APPENDIX 5B

REVISED 2020 BASELINE CONDITION HARBOR SIPHON CAPACITY MEMORANDUM

Date: December 21, 2005
To: Kate Ziino, HNTB
From: Cari Roper, TN & Associates, David Perry, Brown and Caldwell
Subject: Harbor Siphons Capacity for 2020 Baseline Conditions Gap Analysis – Results from 2020 Conveyance Model

The 2020 Treatment Systems Team has requested the 2020 Conveyance Modeling Team to evaluate the capacity of the Harbor Siphons for the Future Conditions Gap Analysis. The evaluation was done using the 2020 Streamlined Conveyance model simulating the August 8-10, 1986 event, which has the largest volume of CSO for the 64-year record with 2020 Baseline conditions.

Future Conditions Streamlined Model

The Harbor Siphon improvement projects include rehabilitation or replacement of existing MIS sewers to increase the capacity of gravity flow to the Jones Island Waste Water Treatment Plant (JIWWTP). With the improvement projects in place, the Harbor Siphons will no longer be the capacity limitation for flow to the JIWWTP.

Instead capacity limitation to the treatment plant will be due to the JIWWTP Screw Pumps and/or the head-works to the screw pumps. The capacity of the low level screw pumps is approximately 140 MGD. The high level screw pumps have a capacity of 330 MGD. When the low level screw pumps are pumping 140 MGD, 190 MGD is left for pumping of high level flow.

Gap Analysis Model

In order to determine the capacity of the harbor siphons, the high and low level screw pumps are removed from the model. By removing the screw pumps downstream of the siphons, a significant flow restriction to JIWWTP is removed. However, removal of the flow restrictions from the screw pumps does not result in the siphons limiting flow alone. Other sources of flow limitations in conveyance to JIWWTP include intercepting structure capacities and head losses in the flow control chambers at the downstream end of the siphons and head losses in the head works upstream of the screw pumps. The flow limitations for the conveyance have not been removed from the model because it is unrealistic to do so. Any type of configuration of pumps or conveyance to JIWWTP would result in head losses close to the ones that presently exist in the conveyance system.

For the simulation of the August 6-10, 1986 event under 2020 Baseline conditions, some of the siphons are at capacity, while others are limited by hydraulic restrictions upstream of the siphons. The restrictions upstream are typically due to intercepting structure hydraulic capacities. At the time when the peak flow and maximum HGL in the siphons are occurring, CSO's are also occurring. The flow that could be routed to the treatment plant is being diverted to the NSC and to combined sewer outfalls by the MMSD Intercepting Structures. The intercepting structure capacities in the model are representative of the improvements that will occur as part of the Central MIS improvement projects.

There are four siphons that convey flow from the low level system into a flow control chamber and four siphons that convey flow from the high level system into another flow control chamber. The head loss at the high level and low level flow control chambers is also a limiting factor on the flow. Additionally, flow downstream of the siphons is conveyed through the JIWWTP head works. The head works also restrict flow because they create head losses.

The peak flow through the siphons for the August 6-10, 1986 simulation are representative of the maximum amount of flow that would be conveyed through the siphons with the Central MIS Improvements, and Harbor Siphon Improvement projects in place. The flow is restricted by the harbor siphons capacity, head loss in the flow control chambers, head losses in the JIWWTP head works, and intercepting structure capacities. The results of the simulation show that the peak flow through the low level siphon is 565 cfs (365 MGD). For this simulation the high level siphon reached a peak flow of 363 cfs (234 MGD). The maximum HGL at the downstream end of the JIWWTP head works as represented in the model results is -5.03 feet and -20.57 feet for the high level and low level respectively.

[Post Memo Phone Conversation between Kate Ziino, HNTB and Cari Roper, TN, December 22, 2005: Cari Roper confirmed that review of the conveyance system model indicated that overflow elevations on overflows upstream of the harbor siphons control the hydraulic grade line such that the high and low level wet wells will not flood during future 2020 condition peak flows even when influent pumping reaches peak capacity.]

APPENDIX 5C

MMSD SYSTEM REVISED 2020 BASELINE CONDITION MASS BALANCE ANALYSIS

1) Mass Balance Schematics, including unit process design parameters and biosolids loading information, was developed from:
MMSD, Jones Island Operations and Maintenance Manual: Plant Summary and Administration (1 July 1993).
MMSD, South Shore Operation & Maintenance Manual : Plant Summary and Administration (1 March 1986).
UWS, *Daily/Weekly Operating Report* (2003) [UWS DWOR]
UWS, Monthly Reports (2003)
2003 Mass Balance, developed from 2003 UWS DWOR and Monthly Report data — provided in 2020 Facilities Plan project files
2006 Mass Balance, developed from 2003 Mass Balance and 2006 influent estimates from reference listed in item #2 below
— provided in 2020 Facilities Plan project files
See Table 5C-8, Revised 2020 Baseline and Existing Data for additional sources

2) Influent Flow and Wasteload data was presented in Appendix 5A, *Future Condition Flow and Wasteload Analysis,* in Table 5A-1, Existing and Future Average and Peak Flows and Loads and Table 5A-7, Existing Condition Maximum Flow and Load Analysis

3) Uses for the Mass Balance Data:

Average Condition Mass Balances:	Tables 5-8 & 5-10	JIWWTP & SSWWTP Unit Process Analysis — Revised 2020 Baseline Condition
	Tables 5-9 & 5-11	JIWWTP & SSWWTP Comparison of Revised 2020 Baseline Operations to Current Design Regulations
	Table 5-12	Milorganite® Processes — Revised 2020 Baseline Condition
	Table 5-13	Agri-Life® Process — Revised 2020 Baseline Condition
	Table 5-14	Interplant Solids Pumping — Revised 2020 Baseline Condition
Maximum Day Flow Mass Balances:	Tables 5-8 & 5-10	JIWWTP & SSWWTP Unit Process Analysis — Revised 2020 Baseline Condition
	Tables 5-9 & 5-11	JIWWTP & SSWWTP Comparison of Revised 2020 Baseline Operations to Current Design Regulations
Peak Hour Flow Mass Balances:	*Used to determine hydraulic operations of wastewater treatment unit processes*	
	Tables 5-8 & 5-10	JIWWTP & SSWWTP Unit Process Analysis — Revised 2020 Baseline Condition
	Tables 5-9 & 5-11	JIWWTP & SSWWTP Comparison of Revised 2020 Baseline Operations to Current Design Regulations
Maximum Day Wasteload Mass Balances:	*Used to determine wasteloading on activated sludge process and operation of biosolids unit processes*	
	Tables 5-8 & 5-10	JIWWTP & SSWWTP Unit Process Analysis — Revised 2020 Baseline Condition
	Tables 5-9 & 5-11	JIWWTP & SSWWTP Comparison of Revised 2020 Baseline Operations to Current Design Regulations
	Table 5-12	Milorganite® Processes — Revised 2020 Baseline Condition
	Table 5-13	Agri-Life® Process — Revised 2020 Baseline Condition
	Table 5-14	Interplant Solids Pumping — Revised 2020 Baseline Condition
Maximum Week & Month Wasteload Mass Balances:	Table 5-12	Milorganite® Processes — Revised 2020 Baseline Condition
	Table 5-13	Agri-Life® Process — Revised 2020 Baseline Condition
	Table 5-14	Interplant Solids Pumping — Revised 2020 Baseline Condition

