

Table 10-3

Baseline

<i>Classicals</i>		
Ammonia	ug/L	NA
Nitrate Nitrite as N	ug/L	67,300
Nitrogen, Kjeldahl	ug/L	NA
Biochemical Oxygen Demand	ug/L	NA
Chemical Oxygen Demand	ug/L	418,000
Chloride	ug/L	7,320,000
Sulfate	ug/L	1,240,000
Cyanide, Total	ug/L	1,190
Total Dissolved Solids	ug/L	28,600,000
Total Suspended Solids	ug/L	27,900
Phosphorus, Total	ug/L	404
<i>Total Metals</i>		
Aluminum	ug/L	2,080
Antimony	ug/L	13
Arsenic	ug/L	6.8
Barium	ug/L	303
Beryllium	ug/L	1.9
Boron	ug/L	243,000
Cadmium	ug/L	112
Calcium	ug/L	2,050,000
Chromium	ug/L	18
Chromium (VI)	ug/L	NA
Cobalt	ug/L	183
Copper	ug/L	21
Iron	ug/L	1,510
Lead	ug/L	4.7
Magnesium	ug/L	3,370,000
Manganese	ug/L	93,100
Mercury	ug/L	5.6
Molybdenum	ug/L	125
Nickel	ug/L	878
Selenium	ug/L	1,110
Silver	ug/L	0.93
Sodium	ug/L	276,000
Thallium	ug/L	13
Tin	ug/L	100
Titanium	ug/L	27
Vanadium	ug/L	16
Zinc	ug/L	1,390

Table 10-4

Chemical Precipitation

<i>Classicals</i>		
Ammonia	ug/L	8,120
Nitrate Nitrite as N	ug/L	67,300
Nitrogen, Kjeldahl	ug/L	27,000
Biochemical Oxygen Demand	ug/L	3,130
Chemical Oxygen Demand	ug/L	418,000
Chloride	ug/L	8,940,000
Sulfate	ug/L	5,980,000
Cyanide, Total	ug/L	1,190
Total Dissolved Solids	ug/L	23,100,000
Total Suspended Solids	ug/L	6,560
Phosphorus, Total	ug/L	404
<i>Total Metals</i>		
Aluminum	ug/L	155
Antimony	ug/L	5
Arsenic	ug/L	4.5
Barium	ug/L	163
Beryllium	ug/L	1
Boron	ug/L	279,000
Cadmium	ug/L	3.8
Calcium	ug/L	2,330,000
Chromium	ug/L	9.1
Chromium (VI)	ug/L	5.3
Cobalt	ug/L	10
Copper	ug/L	2
Iron	ug/L	127
Lead	ug/L	1
Magnesium	ug/L	3,340,000
Manganese	ug/L	13,600
Mercury	ug/L	0.17
Molybdenum	ug/L	215
Nickel	ug/L	5.6
Selenium	ug/L	455
Silver	ug/L	1
Sodium	ug/L	420,000
Thallium	ug/L	8.6
Tin	ug/L	100
Titanium	ug/L	10
Vanadium	ug/L	15
Zinc	ug/L	18

Table 10-5

Biological

<i>Classicals</i>		
Ammonia	ug/L	8,750
Nitrate Nitrite as N	ug/L	79
Nitrogen, Kjeldahl	ug/L	12,100
Biochemical Oxygen Demand	ug/L	1,740
Chemical Oxygen Demand	ug/L	156,000
Chloride	ug/L	6,720,000
Sulfate	ug/L	1,380,000
Cyanide, Total	ug/L	74
Total Dissolved Solids	ug/L	14,100,000
Total Suspended Solids	ug/L	8,210
Phosphorus, Total	ug/L	115
<i>Total Metals</i>		
Aluminum	ug/L	155
Antimony	ug/L	2
Arsenic	ug/L	4.6
Barium	ug/L	323
Beryllium	ug/L	0.97
Boron	ug/L	125,000
Cadmium	ug/L	2.5
Calcium	ug/L	2,970,000
Chromium	ug/L	2.2
Chromium (VI)	ug/L	3
Cobalt	ug/L	10
Copper	ug/L	2.7
Iron	ug/L	302
Lead	ug/L	1
Magnesium	ug/L	741,000
Manganese	ug/L	1,960
Mercury	ug/L	0.067
Molybdenum	ug/L	20
Nickel	ug/L	2.6
Selenium	ug/L	5
Silver	ug/L	2.3
Sodium	ug/L	46,100
Thallium	ug/L	1.9
Tin	ug/L	100
Titanium	ug/L	10
Vanadium	ug/L	5
Zinc	ug/L	4.8

