1000

Ammonia oxidizing

Name	Default	Value
Yield [mgCOD/mgN]	0.1500	0.1500
Denite NO2 fraction as TEA [-]	0.5000	0.5000
Byproduct NH4 fraction to N2O [-]	2.500E-3	2.500E-3
N in biomass [mgN/mgCOD]	0.0700	0.0700
P in biomass [mgP/mgCOD]	0.0220	0.0220
Fraction to endogenous residue [-]	0.0800	0.0800
COD:VSS ratio [mgCOD/mgVSS]	1.4200	1.4200

Nitrite oxidizing

Name	Default	Value
Yield [mgCOD/mgN]	0.0900	0.0900
N in biomass [mgN/mgCOD]	0.0700	0.0700
P in biomass [mgP/mgCOD]	0.0220	0.0220
Fraction to endogenous residue [-]	0.0800	0.0800
COD:VSS ratio [mgCOD/mgVSS]	1.4200	1.4200

Anaerobic ammonia oxidizing

Name	Default	Value
Yield [mgCOD/mgN]	0.1140	0.1140
Nitrate production [mgN/mgBiomassCOD]	2.2800	2.2800
N in biomass [mgN/mgCOD]	0.0700	0.0700
P in biomass [mgP/mgCOD]	0.0220	0.0220
Fraction to endogenous residue [-]	0.0800	0.0800
COD:VSS ratio [mgCOD/mgVSS]	1.4200	1.4200

Ordinary heterotrophic

Name	Default	Value
Yield (aerobic) [-]	0.6660	0.6660
Yield (fermentation, low H2) [-]	0.1000	0.1000
Yield (fermentation, high H2) [-]	0.1000	0.1000
H2 yield (fermentation low H2) [-]	0.3500	0.3500
H2 yield (fermentation high H2) [-]	0	0
Propionate yield (fermentation, low H2) [-]	0	0
Propionate yield (fermentation, high H2) [-]	0.7000	0.7000
CO2 yield (fermentation, low H2) [-]	0.7000	0.7000
CO2 yield (fermentation, high H2) [-]	0	0
N in biomass [mgN/mgCOD]	0.0700	0.0700
P in biomass [mgP/mgCOD]	0.0220	0.0220
Endogenous fraction - aerobic [-]	0.0800	0.0800
Endogenous fraction - anoxic [-]	0.1030	0.1030
Endogenous fraction - anaerobic [-]	0.1840	0.1840
COD:VSS ratio [mgCOD/mgVSS]	1.4200	1.4200
Yield (anoxic) [-]	0.5400	0.5400
Yield propionic (aerobic) [-]	0.6400	0.6400
Yield propionic (anoxic) [-]	0.4600	0.4600
Yield acetic (aerobic) [-]	0.6000	0.6000
Yield acetic (anoxic) [-]	0.4300	0.4300
Yield methanol (aerobic) [-]	0.5000	0.5000

Adsorp. max. [-]	1.0000	1.0000
Max fraction to N2O at high FNA over nitrate [-]	0.0500	0.0500
Max fraction to N2O at high FNA over nitrite [-]	0.1000	0.1000

Ordinary heterotrophic on industrial COD

Name	Default	Value
Yield Ind #1 COD (Aerobic) [-]	0.5000	0.5000
Yield Ind #1 COD (Anoxic) [-]	0.4000	0.4000
Yield Ind #1 COD (Anaerobic) [-]	0.0400	0.0400
COD:Mole ratio - Ind #1 COD [gCOD/Mol]	224.0000	224.0000
Yield Ind #2 COD (Aerobic) [-]	0.5000	0.5000
Yield Ind #2 COD (Anoxic) [-]	0.4000	0.4000
Yield Ind #2 COD (Anaerobic) [-]	0.0500	0.0500
COD:Mole ratio - Ind #2 COD [gCOD/Mol]	240.0000	240.0000
Yield on Ind #3 COD (Aerobic) [-]	0.5000	0.5000
Yield on Ind #3 COD (Anoxic) [-]	0.4000	0.4000
Yield on Ind #3 COD (Anaerobic) [-]	0.0400	0.0400
COD:Mole ratio - Ind #3 COD [gCOD/Mol]	288.0000	288.0000
Yield enmeshed hydrocarbons (Aerobic) [-]	0.5000	0.5000
Yield enmeshed hydrocarbons (Anoxic) [-]	0.4000	0.4000
Yield enmeshed hydrocarbons (Anaerobic) [-]	0.0400	0.0400
COD:Mole ratio - Hydrocarbon COD [gCOD/Mol]	336.0000	336.0000
Hydrocarbon COD:VSS ratio [mgCOD/mgVSS]	3.2000	3.2000
Max. hydrocarbon adsorp. ratio [-]	1.0000	1.0000
Yield of Ind #1 on Ind #3 COD (Aerobic) [-]	0	0
Yield of Ind #1 on Ind #3 COD (Anoxic) [-]	0	0
Hydrocarbon Yield on Ind #3 COD (Aerobic) [-]	0	0
Hydrocarbon Yield on Ind #3 COD (Anoxic) [-]	0	0