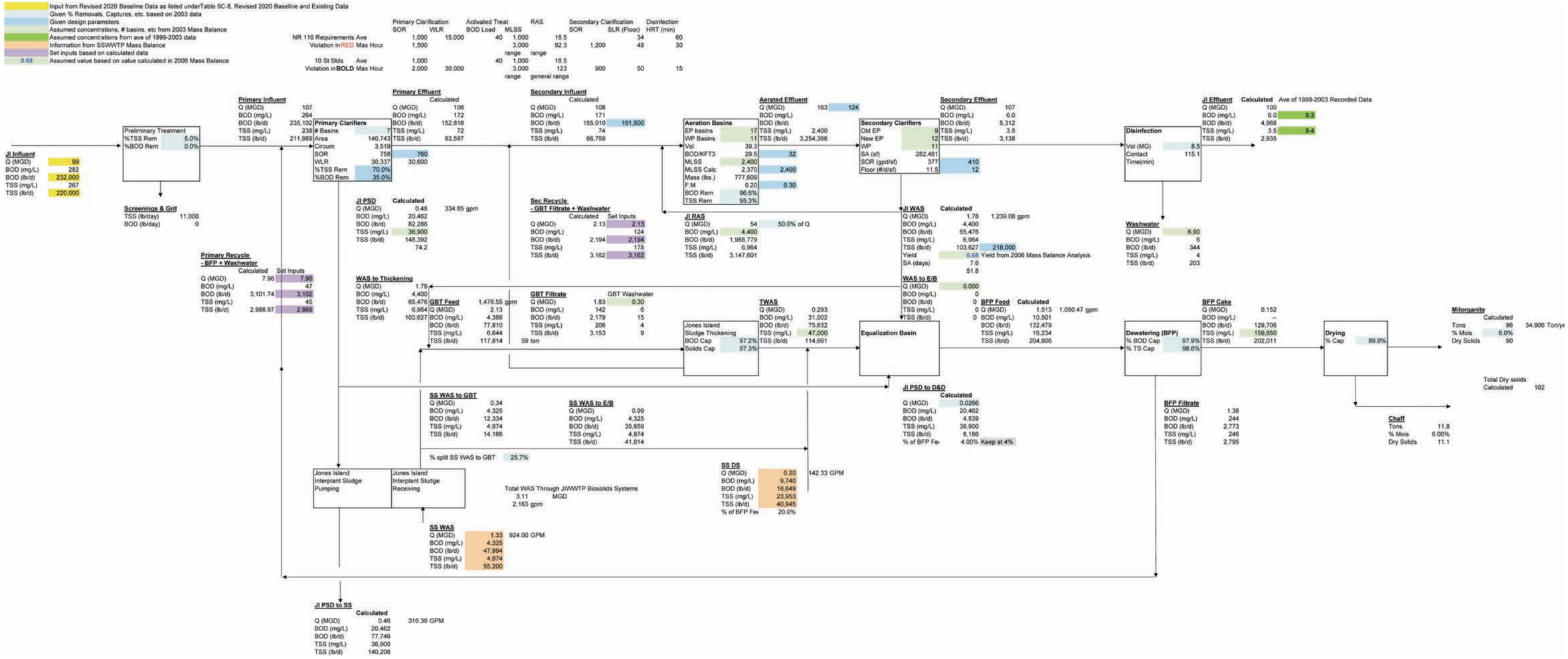

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TABLE 5C-2 SHEET 1 OF 2

REVISED 2020 BASELINE JIWWTP MASS BALANCE – AVERAGE DAY CONDITIONS

2020 TREATMENT REPORT

5/28/07 TR_5C.T002.07.05.28.cdr

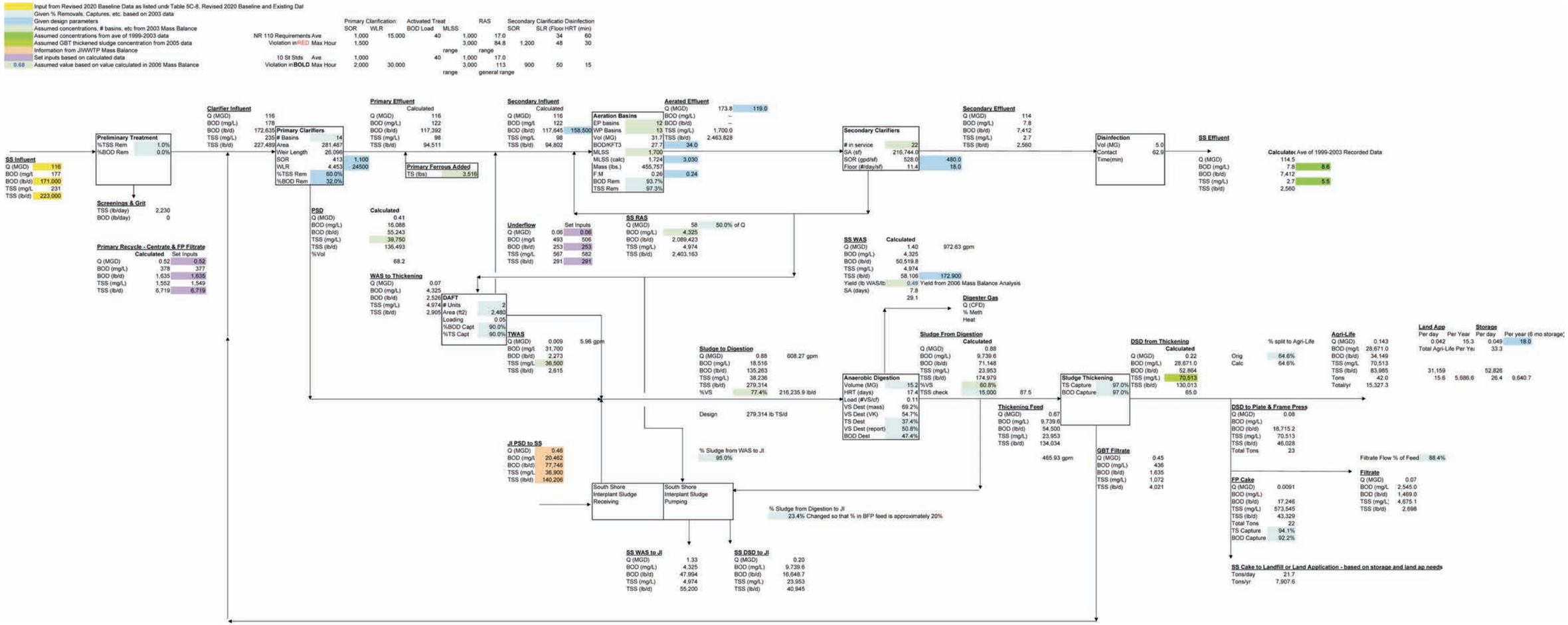

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TABLE 5C-2 SHEET 2 OF 2

REVISED 2020 BASELINE SSWWTP MASS BALANCE – AVERAGE DAY CONDITIONS

2020 TREATMENT REPORT

5/28/07 TR_5C.T002.07.05.28.cdr

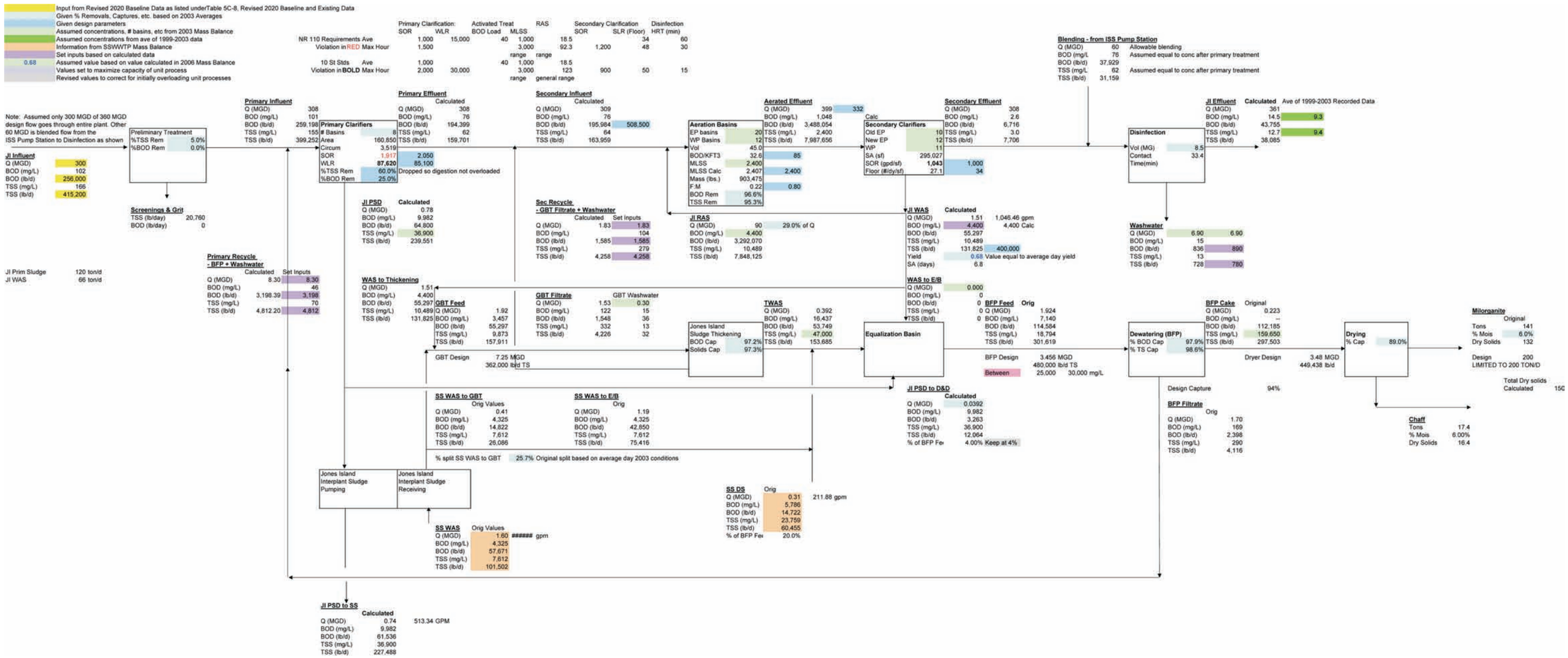

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TABLE 5C-3 SHEET 1 OF 2

REVISED 2020 BASELINE JIWWTP MASS BALANCE – MAXIMUM DAY FLOW CONDITIONS

2020 TREATMENT REPORT

5/28/07 TR_5C.T003.07.05.28.cdr

Input from Revised 2020 Baseline Data as listed undi Table 5C-8, Revised 2020 Baseline and Existing Dat
Given % Removals, Captures, etc. based on 2003 data
Given design parameters
Assumed concentrations, # basins, etc from 2003 Mass Balance
Assumed concentrations from ave of 1999-2003 data
Assumed GBT thickened sludge concentration from 2005 data
Information from JIWWTP Mass Balance
Set inputs based on calculated data
0.68 Assumed value based on value calculated in 2006 Mass Balance

			Primary Clarification: SOR	WLR	Activated Treat BOD Load	MLSS	RAS SOR	Secondary Clarificatio SLR (Floor	Disinfection HRT (min)
NR 110 Requirements	Ave		1,000	15,000	40	1,000	17.0		34	60
Violation in RED	Max Hour		1,500			3,000	84.8	1,200	48	30
					range	range				
10 St Stds	Ave		1,000		40	1,000	17.0			
Violation in **BOLD**	Max Hour		2,000	30,000		3,000	113	900	50	15
					range	general range				

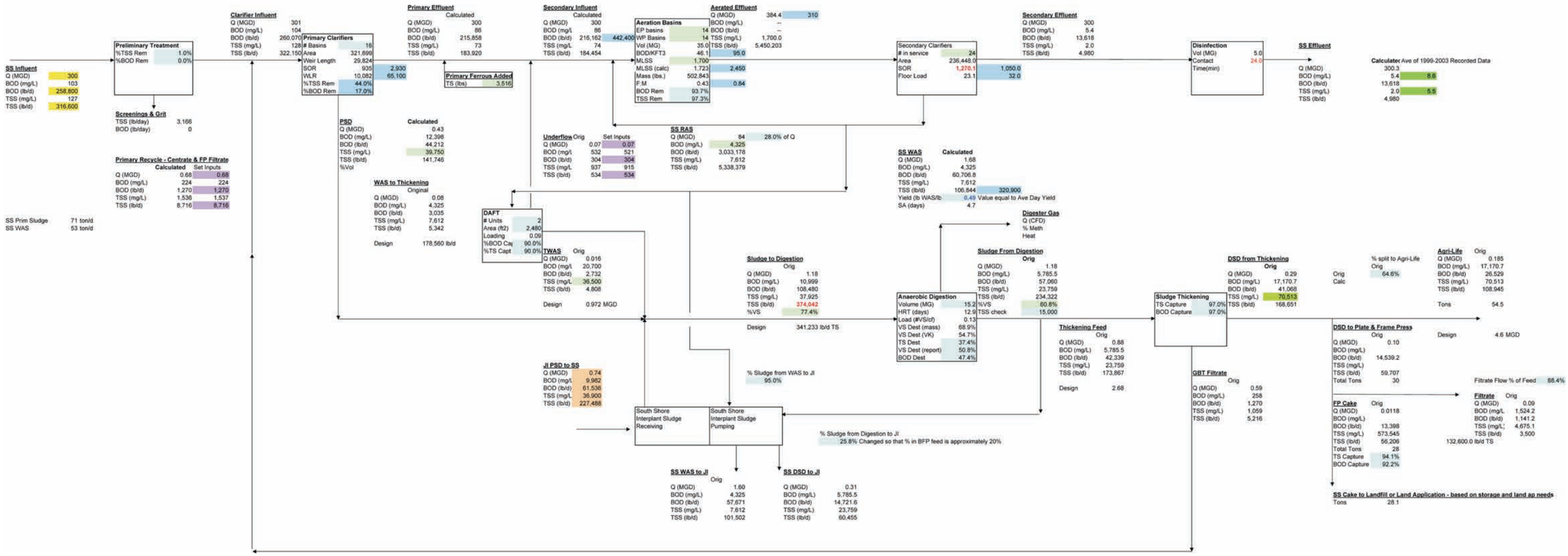

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TABLE 5C-3 SHEET 2 OF 2
REVISED 2020 BASELINE SSWWTP MASS BALANCE – MAXIMUM DAY FLOW CONDITIONS
2020 TREATMENT REPORT
5/28/07 TR_5C.T003.07.05.28.cdr