Table 10-6

Evaporation

<i>Classicals</i>		
Ammonia	ug/L	24,300
Nitrate Nitrite as N	ug/L	100
Nitrogen, Kjeldahl	ug/L	23,500
Chemical Oxygen Demand	ug/L	10,000
Chloride	ug/L	1,500
Sulfate	ug/L	2,500
Total Dissolved Solids	ug/L	10,800
Total Suspended Solids	ug/L	2,000
Phosphorus, Total	ug/L	25
<i>Total Metals</i>		
Aluminum	ug/L	100
Antimony	ug/L	1
Arsenic	ug/L	2
Barium	ug/L	10
Beryllium	ug/L	1
Boron	ug/L	3,750
Cadmium	ug/L	2
Calcium	ug/L	200
Chromium	ug/L	4
Cobalt	ug/L	10
Copper	ug/L	2
Iron	ug/L	100
Lead	ug/L	1
Magnesium	ug/L	200
Manganese	ug/L	10
Mercury	ug/L	0.0103
Molybdenum	ug/L	20
Nickel	ug/L	2
Selenium	ug/L	2
Silver	ug/L	1
Sodium	ug/L	5,000
Thallium	ug/L	1
Tin	ug/L	100
Titanium	ug/L	10
Vanadium	ug/L	5
Zinc	ug/L	28.5