Methylotrophic

Name	Default	Value
Yield (anoxic) [-]	0.4000	0.4000
N in biomass [mgN/mgCOD]	0.0700	0.0700
P in biomass [mgP/mgCOD]	0.0220	0.0220
Fraction to endogenous residue [-]	0.0800	0.0800
COD:VSS ratio [mgCOD/mgVSS]	1.4200	1.4200
Max fraction to N2O at high FNA over nitrate [-]	0.1000	0.1000
Max fraction to N2O at high FNA over nitrite [-]	0.1500	0.1500

Phosphorus accumulating

Name	Default	Value
Yield (aerobic) [-]	0.6390	0.6390
Yield (anoxic) [-]	0.5200	0.5200
Aerobic P/PHA uptake [mgP/mgCOD]	0.9300	0.9300
Anoxic P/PHA uptake [mgP/mgCOD]	0.3500	0.3500
Yield of PHA on Ac sequestration [-]	0.8890	0.8890
N in biomass [mgN/mgCOD]	0.0700	0.0700
N in sol. inert [mgN/mgCOD]	0.0700	0.0700
P in biomass [mgP/mgCOD]	0.0220	0.0220
Fraction to endogenous part. [-]	0.2500	0.2500
Inert fraction of endogenous sol. [-]	0.2000	0.2000
P/Ac release ratio [mgP/mgCOD]	0.5100	0.5100
COD:VSS ratio [mgCOD/mgVSS]	1.4200	1.4200
Yield of low PP [-]	0.9400	0.9400
Mg to P mole ratio in polyphosphate [mmolMg/mmolP]	0.3000	0.3000
Cation to P mole ratio in polyphosphate [meq/mmolP]	0.1500	0.1500
Ca to P mole ratio in polyphosphate [mmolCa/mmolP]	0.0500	0.0500

Propionic acetogenic

Name	Default	Value
Yield [-]	0.1000	0.1000
H2 yield [-]	0.4000	0.4000
CO2 yield [-]	1.0000	1.0000
N in biomass [mgN/mgCOD]	0.0700	0.0700
P in biomass [mgP/mgCOD]	0.0220	0.0220
Fraction to endogenous residue [-]	0.0800	0.0800
COD:VSS ratio [mgCOD/mgVSS]	1.4200	1.4200

Methanogenic

Name	Default	Value
Acetoclastic yield [-]	0.1000	0.1000
Acetoclastic yield on methanol[-]	0.1000	0.1000
H2-utilizing yield [-]	0.1000	0.1000
H2-utilizing yield on methanol [-]	0.1000	0.1000
N in acetoclastic biomass [mgN/mgCOD]	0.0700	0.0700
N in H2-utilizing biomass [mgN/mgCOD]	0.0700	0.0700
P in acetoclastic biomass [mgP/mgCOD]	0.0220	0.0220
P in H2-utilizing biomass [mgP/mgCOD]	0.0220	0.0220
Acetoclastic fraction to endog. residue [-]	0.0800	0.0800
H2-utilizing fraction to endog. residue [-]	0.0800	0.0800
Acetoclastic COD:VSS ratio [mgCOD/mgVSS]	1.4200	1.4200
H2-utilizing COD:VSS ratio [mgCOD/mgVSS]	1.4200	1.4200

Sulfur oxidizing

Name	Default	Value
Yield (aerobic) [mgCOD/mgS]	0.5000	0.5000
Yield (Anoxic) [mgCOD/mgS]	0.3500	0.3500
N in biomass [mgN/mgCOD]	0.0700	0.0700

P in biomass [mgP/mgCOD]	0.0220	0.0220
Fraction to endogenous residue [-]	0.0800	0.0800
COD:VSS ratio [mgCOD/mgVSS]	1.4200	1.4200

Sulfur reducing

Name	Default	Value
Yield [mgCOD/mg H2 COD]	0.0712	0.0712
Yield [mgCOD/mg Ac COD]	0.0470	0.0470
Yield [mgCOD/mg Pr COD]	0.0384	0.0384
N in biomass [mgN/mgCOD]	0.0700	0.0700
P in biomass [mgP/mgCOD]	0.0220	0.0220
Fraction to endogenous residue [-]	0.0800	0.0800
COD:VSS ratio [mgCOD/mgVSS]	1.4200	1.4200

General

Name	Default	Value
Tank head loss per metre of length (from flow) [m/m]	2.500E-3	2.500E-3
BOD calculation rate constant for Xsc degradation [/d]	0.5000	0.5000
BOD calculation rate constant for Xsp (and hydrocarbon) degradation [/d]	0.5000	0.5000
BOD calculation rate constant for Xeo degradation [/d]	0.5000	0.5000