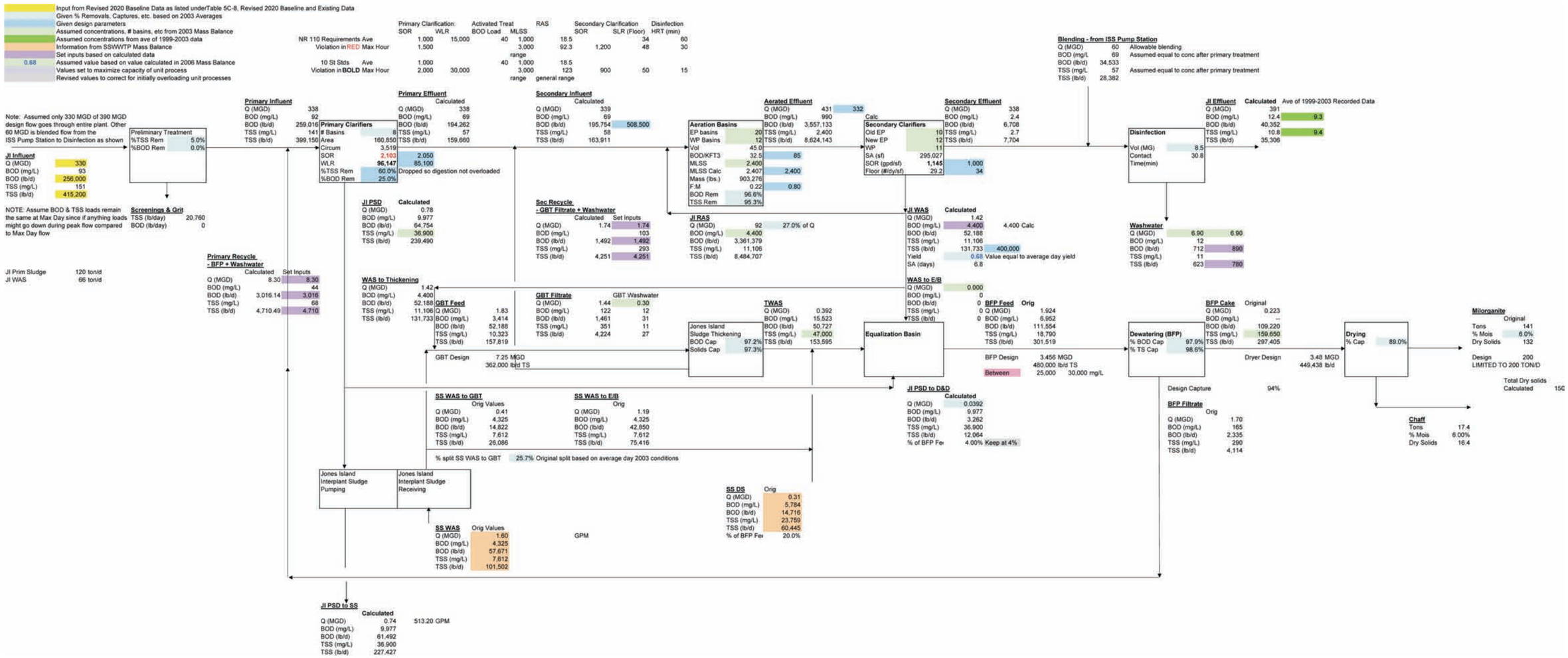

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TABLE 5C-4 SHEET 1 OF 2

REVISED 2020 BASELINE JIWWTP MASS BALANCE – PEAK HOUR FLOW CONDITIONS

2020 TREATMENT REPORT

5/28/07 TR_5C.T004.07.05.28.cdr

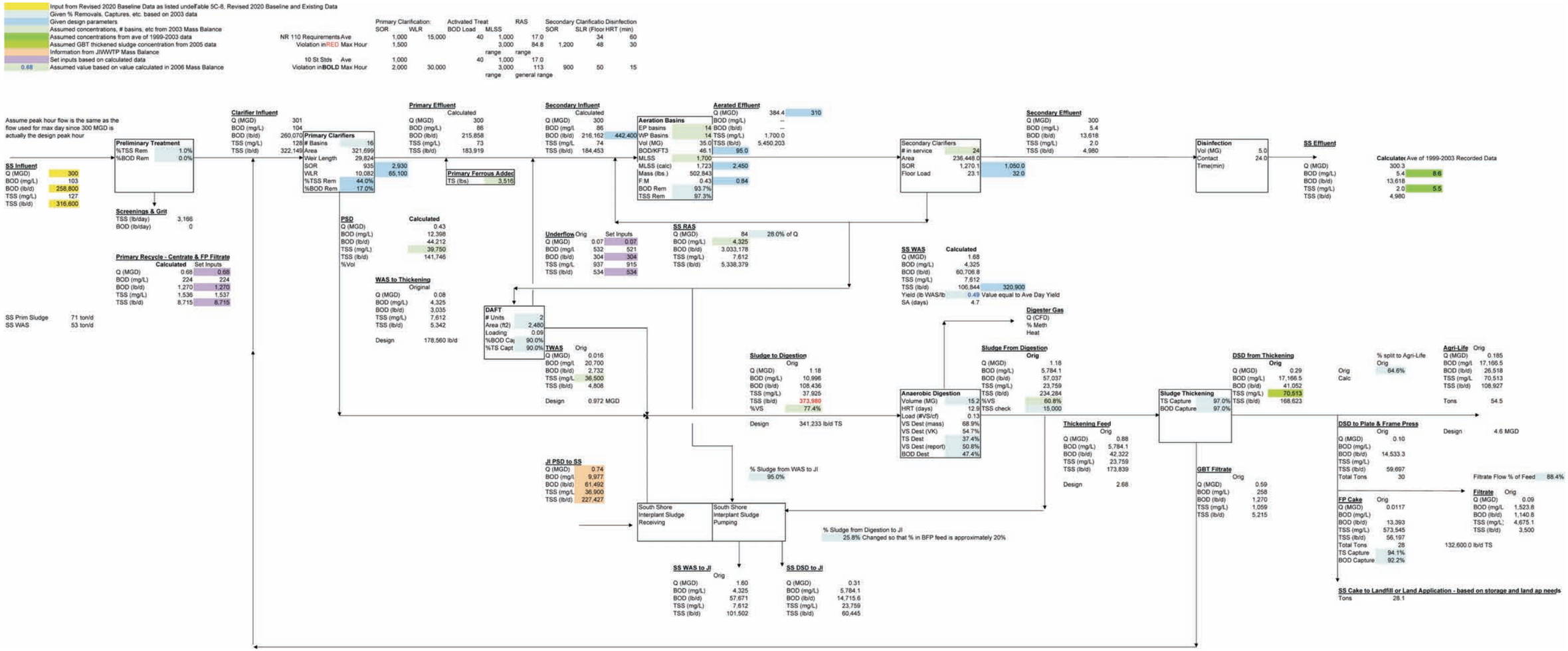

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TABLE 5C-4 SHEET 2 OF 2

REVISED 2020 BASELINE SSWWTP MASS BALANCE – PEAK HOUR FLOW CONDITIONS

2020 TREATMENT REPORT

5/28/07 TR_5C.T004.07.05.28.cdr

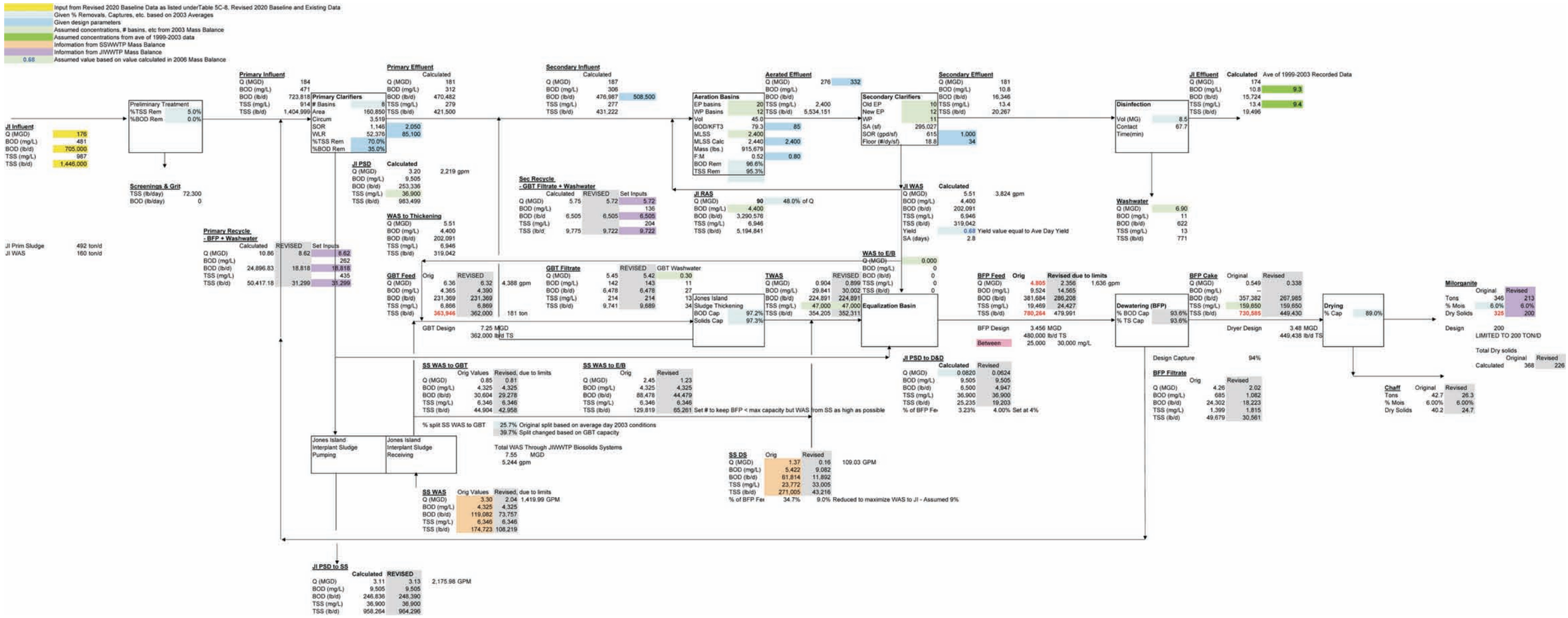

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TABLE 5C-5 SHEET 1 OF 2

REVISED 2020 BASELINE JIWWTP MASS BALANCE – MAXIMUM DAY WASTELOAD CONDITIONS

2020 TREATMENT REPORT

5/28/07

TR_5C.T005.07.05.28.cdr

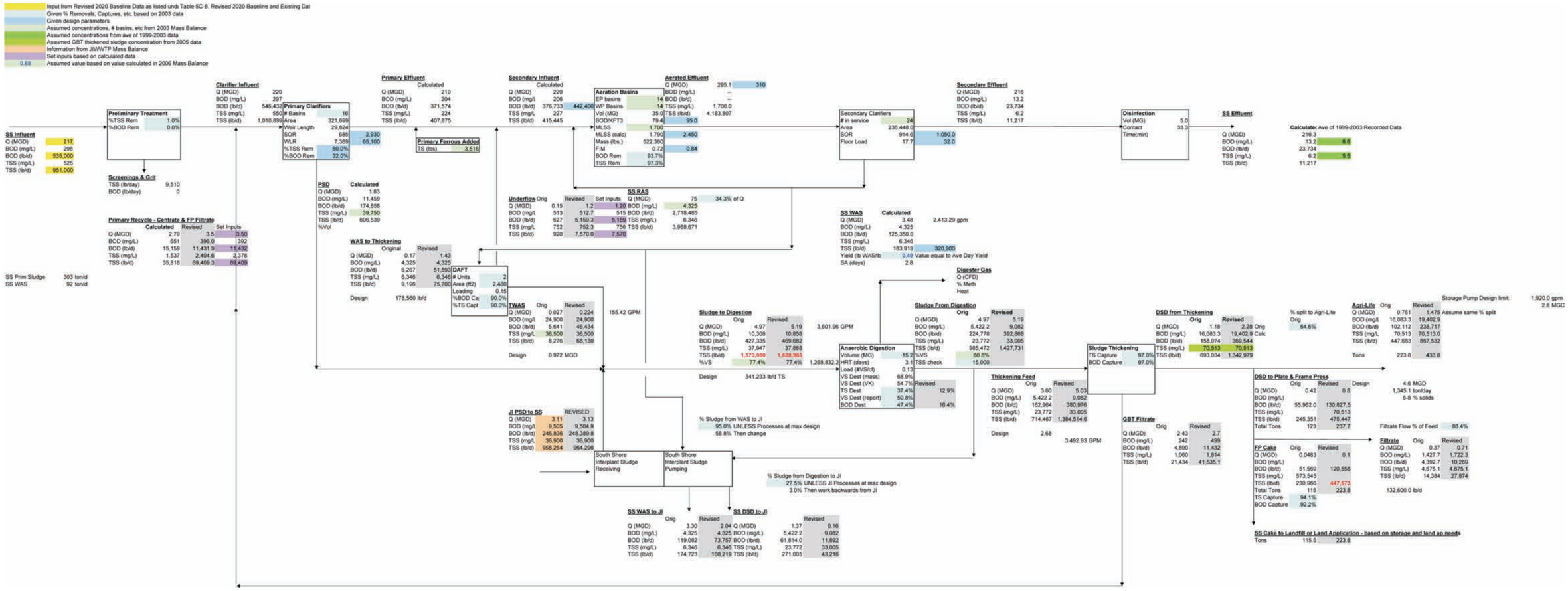

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TABLE 5C-5 SHEET 2 OF 2

REVISED 2020 BASELINE SSWWTP MASS BALANCE – MAXIMUM DAY WASTELOAD CONDITIONS

2020 TREATMENT REPORT

5/28/07

TR_5C.T005.07.05.28.cdr

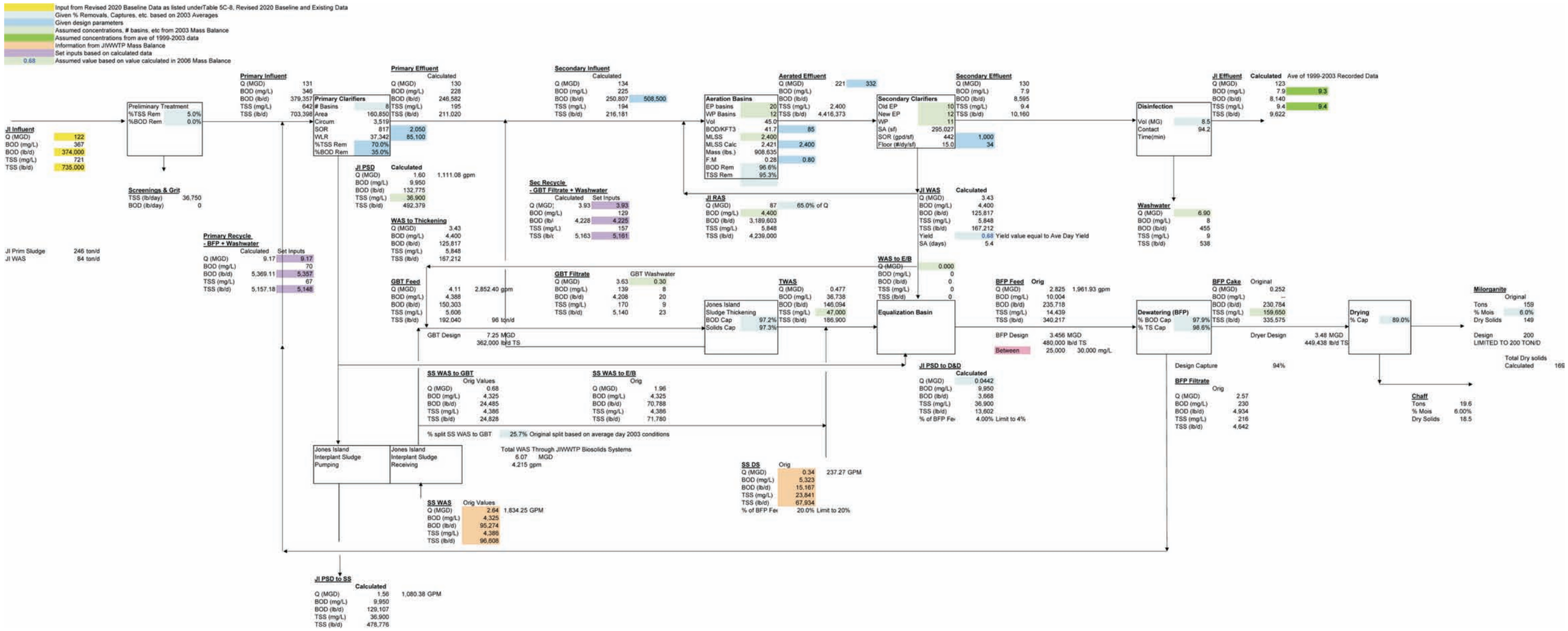

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TABLE 5C-6 SHEET 1 OF 2

REVISED 2020 BASELINE JIWWTP MASS BALANCE – MAXIMUM WEEK WASTELOAD CONDITIONS

2020 TREATMENT REPORT

5/28/07 TR_5C.T006.07.05.28.cdr

Input from Revised 2020 Baseline Data as listed undx Table 5C-8. Revised 2020 Baseline and Existing Dat
Given % Removals, Captures, etc. based on 2003 data
Given design parameters
Assumed concentrations, # basins, etc from 2003 Mass Balance
Assumed concentrations from ave of 1999-2003 data
Information from JIWWTP Mass Balance
Information fro m South Shore Mass Balance