Heating fuel/Chemical Costs

Name	Default	Value
Methanol [\$/gal]	1.6656	1.6656
Ferric chloride [\$/lb Fe]	0.5307	0.5307
Ferric sulfate [\$/lb Fe]	0.3583	0.3583

Ferrous chloride [\$/lb Fe]	0.2767	0.2767
Ferrous sulfate [\$/lb Fe]	1.0750	1.0750
Aluminum sulfate [\$/lb Al]	0.7666	0.7666
Aluminum chloride [\$/lb Al]	0.8981	0.8981
Poly Aluminum Chloride (PAC) [\$/lb Al]	0.5307	0.5307
Natural gas [\$/MMBTU]	3.1652	3.1652
Heating oil [\$/gal]	1.8927	1.8927
Diesel [\$/gal]	2.6498	2.6498
Custom fuel [\$/gal]	3.7854	3.7854
Biogas sale price [\$/MMBTU]	2.1101	2.1101

Anaerobic digester

Name	Default	Value
Bubble rise velocity (anaerobic digester) [cm/s]	23.9000	23.9000
Bubble Sauter mean diameter (anaerobic digester) [cm]	0.3500	0.3500
Anaerobic digester gas hold-up factor []	1.0000	1.0000

Combined Heat and Power (CHP) engine

Name	Default	Value
Methane heat of combustion [kJ/mole]	800.0000	800.0000
Hydrogen heat of combustion [kJ/mole]	240.0000	240.0000
CHP engine heat price [\$/kWh]	0	0
CHP engine power price [\$/kWh]	0.1500	0.1500

Calorific values of heating fuels

Name	Default	Value
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Calorific value of natural gas [BTU/lb]	20636	20636
Calorific value of heating fuel oil [BTU/lb]	18057	18057
Calorific value of diesel [BTU/lb]	19776	19776
Calorific value of custom fuel [BTU/lb]	13758	13758

Density of liquid heating fuels

Name	Default	Value
Density of heating fuel oil [lb/ft3]	56	56
Density of diesel [lb/ft3]	55	55
Density of custom fuel [lb/ft3]	49	49

Mass transfer

Name	Default	Value
Kl for H2 [m/d]	17.0000	17.0000 1.0240
Kl for CO2 [m/d]	10.0000	10.0000 1.0240
Kl for NH3 [m/d]	1.0000	1.0000 1.0240
Kl for CH4 [m/d]	8.0000	8.0000 1.0240
Kl for N2 [m/d]	15.0000	15.0000 1.0240
Kl for N2O [m/d]	8.0000	8.0000 1.0240
Kl for H2S [m/d]	1.0000	1.0000 1.0240
Kl for lnd #1 COD [m/d]	0	0 1.0240
Kl for lnd #2 COD [m/d]	0.5000	0.5000 1.0240
Kl for lnd #3 COD [m/d]	0	0 1.0240
Kl for O2 [m/d]	13.0000	13.0000 1.0240

Henry's law constants

Name	Default	Value	
CO2 [M/atm]	3.4000E-2	3.4000E-2	2400.0000
O2 [M/atm]	1.3000E-3	1.3000E-3	1500.0000
N2 [M/atm]	6.5000E-4	6.5000E-4	1300.0000
N2O [M/atm]	2.5000E-2	2.5000E-2	2600.0000
NH3 [M/atm]	5.8000E+1	5.8000E+1	4100.0000
CH4 [M/atm]	1.4000E-3	1.4000E-3	1600.0000
H2 [M/atm]	7.8000E-4	7.8000E-4	500.0000
H2S [M/Atm]	1.0000E-1	1.0000E-1	2200.0000
Ind 1 [M/Atm]	1.9000E+3	1.9000E+3	7300.0000
Ind 2 [M/Atm]	1.8000E-1	1.8000E-1	2200.0000
Ind 3 [M/Atm]	1.5000E-1	1.5000E-1	1900.0000

Properties constants

Name	Default	Value
K in Viscosity = $K e^{-(Ea/RT)}$ [Pa s]	6.849E-7	6.849E-7
Ea in Viscosity = $K e^{-(Ea/RT)}$ [J/mol]	1.780E+4	1.780E+4
Y in ML Viscosity = H2O viscosity * (1+A*MLSS^Y) [-]	1.0000	1.0000
A in ML Viscosity = H2O viscosity * (1+A*MLSS^Y) [m3/g]	1.000E-7	1.000E-7
A in ML Density = H2O density + A*MLSS [(kg/m3)/(g/m3)]	3.248E-4	3.248E-4
A in Antoine equn. [T in K, P in Bar {NIST}]	5.2000	5.2039
B in Antoine equn. [T in K, P in Bar {NIST}]	1734.0000	1733.9260
C in Antoine equn. [T in K, P in Bar {NIST}]	-39.5000	-39.4800

Metal salt solution densities

Name	Default	Value
Ferric chloride solution density [kg/m3]	3820.0000	3820.0000
Ferric sulfate solution density [kg/m3]	4800.0000	4800.0000
Ferrous chloride solution density [kg/m3]	3160.0000	3160.0000

Ferrous sulfate solution density [kg/m3]	1150.0000	1150.0000
Aluminum sulfate solution density [kg/m3]	1950.0000	1950.0000
Aluminum chloride solution density [kg/m3]	2480.0000	2480.0000

Mineral precipitation rates

Name	Default	Value	
Vivianite precipitation rate [L/(mol d)]	1.000E+5	1.000E+5	1.0240
Vivianite redissolution rate [L/(mol d)]	1.000E+5	1.000E+5	1.0240
Vivianite half sat. [mgTSS/L]	0.0100	0.0100	1.0000
FeS precipitation rate [L/(mol d)]	1000.0000	1000.0000	1.0240
FeS redissolution rate [L/(mol d)]	10.0000	10.0000	1.0240
FeS half sat. [mgTSS/L]	0.1000	0.1000	1.0000
Struvite precipitation rate [L ² /(mol ² d)]	3.000E+10	3.000E+10	1.0240
Struvite redissolution rate [L ² /(mol ² d)]	3.000E+11	3.000E+11	1.0240
Struvite half sat. [mgTSS/L]	1.0000	1.0000	1.0000
Brushite precipitation rate [L/(mol d)]	1.000E+6	1.000E+6	1.0000
Brushite redissolution rate [L/(mol d)]	10000.0000	10000.0000	1.0000
Brushite half sat. [mgTSS/L]	1.0000	1.0000	1.0000
HAP precipitation rate [g/d]	5.000E-4	5.000E-4	1.0000

Mineral precipitation constants

Name	Default	Value
Vivianite solubility product [mol/L] ⁵	1.710E-36	1.710E-36
FeS solubility product [mol/L] ²	4.258E-4	4.258E-4
Struvite solubility product [mol/L] ³	6.918E-14	6.918E-14
Brushite solubility product [mol/L] ²	2.490E-7	2.490E-7

Fe rates

Name	Default	Value	
A in aging rate = $A * \exp(-G/B)$ [1/d]	16.1550	16.1550	1.0000
B in aging rate = $A * \exp(-G/B)$ [1/s]	57.3000	57.3000	1.0000
HFO(L) aging rate factor	2.500E-4	2.500E-4	1.0000
HFO(H) with H2PO4- bound aging factor []	1.000E-5	1.000E-5	1.0000
HFO(L) with H2PO4- bound aging factor []	0.4000	0.4000	1.0000
H2PO4- coprecipitation rate [mol/(L d)]	1.500E-9	1.500E-9	1.0000
H2PO4- Adsorption rate [mol/(L d)]	2.000E-11	2.000E-11	1.0000
H+ competition for HFO(H) protonation sites [L/(mmol . d)]	1000.0000	1000.0000	1.0000
H+ competition for HFO(L) protonation sites [L/(mmol . d)]	100.0000	100.0000	1.0000

Fe constants

Name	Default	Value
Ferric active site factor(high) [{mol Sites}/{mol HFO(H)}]	4.0000	2.0000
Ferric active site factor(low) [{mol Sites}/{mol HFO(L)}]	2.4000	1.2000
H+ competition level for Fe(OH)3 [mol/L]	7.000E-7	7.000E-7
Equilibrium constant for FeOH3-H2PO4- [{mf HFO(H).H2PO4}/({mol H2PO4-}{mf HFO(H)}^2)]	2.000E-9	2.000E-9
Colloidal COD removed with Ferric [gCOD/Fe active site]	80.0000	130.0000
Minimum residual P level with iron addition [mgP/L]	0.0150	0.0150
HFO(H) with H2PO4- P release factor	10000.0000	10000.0000
HFO(L) with H2PO4- P release factor	10000.0000	10000.0000

Fe RedOx rates

Name	Default	Value	
Iron reduction using acetic acid	1.000E-7	1.000E-7	1.0000
Half Sat. acetic acid	0.5000	0.5000	1.0000
Iron reduction using propionic acid	1.000E-7	1.000E-7	1.0000
Half Sat. propionic acid	0.5000	0.5000	1.0000

Iron reduction using dissolved hydrogen gas	1.000E-7	1.000E-7	1.0000
Half Sat. dissolved hydrogen gas	0.5000	0.5000	1.0000
Iron reduction using hydrogen sulfide	5.000E-5	5.000E-5	1.0000
Half Sat. hydrogen sulfide	0.5000	0.5000	1.0000
Iron oxidation rate (aerobic)	1.000E-3	1.000E-3	1.0000
Abiotic iron reduction using acetic acid	2.000E-5	2.000E-5	1.0000
Abiotic iron reduction using propionic acid	2.000E-5	2.000E-5	1.0000
Abiotic iron reduction using dissolved hydrogen gas	2.000E-5	2.000E-5	1.0000
Abiotic iron reduction using hydrogen sulfide	2.000E-5	2.000E-5	1.0000
Abiotic iron oxidation rate (aerobic)	1.0000	1.0000	1.0000