Set inputs based on calculated data
0.68 Assumed value based on value calculated in 2006 Mass Balance

SS Influent
Q (MGD) 139
BOD (mg/L) 246
BOD (lb/d) 284,000
TSS (mg/L) 493
TSS (lb/d) 570,000

Preliminary Treatment
%TSS Rem 1.0%
%BOD Rem 0.0%

Screenings & Grit
TSS (lb/day) 5,700
BOD (lb/day) 0

Primary Recycle - Centrate & FP Filtrate

	Calculated	Set Inputs
Q (MGD)	1.76	1.76
BOD (mg/L)	206	206
BOD (lb/d)	3,032	3,028
TSS (mg/L)	1,543	1,546
TSS (lb/d)	22,692	22,692

SS Prim Sludge 176 ton/d
SS WAS 48 ton/d

Clarifier Influent
Q (MGD) 140
BOD (mg/L) 245
BOD (lb/d) 287,028
TSS (mg/L) 501
TSS (lb/d) 586,992

Primary Clarifiers
Basins 16
Area 321,699
Weir Length 29,824
SOR 437 2,930
WLR 4,709 65,100
%TSS Rem 60.0%
%BOD Rem 32.0%

PSD Calculated
Q (MGD) 1.06
BOD (mg/L) 10,396
BOD (lb/d) 91,849
TSS (mg/L) 39,750
TSS (lb/d) 352,195
%Vol

WAS to Thickening Original
Q (MGD) 0.00
BOD (mg/L) #DIV/0!
BOD (lb/d) 0
TSS (mg/L) 4,386
TSS (lb/d) 0
Design 178,560 lb/d

Primary Effluent Calculated
Q (MGD) 139
BOD (mg/L) 168
BOD (lb/d) 195,179
TSS (mg/L) 205
TSS (lb/d) 238,312

Primary Ferrous Added
TS (lbs) 3,516

Secondary Influent Calculated
Q (MGD) 139
BOD (mg/L 168
BOD (lb/d) 195,179 442,400
TSS (mg/L 205
TSS (lb/d) 238,312

Aeration Basins
EP basins 14
WP Basins 14
Vol (MG) 35.0
BOD/KFT3 41.7 95.0
MLSS 1,700
MLSS (calc) 1,773 2,450
Mass (lbs.) 517,461
F:M 0.38 0.84
BOD Rem 93.7%
TSS Rem 97.3%

Aerated Effluent
Q (MGD) 223.0 310
BOD (mg/L) --
BOD (lb/d) --
TSS (mg/L) 1,700.0
TSS (lb/d) 3,161,620

Underflow Orig Set Inputs
Q (MGD) 0.00 0.00
BOD (mg/L #DIV/0! #DIV/0!
BOD (lb/d) 0 0
TSS (mg/L #DIV/0! #DIV/0!
TSS (lb/d) 0 0

SS RAS
Q (MGD) 84 60.0% of Q
BOD (mg/L) 4,325
BOD (lb/d) 3,016,325
TSS (mg/L) 4,386
TSS (lb/d) 3,058,577

DAFT
Units 2
Area (ft2) 2,480
Loading 0.00
%BOD Cap 90.0%
%TS Capt 90.0%

TWAS Orig
Q (MGD) 0.000
BOD (mg/L #DIV/0!
BOD (lb/d) 0
TSS (mg/L) 36,500
TSS (lb/d) 0
Design 0.972 MGD

Secondary Clarifiers
in service 24
Area 236,448.0
SOR 589.4 1,050.0
Floor Load 13.4 32.0

Secondary Effluent
Q (MGD) 139
BOD (mg/L) 10.6
BOD (lb/d) 12,296
TSS (mg/L) 5.5
TSS (lb/d) 6,434

SS WAS Calculated
Q (MGD) 2.64
BOD (mg/L) 4,325
BOD (lb/d) 95,273.6
TSS (mg/L) 4,386
TSS (lb/d) 96,608 320,900
Yield (lb WAS/lb 0.49 Value equal to Ave Day Yield
SA (days) 5.4

Disinfection
Vol (MG) 5.0
Contact Time(min) 51.7

SS Effluent
Q (MGD) 139.4
BOD (mg/L) 10.6 8.6
BOD (lb/d) 12,296
TSS (mg/L) 5.5 5.5
TSS (lb/d) 6,434

Calculated Ave of 1999-2003 Recorded Data

Digester Gas
Q (CFD)
% Meth
Heat

Sludge to Digestion Orig
Q (MGD) 2.62 1,818.15 gpm
BOD (mg/L) 10,119
BOD (lb/d) 220,956
TSS (mg/L) 38,056
TSS (lb/d) 830,972
%VS 77.4% 643,311 lb VS/d
Design 341,233 lb/d TS

Anaerobic Digestion
Volume (MG) 15.2
HRT (days) 5.8
Load (#VS/cf) 0.13
VS Dest (mass) 69.0%
VS Dest (VK) 54.7%
TS Dest 37.4%
VS Dest (report) 50.8%
BOD Dest 47.4%

Sludge From Digestion Orig
Q (MGD) 2.62
BOD (mg/L) 5,322.7
BOD (lb/d) 116,223
TSS (mg/L) 23,841
TSS (lb/d) 520,571
%VS 60.8%
TSS check 15,000

Thickening Feed Orig
Q (MGD) 2.28
BOD (mg/L) 5,322.7 1,580.88 gpm
BOD (lb/d) 101,056
TSS (mg/L) 23,841
TSS (lb/d) 452,636
Design 2.68

Sludge Thickening
TS Capture 97.0%
BOD Capture 97.0%

DSD from Thickening Orig
Q (MGD) 0.75
BOD (mg/L) 15,742.6
BOD (lb/d) 98,023
TSS (mg/L) 70,513
TSS (lb/d) 439,057

% split to Agri-Life Orig 64.6% Calc

Agri-Life Orig
Q (MGD) 0.482
BOD (mg/L 15,742.6
BOD (lb/d) 63,321
TSS (mg/L 70,513
TSS (lb/d) 283,621
Tons 141.8

Storage Pump Design limit: 1,920.0 gpm
2.8 MGD

GBT Filtrate Orig
Q (MGD) 1.53
BOD (mg/L) 238
BOD (lb/d) 3,032
TSS (mg/L) 1,064
TSS (lb/d) 13,579

DSD to Plate & Frame Press Orig
Q (MGD) 0.26
BOD (mg/L)
BOD (lb/d) 34,702.6
TSS (mg/L) 70,513.0
TSS (lb/d) 155,437
Total Tons 78

Design 4.6 MGD
1,345.1 ton/day
6-8 % solids
Filtrate Flow % of Feed 88.4%

FP Cake Orig
Q (MGD) 0.0306
BOD (mg/L)
BOD (lb/d) 31,979
TSS (mg/L) 573,545
TSS (lb/d) 146,324
Total Tons 73
TS Capture 94.1%
BOD Capture 92.2%

Filtrate Orig
Q (MGD) 0.23
BOD (mg/L 1,397.4
BOD (lb/d) 2,723.9
TSS (mg/L; 4,675.1
TSS (lb/d) 9,113
132,600.0 lb/d

SS Cake to Landfill or Land Application - based on storage and land ap needs
Tons 73.2

JI PSD to SS
Q (MGD) 1.56
BOD (mg/L 9,950
BOD (lb/d) 129,107
TSS (mg/L 36,900
TSS (lb/d) 478,776

% Sludge from WAS to JI
100.0% Change to maximize unit process capacities

% Sludge from Digestion to JI
13.1%

South Shore Interplant Sludge Receiving
South Shore Interplant Sludge Pumping

SS WAS to JI Orig
Q (MGD) 2.64
BOD (mg/L) 4,325
BOD (lb/d) 95,274
TSS (mg/L) 4,386
TSS (lb/d) 96,608

SS DSD to JI
Q (MGD) 0.34
BOD (mg/L) 5,322.7
BOD (lb/d) 15,167.1
TSS (mg/L) 23,841
TSS (lb/d) 67,934

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TABLE 5C-6 SHEET 2 OF 2
REVISED 2020 BASELINE SSWWTP MASS BALANCE – MAXIMUM WEEK WASTELOAD CONDITIONS
2020 TREATMENT REPORT
5/28/07 TR_5C.T006.07.05.28.cdr