CEPT rates

Name	Default	Value	
HFO colloidal adsorption rate	1.0000	1.0000	1.0000
Residual Xsc for adsorption to HFO	5.0000	5.0000	1.0000
Slope for Xsc residual	1.0000	1.0000	1.0000
HAO colloidal adsorption rate	1.0000	1.0000	1.0000
Residual Xsc for adsorption to HAO	5.0000	5.0000	1.0000
Slope for Xsc residual	1.0000	1.0000	1.0000

AI rates

Name	Default	Value	
A in aging rate = $A * \exp(-G/B)$ [1/d]	16.1550	16.1550	1.0000
B in aging rate = $A * \exp(-G/B)$ [1/s]	57.3000	57.3000	1.0000
HAO(L) aging rate factor	2.500E-4	2.500E-4	1.0000
HAO(H) with H ₂ PO ₄ - bound aging factor []	1.000E-5	1.000E-5	1.0000
HAO(L) with H ₂ PO ₄ - bound aging factor []	0.4000	0.4000	1.0000
H ₂ PO ₄ - coprecipitation rate [mol/(L d)]	1.500E-9	1.500E-9	1.0000
H ₂ PO ₄ - Adsorption rate [mol/(L d)]	1.000E-9	1.000E-9	1.0000

Al constants

Name	Default	Value
Al active site factor(high) [{mol Sites}/{mol HAO(H)}]	3.0000	3.0000
Al active site factor(low) [{mol Sites}/{mol HAO(L)}]	1.5000	1.5000
Equilibrium constant for AlOH3-H2PO4- [{mf HAO(H).H2PO4}/{(mol H2PO4-){mf HAO(H)}^2}]	8.000E-10	8.000E-10
Colloidal COD removed with Al [gCOD/Al active site]	30.0000	30.0000
Minimum residual P level with Al addition [mgP/L]	0.0150	0.0150
HAO(H) with H2PO4- P release factor	10000.0000	10000.0000
HAO(L) with H2PO4- P release factor	10000.0000	10000.0000

Pipe and pump parameters

Name	Default	Value
Static head [ft]	0.8202	0.8202
Pipe length (headloss calc.s) [ft]	164.0420	164.0420
Pipe inside diameter [in]	19.68504	19.68504
K(fittings) - Total minor losses K	5.0000	5.0000
Pipe roughness [in]	0.00787	0.00787
'A' in overall pump efficiency = $A + B*Q + C*(Q^2)$ [-]	0.8500	0.8500
'B' in overall pump efficiency = $A + B*Q + C*(Q^2)$ [-]/(mgd)]	0	0
'C' in overall pump efficiency = $A + B*Q + C*(Q^2)$ [-]/(mgd)^2]	0	0

Fittings and loss coefficients ('K' values)

Name	Default	Value
Pipe entrance (bellmouth)	0.0500	1.0000
90° bend	0.7500	5.0000

45° bend	0.3000	2.0000
Butterfly value (open)	0.3000	1.0000
Non-return value	1.0000	0
Outlet (bellmouth)	0.2000	1.0000

Aeration

Name	Default	Value
Surface pressure [kPa]	101.3250	101.3250
Fractional effective saturation depth (Fed) [-]	0.3250	0.3250
Supply gas CO2 content [vol. %]	0.0400	0.0350
Supply gas O2 [vol. %]	20.9500	20.9500
Off-gas CO2 [vol. %]	2.0000	2.0000
Off-gas O2 [vol. %]	18.8000	18.8000
Off-gas H2 [vol. %]	0	0
Off-gas NH3 [vol. %]	0	0
Off-gas CH4 [vol. %]	0	0
Off-gas N2O [vol. %]	0	0
Surface turbulence factor [-]	2.0000	2.0000
Set point controller gain []	1.0000	1.0000