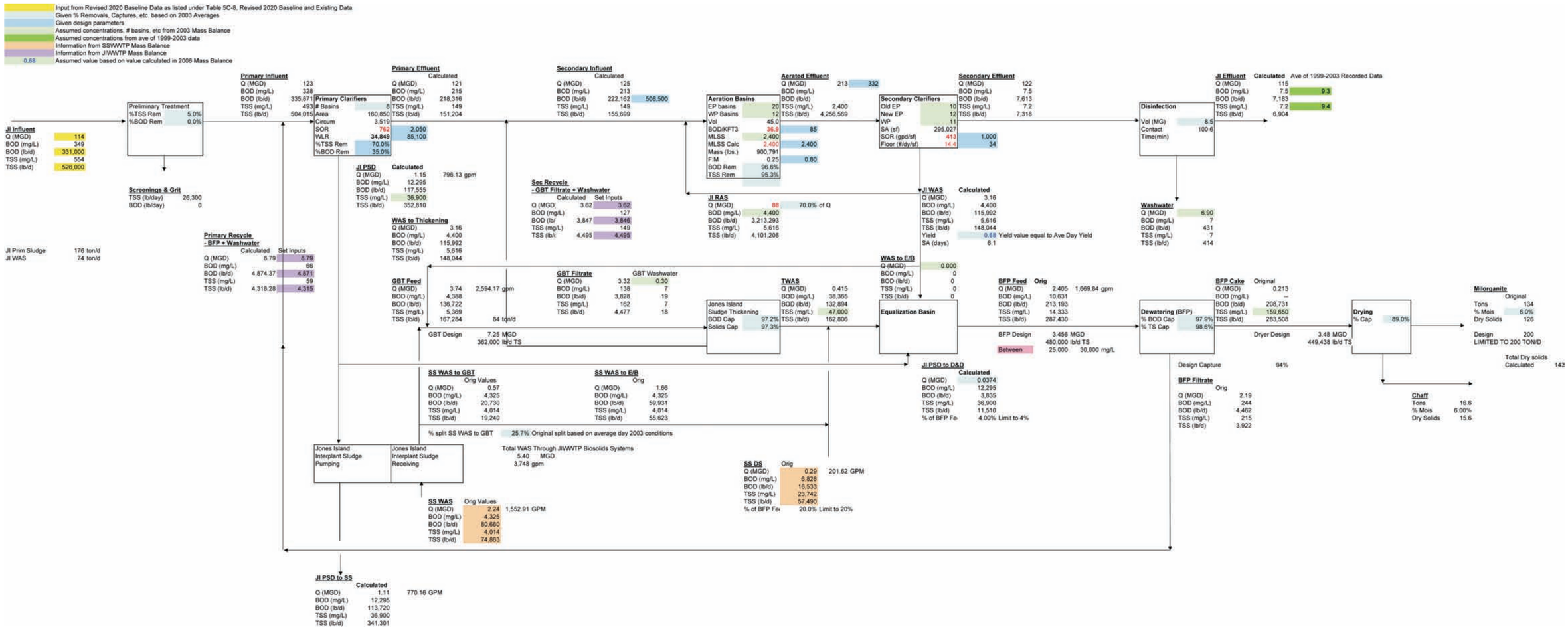

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TABLE 5C-7 SHEET 1 OF 2

REVISED 2020 BASELINE JIWWTP MASS BALANCE – MAXIMUM MONTH WASTELOAD CONDITIONS

2020 TREATMENT REPORT

5/28/07 TR_5C.T007.07.05.28.cdr

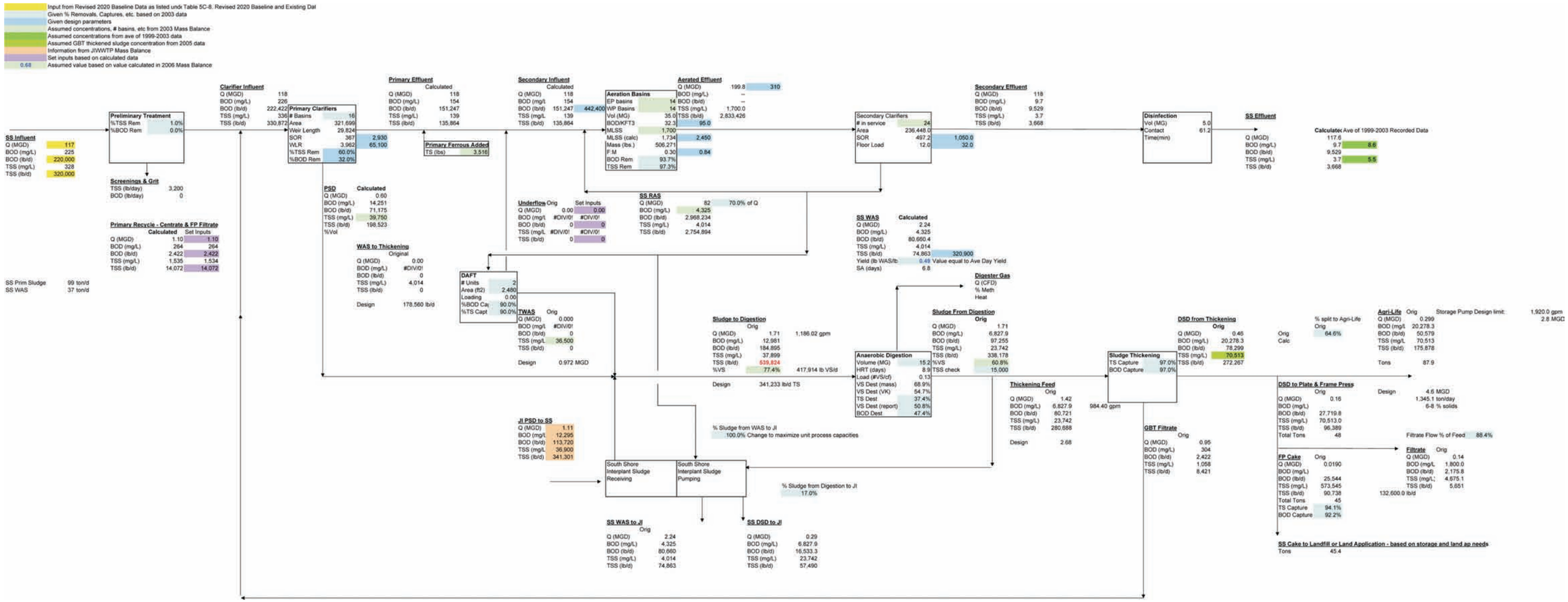

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TABLE 5C-7 SHEET 2 OF 2

REVISED 2020 BASELINE JIWWTP MASS BALANCE – MAXIMUM MONTH WASTELOAD CONDITIONS

2020 TREATMENT REPORT

5/28/07

TR_5C.T007.07.05.28.cdr

Revised 2020 Baseline Flows & Loads

	JIWWTP				SSWWTP			
	Average Day	Maximum Day	Maximum Week	Maximum Month	Average Day	Maximum Day	Maximum Week	Maximum Month
Flow (MGD)	98.8	360	NA	NA	115.7	300	NA	NA
BOD (lb/d)	232,000	705,000	374,000	331,000	171,000	535,000	284,000	220,000
TSS (lb/d)	220,000	1,446,000	735,000	526,000	223,000	951,000	570,000	320,000

NA -- Not applicable
Source: Data from Appendix 5A, *Future Condition Flow and Wasteload Analysis*

Maximum Flows, Maximum Wasteloads

ISSUE: When WWTPs are at maximum flows, loads are less than maximum wasteloads. Conversely, when WWTPs are at maximum loads, flows are less than maximum flows.

Mass Flow/Load Determination — **Revised 2020 Baseline Conditions**

	JIWWTP			SSWWTP		
	Average Day	Total %, Maximum Values compared to Average Day	Maximum Values	Average Day	Total %, Maximum Values compared to Average Day	Maximum Values
Maximum Day Flow						
Flow (MGD)	NA	NA	360	NA	NA	300
BOD (lb/d)	232,000	110.3%	256,000	171,000	151.3%	258,800
TSS (lb/d)	220,000	188.7%	415,200	223,000	142.0%	316,600
Maximum Day Wasteloads						
Flow (MGD)	99	177.8%	176	116	187.5%	217
BOD (lb/d)	NA	NA	705,000	NA	NA	535,000
TSS (lb/d)	NA	NA	1,446,000	NA	NA	951,000
Maximum Week Wasteloads						
Flow (MGD)	99	123.7%	122	116	119.9%	139
BOD (lb/d)	NA	NA	374,000	NA	NA	284,000
TSS (lb/d)	NA	NA	735,000	NA	NA	570,000
Maximum Month Wasteloads						
Flow (MGD)	99	115.2%	114	116	101.2%	117
BOD (lb/d)	NA	NA	331,000	NA	NA	220,000
TSS (lb/d)	NA	NA	526,000	NA	NA	320,000

Source: Analysis found in Table 5A-7, Existing Condition Maximum Flow and Load Analysis under Appendix 5A, Future Condition Flow and Wasteload Analysis

Effluent Parameter Data

Measured effluent parameter data was used to compare projected effluent concentrations in each of the mass balances presented in this appendix.

	JIWWTP				SSWWTP			
	Monthly BOD	Monthly TSS	Monthly TP	Fecal Coliform	Monthly BOD	Monthly TSS	Monthly TP	Fecal Coliform
Year	mg/L	mg/L	mg/L	No./100 mL	mg/L	mg/L	mg/L	No./100 mL
Contract	15	15	0.5	100	15	15	0.5	100
Permit	30	30	1	400	30	30	1	400
1999	9	11	0.31	18	6	7	0.64	19
2000	9	11	0.37	45	8	8	0.72	31
2001	9.3	9.1	0.4	37	8	9	0.67	31
2002	9.9	9	0.42	39	11	8	0.76	42
2003	9.4	6.8	0.36	44	8.6	5.5	0.63	32
Average	**9.32**	**9.38**	**0.372**	**36.6**	**8.32**	**7.5**	**0.684**	**31**

Source: MMSD, Contract Compliance Office Annual Summary (1999-2003)

Gravity Belt Thickener (GBT) Analysis

	GBT Feed			Thickened Digested Sludge			GBT Filtrate		
	Q	TSS	BOD	Q	TSS	BOD	Q	TSS	BOD
	MGD	lb	lb	MGD	lb	lb	MGD	lb	lb
June	0.18	36040	19509	0.05	34958	18924	0.13	1081	585
July	0.23	48160	31047	0.07	46715	30115	0.16	1445	931
August	0.52	107949	73547	0.17	104711	71341	0.35	3238	2206
September	0.4	79358	26944	0.12	76978	26135	0.29	2381	808
October	0.4	79358	26944	0.12	76978	26135	0.29	2381	808
November	0.46	94589	51778	0.15	91751	50224	0.31	2838	1553
December	0.4	82541	44518	0.18	80065	43182	0.22	2476	1336
Average (not Oct.)	0.37	74,773	41,224	0.12	72,530	39,987	0.24	2,243	1,237

GBT Capacity: 230 to 250 gpm range, 300 gpm max
0.33 MGD 0.36 MGD 0.43 MGD

NOTES:
1) Made the assumption that all sludge to be thickened sent to GBT, though centrifuges still available, since average < max capacity
2) Oct appears wrong - same as Sept, though primary sludge dry (PSD) values in 2005 UWS Monthly Report Mass Balance from JIWWTP were different - so excluded data

Source: 2005 UWS Monthly Reports Mass Balances, GBT installed May 2005 so only used last six months of data for 2005

GBT Analysis (continued)

Based on this data,

TSS Capture %:	97.0%
BOD Capture %:	97.0%
Thickened Solids Concentration (mg/L):	70,513

Agri-Life® Application

	Agri-Life®			Filter Cake		
	Land Applied (MG)	Land Applied (Dry Tons)	Acreage Utilized	Minergy1 (Dry Tons)	Land Applied (Dry Tons)	Landfill (Dry Tons)
1999	20.1	8,186	2,255	2,797	0	0
2000	16.7	5,774	1,64	1,713	0	0
2001	12.2	4,241	1,134	0	1,540	0
2002	16.6	5,729	1,670	0	455	0
2003	11.1	4,503	1,476	0	1,563	0
Avg.	15.3	5,687	1,634	902	712	0
Avg. Day	0.04	15.6	4.5	2.5	1.9	0.0

NOTE:
1) WE Energies' Lightweight Aggregate Program

Source: Data from MMSD, Contract Compliance Office Annual Report (1999-2003) and input from MMSD personnel.

	2006 Prediction Comparison (Average Day)		Revised 2020 Baseline Projections									
			Average Day		Maximum Day Flow		Maximum Day Wasteloads		Maximum Week Wasteloads		Maximum Month Wasteloads	
Treatment Plant Influent	JIWWTP	SSWWTP	JIWWTP	SSWWTP	JIWWTP	SSWWTP	JIWWTP	SSWWTP	JIWWTP	SSWWTP	JIWWTP	SSWWTP
Flow (MGD)	82	89	99	116	360	300	176	217	122	139	114	117
BOD (lb/day)	193,000	163,000	232,000	171,000	256,000	258,800	705,000	535,000	374,000	284,000	331,000	220,000
TSS (lb/day)	186,000	179,000	220,000	223,000	415,200	316,600	1,446,000	951,000	735,000	570,000	526,000	320,000
From Liquid Treatment												
Primary Sludge (lb TSS/day)	72,002	64,825	148,392	136,493	239,551	141,746	983,499	606,539	492,379	352,195	352,810	198,523
WAS (lb TSS/day)	106,546	65,049	103,627	58,106	131,825	106,844	319,042	183,919	167,212	96,608	148,044	74,863
Biosolids Program Influent												
Raw Primary (lb TSS/day)	8,917	0	8,186	0	12,064	0	19,203	0	13,602	0	11,510	0
Digested Sludge (lb TSS/day)	NA	74,952	NA	174,979	NA	234,322	NA	1,427,731	NA	520,571	NA	338,178
Raw WAS (lb TSS/day)	106,546	61,797	103,627	55,200	131,825	101,502	319,042	108,219	167,212	96,608	148,044	74,863
Total	126		171		240		937		399		286	
	46,029		62,414		87,548		342,041		145,634		104,499	
Biosolids Product (ton/yr)												
Agrilife Liquid	4,611		15,327		NA		NA		NA		NA	
Agrilife Cake	2,379		7,908		NA		NA		NA		NA	
Total Agrilife Products	6,990		23,235		NA		NA		NA		NA	
Milorganite	34,923		32,812		NA		NA		NA		NA	
Off-Spec Product	0		0		NA		NA		NA		NA	
Chaff	2,629		4,055		NA		NA		NA		NA	
Total Dried Product	37,552		36,867		NA		NA		NA		NA	
Total Biosolids	**44,542**		**60,102**									

The difference between the Biosolids Program Influent and the total biosolids is a result of recycle flows back to treatment plant (thickening and dewatering)

NOTE:
2006 condition comparison developed in 2006 Mass Balance, provided in 2020 Facilites Plan project files.

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TABLE 5C-9
SUMMATION OF TOTAL BIOSOLIDS PROJECTIONS
2020 TREATMENT REPORT
5/28/07 TR_5C.T009.07.05.28.cdr

APPENDIX 5D

REVISED 2020 BASELINE CONDITION UNIT PROCESS CALCULATIONS

	JIWWTP		
	Secondary Plant Capacity (w/Storage)	No. of Times Capacity	No. of Times Capacity
DATE	MGD	< 300 MGD	< 330 MGD
1-Jan			
2-Jan			
3-Jan	665		
4-Jan	630		
5-Jan	812		
6-Jan	591		
7-Jan	622		
8-Jan	647		
9-Jan	511		
10-Jan	494		
11-Jan	523		
12-Jan	808		
13-Jan	924		
14-Jan	459		
15-Jan	437		
16-Jan	505		
17-Jan	472		
18-Jan	439		
19-Jan	373		
20-Jan	338		
21-Jan	486		
22-Jan	512		
23-Jan	495		
24-Jan	707		
25-Jan	712		
26-Jan	577		
27-Jan	437		
28-Jan	461		
29-Jan	473		
30-Jan	473		
31-Jan	487		
1-Feb	476		
2-Feb	402		
3-Feb	434		
4-Feb	386		
5-Feb	346		
6-Feb	398		
7-Feb	401		
8-Feb	324		1
9-Feb	307		1
10-Feb	253	1	
11-Feb	262	1	
12-Feb	234	1	
13-Feb	335		
14-Feb	460		
15-Feb	373		
16-Feb	349		
17-Feb	287	1	
18-Feb	234	1	
19-Feb	208	1	
20-Feb	289	1	
21-Feb	359		
22-Feb	396		
23-Feb	362		
24-Feb	360		
25-Feb	321		1
26-Feb	261	1	
27-Feb	280	1	
28-Feb	417		
1-Mar	493		
2-Mar	550		
3-Mar	590		
4-Mar	527		
5-Mar	439		
6-Mar	530		
7-Mar	541		
8-Mar	464		
9-Mar	454		
10-Mar	469		
11-Mar	453		
12-Mar	423		
13-Mar	444		
14-Mar	383		
15-Mar	381		
16-Mar	388		

	JIWWTP		
	Secondary Plant Capacity (w/Storage)	No. of Times Capacity	No. of Times Capacity
DATE	MGD	< 300 MGD	< 330 MGD
17-Mar	388		
18-Mar	427		
19-Mar	416		
20-Mar	333		
21-Mar	351		
22-Mar	309		1
23-Mar	255	1	
24-Mar	283	1	
25-Mar	242	1	
26-Mar	329		1
27-Mar	324		1
28-Mar	406		
29-Mar	427		
30-Mar	512		
31-Mar	454		
1-Apr	608		
2-Apr	335		
3-Apr	478		
4-Apr	589		
5-Apr	687		
6-Apr	630		
7-Apr	463		
8-Apr	486		
9-Apr	529		
10-Apr	459		
11-Apr	470		
12-Apr	460		
13-Apr	507		
14-Apr	545		
15-Apr	322		1
16-Apr	272	1	
17-Apr	143	1	
18-Apr	145	1	
19-Apr	145	1	
20-Apr	306		1
21-Apr	198	1	
22-Apr	275	1	
23-Apr	286	1	
24-Apr	522		
25-Apr	739		
26-Apr	916		
27-Apr	1109		
28-Apr	1171		
29-Apr	992		
30-Apr	969		
1-May	831		
2-May	822		
3-May	703		
4-May	700		
5-May	800		
6-May	717		
7-May	360		
8-May			
9-May	435		
10-May	423		
11-May	527		
12-May	529		
13-May	480		
14-May	391		
15-May	403		
16-May	526		
17-May	633		
18-May	619		
19-May	637		
20-May	427		
21-May	360		
22-May	383		
23-May	471		
24-May	513		
25-May	385		
26-May	370		
27-May	256	1	
28-May	247	1	
29-May	360		
30-May	428		

	JIWWTP		
	Secondary Plant Capacity (w/Storage)	No. of Times Capacity	No. of Times Capacity
DATE	MGD	< 300 MGD	< 330 MGD
31-May	353		
1-Jun	352		
2-Jun	565		
3-Jun	537		
4-Jun	595		
5-Jun	372		
6-Jun	457		
7-Jun	452		
8-Jun	318		1
9-Jun	364		
10-Jun	229	1	
11-Jun	248	1	
12-Jun	310		1
13-Jun	520		
14-Jun	650		
15-Jun	752		
16-Jun	935		
17-Jun	805		
18-Jun	713		
19-Jun	792		
20-Jun	911		
21-Jun	1031		
22-Jun	957		
23-Jun	1059		
24-Jun	1115		
25-Jun	852		
26-Jun	815		
27-Jun	844		
28-Jun	961		
29-Jun	871		
30-Jun	684		
1-Jul	787		
2-Jul	777		
3-Jul	809		
4-Jul	771		
5-Jul	747		
6-Jul	956		
7-Jul	991		
8-Jul	881		
9-Jul	1117		
10-Jul	931		
11-Jul	1508		
12-Jul	1447		
13-Jul	1226		
14-Jul	1157		
15-Jul	858		
16-Jul	769		
17-Jul	700		
18-Jul	685		
19-Jul	668		
20-Jul	928		
21-Jul	942		
22-Jul	230	1	
23-Jul	270	1	
24-Jul	407		
25-Jul	584		
26-Jul	871		
27-Jul	955		
28-Jul	1294		
29-Jul	1256		
30-Jul	1133		
31-Jul	1158		
1-Aug	1074		
2-Aug	1074		
3-Aug	1102		
4-Aug	699		
5-Aug	638		
6-Aug	584		
7-Aug	735		
8-Aug	791		
9-Aug	846		
10-Aug	846		
11-Aug	568		
12-Aug	525		
13-Aug	675		

	JIWWTP		
	Secondary Plant Capacity (w/Storage)	No. of Times Capacity	No. of Times Capacity
DATE	MGD	< 300 MGD	< 330 MGD
14-Aug	526		
15-Aug	790		
16-Aug	1003		
17-Aug	856		
18-Aug	961		
19-Aug	546		
20-Aug	272	1	
21-Aug	185	1	
22-Aug	110	1	
23-Aug	182	1	
24-Aug	158	1	
25-Aug	203	1	
26-Aug	387		
27-Aug	392		
28-Aug	443		
29-Aug	418		
30-Aug	369		
31-Aug	321		1
1-Sep	337		
2-Sep	476		
3-Sep	535		
4-Sep	675		
5-Sep	690		
6-Sep	1490		
7-Sep	1691		
8-Sep	1379		
9-Sep	1474		
10-Sep	1521		
11-Sep	1541		
12-Sep	1579		
13-Sep	1584		
14-Sep	1777		
15-Sep	1757		
16-Sep	1326		
17-Sep	1487		
18-Sep	1392		
19-Sep	1399		
20-Sep	1432		
21-Sep	1382		
22-Sep	997		
23-Sep	1055		
24-Sep	1401		
25-Sep	997		
26-Sep	990		
27-Sep	851		
28-Sep	888		
29-Sep	648		
30-Sep	795		
1-Oct	973		
2-Oct	818		
3-Oct	890		
4-Oct	913		
5-Oct	1029		
6-Oct	882		
7-Oct	958		
8-Oct	1053		
9-Oct	1142		
10-Oct	1156		
11-Oct	1336		
12-Oct	1392		
13-Oct	1223		
14-Oct	1123		
15-Oct	1181		
16-Oct	1485		
17-Oct	1943		
18-Oct	1882		
19-Oct	1831		
20-Oct	1694		
21-Oct	1820		
22-Oct	1582		
23-Oct	1260		
24-Oct	1133		
25-Oct	1199		
26-Oct	1508		
27-Oct	1460		

	JIWWTP		
	Secondary Plant Capacity (w/Storage)	No. of Times Capacity	No. of Times Capacity
DATE	MGD	< 300 MGD	< 330 MGD
28-Oct	1620		
29-Oct	1620		
30-Oct	1620		
31-Oct	1620		
1-Nov	1620		
2-Nov	1180		
3-Nov	1108		
4-Nov	1036		
5-Nov	943		
6-Nov	786		
7-Nov	540		
8-Nov	1234		
9-Nov	1196		
10-Nov	881		
11-Nov	940		
12-Nov	732		
13-Nov	585		
14-Nov	611		
15-Nov	598		
16-Nov	495		
17-Nov	325		1
18-Nov	342		
19-Nov	302		1
20-Nov	299	1	
21-Nov	320		1
22-Nov	362		
23-Nov	429		
24-Nov	472		
25-Nov	399		
26-Nov	405		
27-Nov	464		
28-Nov	468		
29-Nov	445		
30-Nov	494		
1-Dec	489		
2-Dec	441		
3-Dec	504		
4-Dec	467		
5-Dec	623		
6-Dec	764		
7-Dec	1050		
8-Dec	853		
9-Dec	667		
10-Dec	651		
11-Dec	500		
12-Dec	511		
13-Dec	521		
14-Dec	509		
15-Dec	475		
16-Dec	441		
17-Dec	370		
18-Dec	357		
19-Dec	440		
20-Dec	378		
21-Dec	450		
22-Dec	402		
23-Dec	466		
24-Dec	431		
25-Dec	427		
26-Dec	442		
27-Dec	619		
28-Dec	710		
29-Dec	780		
30-Dec	799		
31-Dec	641		
	No.	32	14
	Total	362	362
Percent of total number of values that capacity less than set capacity:		8.84%	12.7%

NOTE:
1) Secondary plant capacity data is a calculated value from UWS, *Daily/Weekly Operating Report* (2005)

Future Condition Process Air System

				Capacity, with Indicated # of Units On			
				1	2	3	4
JIWWTP	4	Compressors @	cfm each	118,000	236,000	354,000	472,000
SSWWTP[1]	4	Blowers @	cfm each	37,500	75,000	112,500	150,000

Current Regulations and Advisory Standards

NR 110 Requirements[2]

Oxygen Demand:	1.1	lb Oxygen/lb peak BOD
Oxygen transfer efficiency[3]	7	% of total oxygen supplied is utilized in activated sludge process
Mixing Requirements:	20	cfm/1000 cf of aeration volume for diffusers

10-States Standards[4]

Oxygen Demand:	1.1	lb Oxygen/lb peak BOD
Diffuser System sizing:	200	% of design average day Oxygen demand
Mixing Requirements:	None specified	

Air Requirement Analysis — Revised 2020 Baseline Condition

	JIWWTP		SSWWTP
	Average Day	Maximum Day	Maximum Day
BOD Wasteload (lb/day)[5]	155,000	477,000	377,000
Air Requirement Based on Oxygen Demand			
Oxygen Demand, lb/d	170,500	524,700	414,700
Oxygen Requirement, lb/d[3]	1,389,717	4,896,244	2,666,678
Air Requirement, lb/d (21% Oxygen)[6]	6,617,698	23,315,447	12,698,466
Air Demand, cfm[7]	60,000	212,000	116,000
Air Requirement Based on Mixing Requirement			
Tank Volume[8] (MG)		48.05	34.88
Air Requirement, cfm		128,000	93,000