BioWin user and configuration data

Project details

Project name: Unknown Project ref.: BW1

Plant name: Unknown

User name: Jason.Flowers

Created: 5/18/2018

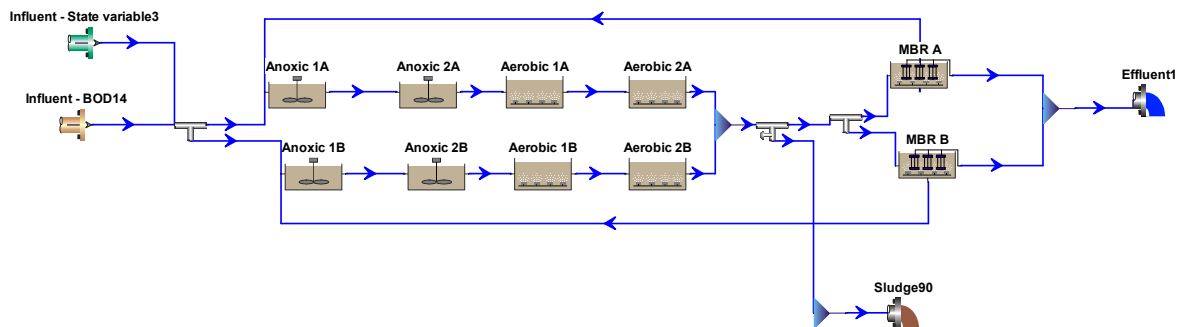
Saved: 6/14/2020

Steady state solution

Target SRT: 15.00 days SRT #0: 14.99 days

Temperature: 22.0°C

Flowsheet



Configuration information for all Bioreactor units

Physical data

Element name	Volume [Mil. Gal]	Area [ft2]	Depth [ft]	# of diffusers
Anoxic 1A	0.0100	102.8312	13.000	Un-aerated
Aerobic 1A	0.0300	308.4936	13.000	70
Aerobic 2A	0.0300	308.4936	13.000	70
Anoxic 2A	0.0100	102.8312	13.000	Un-aerated
Anoxic 1B	0.0100	102.8312	13.000	Un-aerated
Aerobic 1B	0.0300	308.4936	13.000	70
Aerobic 2B	0.0300	308.4936	13.000	70
Anoxic 2B	0.0100	102.8312	13.000	Un-aerated

Operating data Average (flow/time weighted as required)

Element name	Average DO Setpoint [mg/L]
Anoxic 1A	0
Aerobic 1A	2.0
Aerobic 2A	2.0
Anoxic 2A	0
Anoxic 1B	0
Aerobic 1B	2.0
Aerobic 2B	2.0
Anoxic 2B	0

Aeration equipment parameters

Element name	k_1 in C = $k_1(PC)^{0.25} + k_2$	k_2 in C = $k_1(PC)^{0.25} + k_2$	Y in $Kla = C Usg \wedge Y - Usg$ in $[m^3/(m^2 d)]$	Area of one diffuser	Diffuser mounting height	Min. air flow rate per diffuser (20C, 1 atm)	Max. air flow rate per diffuser (20C, 1 atm)	'A' in diffuser pressure drop = $A + B^*(Qa/Diff) + C^*(Qa/Diff)^2$	'B' in diffuser pressure drop = $A + B^*(Qa/Diff) + C^*(Qa/Diff)^2$	'C' in diffuser pressure drop = $A + B^*(Qa/Diff) + C^*(Qa/Diff)^2$
Anoxic 1A	1.2400	0.8960	0.8880	0.4413	0.2500	0.2943	5.8858	3.0000	0	0
Aerobic 1A	1.2400	0.8960	0.8880	0.4413	0.2500	0.2943	5.8858	3.0000	0	0
Aerobic 2A	1.2400	0.8960	0.8880	0.4413	0.2500	0.2943	5.8858	3.0000	0	0
Anoxic 2A	1.2400	0.8960	0.8880	0.4413	0.2500	0.2943	5.8858	3.0000	0	0
Anoxic 1B	1.2400	0.8960	0.8880	0.4413	0.2500	0.2943	5.8858	3.0000	0	0
Aerobic 1B	1.2400	0.8960	0.8880	0.4413	0.2500	0.2943	5.8858	3.0000	0	0
Aerobic 2B	1.2400	0.8960	0.8880	0.4413	0.2500	0.2943	5.8858	3.0000	0	0
Anoxic 2B	1.2400	0.8960	0.8880	0.4413	0.2500	0.2943	5.8858	3.0000	0	0

Configuration information for all Bioreactor - MBR units

Physical data

Element name	Volume [Mil. Gal]	Area [ft ²]	Depth [ft]	# of diffusers	# of cassettes	Displaced volume / cassette [ft ³ /cassette]	Membrane area / cassette [ft ² /cassette]	Total displaced volume [Mil. Gal]	Membrane surface area [ft ²]
MBR A	0.0300	308.4936	13.000	57	6.00	59.682	16320.03	0.00	97920.18
MBR B	0.0300	308.4936	13.000	57	6.00	59.682	16320.03	0.00	97920.18

Operating data Average (flow/time weighted as required)

Element name	Average DO Setpoint [mg/L]
MBR A	2.0
MBR B	2.0

Element name	Split method	Average Split specification
MBR A	Flow paced	200.00 %
MBR B	Flow paced	200.00 %