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NOTES:

1) Increased capacity of SSWWTP based on information provided in:
   Donahue & Associates, *Preliminary Engineering Report, South Shore Wastewater Treatment Plant Blower System Upgrade* (October 2004).
2) Department of Natural Resources, *Wisconsin Administrative Code, Volume 11, Chapter NR 110* (Revisor of Statutes Bureau, May 2001).
3) NR 110.21(5)(c)2 indicates that the 7% oxygen transfer efficiency value should only be used if specific design information is not available.
   Specific design information is available at both JIWWTP and SSWWTP so the following information will be used instead.
   At JIWWTP, based on information provided in Jones Island O&M Manual, 1996:

	Average Day	**Maximum Day**
Oxygen Demand (lb/d)	184,000	361,000
Air Flow Rate (CFM)	65,000	146,000
Based on these values,		
% Oxygen Transfer Efficiency calculated at	12.27%	10.72%

   At SSWWTP, based on information provided in *Technical Memorandum 1 Plant Loading and Process Air Flow Requirements* (July 2004) included in the SSWWTP Blower System Upgrade report referenced in Note 1, the 2001-2003 Oxygen Demand and Airflow Supply was as shown:

	Average Day	**Maximum Day**
Oxygen Demand (lb/d)	111,000	230,000
Air Flow Rate (CFM)	51,700	64,100
Based on these values,		
% Oxygen Transfer Efficiency calculated at	9.31%	15.55%

4) Wastewater Committee of the Great Lakes – Upper Mississippi River Board of State and Provincial Public Health and Environmental Managers, *Recommended Standards for Wastwater Facilities* (Health Education Services Division, 2004).
5) BOD wasteload is from Appendix 5C, *MMSD System Revised 2020 Baseline Condition Mass Balance Analysis* in Table 5C-2 (which lists average day conditions at both WWTPs)and Table 5C-5 (which lists maximum day wasteload conditions at both WWTPs)
6) Oxygen is only 21% of air so air requirement is proportionally larger than the oxygen requirement
7) Air density, at 60 deg F, equals 0.0763 lb/cf from Michael R. Lindeburg, Civil Engineering Reference Manual for the PE Exam, 7th Ed, (1999).
8) Appendix 4F, *MMSD WWTP Unit Process Analysis and Regulation Review*, Table 4F-7, *JIWWTP Unit Process No. 5: Secondary Flow Control/ Aeration System*, and Table 4F-39, *SSWWTP Unit Process No. 5: Aeration and RAS Pumping*
   Additional aerated channel (MLSS channels & Aerated Effluent Channels) volume at JIWWTP assumed to be 2 x largest basin 3.3 MG

JIWWTP

Pickle liquor is used as needed, which is rarely. Therefore, did not calculate future usage.

SSWWTP

Existing Condition Usage[1]:	Average	3.0	gpm
	Maximum	16.0	gpm

Assumed the increase in usage would be based on the increase in Revised 2020 Baseline influent flow projections

	Average Day (MGD)	Maximum Day Flow (MGD)
Existing Influent Flow (1999-2003)[2]:	101.6	307
Revised 2020 Baseline Influent Flow[2]:	115.7	300

Therefore:

Revised 2020 Baseline Projected Usage:	Average	3.4	gpm
	Maximum	16.4	gpm

NOTES:

1) Existing usage is from *Table 4-F-50, SWWTP Unit Process No. 18: Pickle Liquor Storage and Feed* in Appendix 4F, MMSD WWTP Unit Process Analysis and Regulation Review

2) Existing and Revised 2020 Baseline influent flow data are from Table 5A-1, Existing and Future Average and Peak Flows and Loads in Appendix 5A, Future Condition Flow and Wasteload Analysis

APPENDIX 5E

PROJECTED CMAR RESULTS ANALYSIS

This analysis used the new CMAR review process as of 2004 and reviewed how MMSD would have been graded for the last five years of the existing condition review, 1999-2003.

New CMAR Parameters Reviewed	Weight Assigned to Exceedence
1) Average Monthly Influent Flow Compared to Design Max Monthly Flow	
Number of times Ave Mo Flow Exceeded 90% of Design Flow	2
Number of times Ave Mo Flow Exceeded 100% of Design Flow	1
2) Average Monthly Influent BOD Compared to Design Average BOD (lb/d)	
Number of times Ave Mo BOD Exceeded 90% of Design Flow	3
Number of times Ave Mo BOD Exceeded 100% of Design Flow	2
Ave Mo BOD Calculation: Ave Mo Flow x Ave Mo BOD conc x 8.34	
3) Added Analysis: Average Monthly Influent TSS Compared to Design Average TSS (lb/d)	
(This item is NOT reviewed in CMAR so is not included in grading)	
Number of times Ave Mo TSS Exceeded 90% of Design Flow	
Number of times Ave Mo TSS Exceeded 100% of Design Flow	
Ave Mo TSS Calculation: Ave Mo Flow x Ave Mo TSS conc x 8.34	
4) Average Mo. Effluent BOD Compared to Permit Limit	
Number of times Ave Mo BOD Exceeded 90% of Permit Limit	3
Number of times Ave Mo BOD Exceeded 100% of Permit Limit	7
5) Average Mo. Effluent TSS Compared to Permit Limit	
Number of times Ave Mo TSS Exceeded 90% of Permit Limit	3
Number of times Ave Mo TSS Exceeded 100% of Permit Limit	7
6) Average Weekly Effluent NH_3 Compared to Permit Limit (for South Shore only, see table))	
Number of times Ave Weekly NH_3 Exceeded 100% of Permit Limit	2.5
7) Average Mo. Effluent P Compared to Permit Limit	
Number of times Ave Mo. P Exceeded 100% of Permit Limit	10

Grade Determination - Total points generated were subtracted from 100 and grade assigned based on Table 1 in NR 208.

Sources:
1) Department of Natural Resources,*Wisconsin Administrative Code, Volume 11, Chapter NR 208, Compliance Maintenance* (Revisor of Statutes Bureau, November 2004).
2) UWS, Daily/Weekly Operating Reports (1999-2003)
3) Appendix 5A, *Future Condition Flow and Wasteload Analysis*, Table 5A-8, *LeSaffre Yeast Data*

JIWWTP

	Influent Design Parameters/ Effluent Limits		No. of Influent Design Parameters/Effluent Limits Exceedances									
			1999		2000		2001		2002		2003	
	90%	100%	90%	100%	90%	100%	90%	100%	90%	100%	90%	100%
Influent Flow and Loading												
Max Monthly Flow (MGD)	144	160	1	0	2	0	0	0	0	0	0	0
Average Day BOD (lb/d)	269100	299,000	4	2	3	1	4	1	1	0	0	0
Average Day TSS (lb/d)	282600	314,000	4	3	2	0	3	2	0	0	0	0
Total Points Generated			**14**	**4**	**13**	**2**	**12**	**2**	**3**	**0**	**0**	**0**
Score			**82**		**85**		**86**		**97**		**100**	
Section Grade			**B**		**B**		**B**		**A**		**A**	
Effluent Quality and Plant Performance												
Monthly Ave BOD (mg/L)	27	30	0	0	0	0	0	0	0	0	0	0
Total Points Generated			**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Score			**100**		**100**		**100**		**100**		**100**	
Section Grade			**A**		**A**		**A**		**A**		**A**	
Monthly Ave TSS (mg/L)	27	30	0	0	0	0	0	0	0	0	0	0
Total Points Generated			**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Score			**100**		**100**		**100**		**100**		**100**	
Section Grade			**A**		**A**		**A**		**A**		**A**	
Monthly Ave Phosphorus (mg/L)	N/A	1	N/A	0	N/A	0	N/A	0	N/A	0	N/A	0
Total Points Generated				**0**		**0**		**0**		**0**		**0**
Score			**100**		**100**		**100**		**100**		**100**	
Section Grade			**A**		**A**		**A**		**A**		**A**	

NOTES:

1) Review needs to take into account the closure of LeSaffre Yeast. The following yearly average day values were applied to the monthly averages since a lot of data was not readily available

	Flow (MGD)	Inf BOD (lb/d)	Inf TSS (lb/d)
LeSaffre Yeast	0.80	34,000	8,000

Only applied the reduction to corresponding parameters when monthly averages exceeded the CMAR requirements. If already were below requirements, did not need to check that it met CMAR limits

2) No Ammonia limits at JIWWTP so did not include in grade

3) In December 2000, due to extenuating circurcumstances related to the Hoan Bridge Collapse, only the first 12 days of the month were averaged

SSWWTP

	Influent Design Parameters/ Effluent Limits		No. of Influent Design Parameters/Effluent Limits Exceedances									
			1999		2000		2001		2002		2003	
	90%	100%	90%	100%	90%	100%	90%	100%	90%	100%	90%	100%
Influent Flow and Loading												
Max Monthly Flow (MGD)	153	170	1	0	1	0	0	0	0	0	0	0
Average Day BOD (lb/d)	201600	224,000	0	0	0	0	0	0	0	0	0	0
Average Day TSS (lb/d)	239400	266,000	1	0	0	0	0	0	0	0	4	3
Total Points Generated			**2**	**0**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Score			**98**		**98**		**100**		**100**		**100**	
Section Grade			**A**		**A**		**A**		**A**		**A**	
Effluent Quality and Plant Performance												
Monthly Ave BOD (mg/L)	27	30	0	0	0	0	0	0	0	0	0	0
Total Points Generated			**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Score			**100**		**100**		**100**		**100**		**100**	
Section Grade			**A**		**A**		**A**		**A**		**A**	
Monthly Ave TSS (mg/L)	27	30	0	0	0	0	0	0	0	0	0	0
Total Points Generated			**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Score			**100**		**100**		**100**		**100**		**100**	
Section Grade			**A**		**A**		**A**		**A**		**A**	
Weekly Ave NH3 (mg/L)	N/A	See table	N/A	0	N/A	0	N/A	0	N/A	0	N/A	0
Total Points Generated				**0**		**0**		**0**		**0**		**0**
Score			**100**		**100**		**100**		**100**		**100**	
Section Grade			**A**		**A**		**A**		**A**		**A**	
Monthly Ave Phosphorus (mg/L)	N/A	1	N/A	0	N/A	0	N/A	0	N/A	0	N/A	0
Total Points Generated				**0**		**0**		**0**		**0**		**0**
Score			**100**		**100**		**100**		**100**		**100**	
Section Grade			**A**		**A**		**A**		**A**		**A**	

NOTE:

1) Ammonia limits at South Shore (for assumed 7.0 pH)

June	16.7
July	11.3
August	11.1
September	12.7

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