Aeration equipment parameters

Element name	k_1 in C = $k_1(PC)^{0.25} + k_2$	k_2 in C = k_2	Y in $Kla = C U_{sg} Y - U_{sg}$ in $[m^3/(m^2 d)]$	Area of one diffuser	Diffuser mounting height	Min. air flow rate per diffuser (20C, 1 atm)	Max. air flow rate per diffuser (20C, 1 atm)	'A' in diffuser pressure drop = A + $B^*(Qa/Diff)^2$	'B' in diffuser pressure drop = A + $C^*(Qa/Diff)^2$	'C' in diffuser pressure drop = A + $C^*(Qa/Diff)^2$
MBR A	0.0500	0.3800	1.0000	0.5382	0.2500	1.1772	29.4289	1.0000	0	0
MBR B	0.0500	0.3800	1.0000	0.5382	0.2500	1.1772	29.4289	1.0000	0	0

Element name	Surface pressure [kPa]	Fractional effective saturation depth (Fed) [-]
MBR A	101.3250	0.3000
MBR B	101.3250	0.3000

Element name	Supply gas CO2 content [vol. %]	Supply gas O2 [vol. %]	Off-gas CO2 [vol. %]	Off-gas O2 [vol. %]	Off-gas H2 [vol. %]	Off-gas NH3 [vol. %]	Off-gas CH4 [vol. %]	Off-gas N2O [vol. %]	Surface turbulence factor [-]
MBR A	0.0350	20.9500	1.2000	19.9000	0	0	0	0	2.0000
MBR B	0.0350	20.9500	1.2000	19.9000	0	0	0	0	2.0000

Configuration information for all Influent - BOD units

Operating data Average (flow/time weighted as required)

Element name	Influent - BOD14
Flow	0.6
BOD - Total Carbonaceous mgBOD/L	350.00
Volatile suspended solids mg/L	302.00
Total suspended solids mg/L	338.00
N - Total Kjeldahl Nitrogen mgN/L	58.00
P - Total P mgP/L	6.50
S - Total S mgS/L	0
N - Nitrate mgN/L	0
pH	7.20
Alkalinity mmol/L	4.00
Metal soluble - Calcium mg/L	11.20
Metal soluble - Magnesium mg/L	3.28
Gas - Dissolved oxygen mg/L	0

Element name	Influent - BOD14
Fbs - Readily biodegradable (including Acetate) [gCOD/g of total COD]	0.1410
Fac - Acetate [gCOD/g of readily biodegradable COD]	0.1418
Fxsp - Non-colloidal slowly biodegradable [gCOD/g of slowly degradable COD]	0.6770
Fus - Unbiodegradable soluble [gCOD/g of total COD]	0.0650
Fup - Unbiodegradable particulate [gCOD/g of total COD]	0.1300
Fcel - Cellulose fraction of unbiodegradable particulate [gCOD/gCOD]	0.5000
Fna - Ammonia [gNH3-N/gTKN]	0.7353
Fnox - Particulate organic nitrogen [gN/g Organic N]	0.5000
Fnus - Soluble unbiodegradable TKN [gN/gTKN]	0.0200
FupN - N:COD ratio for unbiodegradable part. COD [gN/gCOD]	0.0700
Fpo4 - Phosphate [gPO4-P/gTP]	0.4717

FupP - P:COD ratio for unbiodegradable part. COD [gP/gCOD]	0.0220
Fsr - Reduced sulfur [H2S] [gS/gS]	0
FZbh - Ordinary heterotrophic COD fraction [gCOD/g of total COD]	0.0200
FZbm - Methylotrophic COD fraction [gCOD/g of total COD]	1.000E-4
FZao - Ammonia oxidizing COD fraction [gCOD/g of total COD]	1.000E-4
FZno - Nitrite oxidizing COD fraction [gCOD/g of total COD]	1.000E-4
FZaao - Anaerobic ammonia oxidizing COD fraction [gCOD/g of total COD]	1.000E-4
FZppa - Phosphorus accumulating COD fraction [gCOD/g of total COD]	1.000E-4
FZpa - Propionic acetogenic COD fraction [gCOD/g of total COD]	1.000E-4
FZam - Acetoclastic methanogenic COD fraction [gCOD/g of total COD]	1.000E-4
FZhm - Hydrogenotrophic methanogenic COD fraction [gCOD/g of total COD]	1.000E-4
FZso - Sulfur oxidizing COD fraction [gCOD/g of total COD]	1.000E-4
FZsrpa - Sulfur reducing propionic acetogenic COD fraction [gCOD/g of total COD]	1.000E-4
FZsra - Sulfur reducing acetotrophic COD fraction [gCOD/g of total COD]	1.000E-4
FZsrh - Sulfur reducing hydrogenotrophic COD fraction [gCOD/g of total COD]	1.000E-4
FZe - Endogenous products COD fraction [gCOD/g of total COD]	0

Configuration information for all Splitter units

Operating data Average (flow/time weighted as required)

Element name	Split method	Average Split specification
Splitter66	Fraction	0.50
Splitter7	Flowrate [Side]	0.015213631508132
Splitter8	Fraction	0.50

Configuration information for all Influent - State variable units

Operating data Average (flow/time weighted as required)

Element name	Influent - State variable3
Biomass - Ordinary heterotrophic [mgCOD/L]	0
Biomass - Methylothetic [mgCOD/L]	0
Biomass - Ammonia oxidizing [mgCOD/L]	0
Biomass - Nitrite oxidizing [mgCOD/L]	0
Biomass - Anaerobic ammonia oxidizing [mgCOD/L]	0
Biomass - Phosphorus accumulating [mgCOD/L]	0
Biomass - Propionic acetogenic [mgCOD/L]	0
Biomass - Acetoclastic methanogenic [mgCOD/L]	0
Biomass - Hydrogenotrophic methanogenic [mgCOD/L]	0
Biomass - Endogenous products [mgCOD/L]	0
CODp - Slowly degradable particulate [mgCOD/L]	0
CODp - Slowly degradable colloidal [mgCOD/L]	0
CODp - Degradable external organics [mgCOD/L]	0
CODp - Undegradable non-cellulose [mgCOD/L]	0
CODp - Undegradable cellulose [mgCOD/L]	0
N - Particulate degradable organic [mgN/L]	0
P - Particulate degradable organic [mgP/L]	0
N - Particulate degradable external organics [mgN/L]	0
P - Particulate degradable external organics [mgP/L]	0
N - Particulate undegradable [mgN/L]	0
P - Particulate undegradable [mgP/L]	0
CODp - Stored PHA [mgCOD/L]	0
P - Releasable stored polyP [mgP/L]	0
P - Unreleasable stored polyP [mgP/L]	0
CODs - Complex readily degradable [mgCOD/L]	0
CODs - Acetate [mgCOD/L]	0
CODs - Propionate [mgCOD/L]	0
CODs - Methanol [mgCOD/L]	0
Gas - Dissolved hydrogen [mgCOD/L]	0
Gas - Dissolved methane [mg/L]	0
N - Ammonia [mgN/L]	0
N - Soluble degradable organic [mgN/L]	0
Gas - Dissolved nitrous oxide [mgN/L]	0

N - Nitrite [mgN/L]	0
N - Nitrate [mgN/L]	0
Gas - Dissolved nitrogen [mgN/L]	0
P - Soluble phosphate [mgP/L]	0
CODs - Undegradable [mgCOD/L]	0
N - Soluble undegradable organic [mgN/L]	0
Influent inorganic suspended solids [mgISS/L]	0
Precipitate - Struvite [mgISS/L]	0
Precipitate - Brushite [mgISS/L]	0
Precipitate - Hydroxy - apatite [mgISS/L]	0
Precipitate - Vivianite [mgISS/L]	0
HFO - High surface [mg/L]	0
HFO - Low surface [mg/L]	0
HFO - High with H2PO4- adsorbed [mg/L]	0
HFO - Low with H2PO4- adsorbed [mg/L]	0
HFO - Aged [mg/L]	0
HFO - Low with H+ adsorbed [mg/L]	0
HFO - High with H+ adsorbed [mg/L]	0
HAO - High surface [mg/L]	0
HAO - Low surface [mg/L]	0
HAO - High with H2PO4- adsorbed [mg/L]	0
HAO - Low with H2PO4- adsorbed [mg/L]	0
HAO - Aged [mg/L]	0
P - Bound on aged HMO [mgP/L]	0
Metal soluble - Magnesium [mg/L]	0
Metal soluble - Calcium [mg/L]	0
Metal soluble - Ferric [mg/L]	0
Metal soluble - Ferrous [mg/L]	0
Metal soluble - Aluminum [mg/L]	0
Other Cations (strong bases) [meq/L]	12500.00
Other Anions (strong acids) [meq/L]	0
Gas - Dissolved total CO2 [mmol/L]	0
User defined - UD1 [mg/L]	0
User defined - UD2 [mg/L]	0
User defined - UD3 [mgVSS/L]	0

User defined - UD4 [mgISS/L]	0
Biomass - Sulfur oxidizing [mgCOD/L]	0
Biomass - Sulfur reducing propionic acetogenic [mgCOD/L]	0
Biomass - Sulfur reducing acetotrophic [mgCOD/L]	0
Biomass - Sulfur reducing hydrogenotrophic [mgCOD/L]	0
Gas - Dissolved total sulfides [mgS/L]	0
S - Soluble sulfate [mgS/L]	0
S - Particulate elemental sulfur [mgS/L]	0
Precipitate - Ferrous sulfide [mgISS/L]	0
CODp - Adsorbed hydrocarbon [mgCOD/L]	0
CODs - Degradable volatile ind. #1 [mgCOD/L]	0
CODs - Degradable volatile ind. #2 [mgCOD/L]	0
CODs - Degradable volatile ind. #3 [mgCOD/L]	0
CODs - Soluble hydrocarbon [mgCOD/L]	0
Gas - Dissolved oxygen [mg/L]	0
Flow	0.0001

BioWin Album

Album page - Nitrogen species