	A	B	C	D	E	F	G	H	I
1	Baseline								
2	<i>Classicals</i>			mg/L	Calc, p. 10-2	mg/L	Calc, p. 10-2	TWF	GxH
3	Ammonia	ug/L	NA					0.001349	0
4	Nitrate Nitrite as N	ug/L	67.300	67.300	20500.20	67.3	20500.20365	0.0032	65.60065
5	Nitrogen, Kjeldahl	ug/L	NA		0.00		0		0
6	Biochemical Oxygen Demand	ug/L	NA		0.00		0		0
7	Chemical Oxygen Demand	ug/L	418,000	418.000	127326.67	0	0		0
8	Chloride	ug/L	7,320,000	7320.000	2229739.83	7320	2229739.833		0
9	Sulfate	ug/L	1,240,000	1240.000	377715.49	1240	377715.4908	5.6E-06	2.115207
10	Cyanide, Total	ug/L	1,190	1.190	362.49	0	0	1.116923	0
11	Total Dissolved Solids	ug/L	28,600,000	28600.000	8711825.03	0	0		0
12	Total Suspended Solids	ug/L	27,900	27.900	8498.60	0	0		0
13	Phosphorus, Total	ug/L	404	0.404	123.06	0.404	123.0621438		0
14	<i>Total Metals</i>			0.000	0.00		0		0
15	Aluminum	ug/L	2,080	2.080	633.59	2.08	633.5872749	0.064691	40.98753
16	Antimony	ug/L	13	0.013	3.96	0.013	3.959920468	0.01225	0.048509
17	Arsenic	ug/L	6.8	0.0068	2.07	0.0068	2.071343014	4.041333	8.370988
18	Barium	ug/L	303	0.303	92.30	0.303	92.29660783	0.001991	0.18374
19	Beryllium	ug/L	1.9	0.002	0.58	0.0019	0.578757607	1.056604	0.611517
20	Boron	ug/L	243,000	243.000	74020.05	243	74020.05182	0.008342	617.4506
21	Cadmium	ug/L	112	0.112	34.12	0.112	34.11623788	23.1168	788.6582
22	Calcium	ug/L	2,050,000	2050.000	624449.00	2050	624448.9969	0.000028	17.48457
23	Chromium	ug/L	18	0.018	5.48	0.018	5.482966802	0.075697	0.415043
24	Chromium (VI)	ug/L	NA		0.00		0	0.516558	0
25	Cobalt	ug/L	183	0.183	55.74	0.183	55.74349582	0.114286	6.370685
26	Copper	ug/L	21	0.021	6.40	0.021	6.396794602	0.634822	4.060827
27	Iron	ug/L	1,510	1.510	459.96	1.51	459.9599928	0.0056	2.575776
28	Lead	ug/L	4.7	0.0047	1.43	0.0047	1.431663554	2.24	3.206926
29	Magnesium	ug/L	3,370,000	3370.000	1026533.23	3370	1026533.229	0.000866	888.4986
30	Manganese	ug/L	93,100	93.100	28359.12	93.1	28359.12274	0.070433	1997.418
31	Mercury	ug/L	5.6	0.0056	1.71	0.0056	1.705811894	117.118	199.7813
32	Molybdenum	ug/L	125	0.125	38.08	0.125	38.07615835	0.201439	7.670018
33	Nickel	ug/L	878	0.878	267.45	0.878	267.4469362	0.108914	29.1288
34	Selenium	ug/L	1,110	1.110	338.12	1.11	338.1162861	1.121344	379.1447
35	Silver	ug/L	0.93	0.00093	0.28	0.00093	0.283286618	16.47073	4.665937
36	Sodium	ug/L	276,000	276.000	84072.16	276	84072.15763	5.49E-06	0.461573
37	Thallium	ug/L	13	0.013	3.96	0.013	3.959920468	1.027059	4.067071
38	Tin	ug/L	100	0.100	30.46	0.1	30.46092668	0.301075	9.171032
39	Titanium	ug/L	27	0.027	8.22	0.027	8.224450203	0.029319	0.241136
40	Vanadium	ug/L	16	0.016	4.87	0.016	4.873748268	0.035	0.170581
41	Zinc	ug/L	1,390	1.390	423.41	1.39	423.4068808	0.046886	19.85186
42									
43				Sum of loadings	13315937.11		4467924.327		5098.411
44							↑		
45									
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55									

Column G for each table shows the pollutant loadings excluding 1) the pollutant parameters biochemical oxygen demand (BOD), chemical oxygen demand (COD), total dissolved solids (TDS), and TSS to avoid double counting the loadings for other specific pollutants, and 2) the other pollutants not common for all the options (ammonia, cyanide, hexavalent chromium and total kjeldahl nitrogen).

	A	B	C	D	E	F	G	H	I
1	Chemical Precipitation								
2	<i>Classicals</i>			mg/L	Calc, p. 10-2	mg/L	Calc, p. 10-2	TWF	GxH
3	Ammonia	ug/L	8,120	8.12	2473.427246	0	0	0.001349	0
4	Nitrate Nitrite as N	ug/L	67,300	67.3	20500.20365	67.3	20500.2037	0.0032	65.60065
5	Nitrogen, Kjeldahl	ug/L	27,000	27	8224.450203	0	0		0
6	Biochemical Oxygen Demand	ug/L	3,130	3.13	953.427005	0	0		0
7	Chemical Oxygen Demand	ug/L	418,000	418	127326.6735	0	0		0
8	Chloride	ug/L	8,940,000	8940	2723206.845	8940	2723206.84		0
9	Sulfate	ug/L	5,980,000	5980	1821563.415	5980	1821563.42	5.6E-06	10.20076
10	Cyanide, Total	ug/L	1,190	1.19	362.4850274	0	0	1.116923	0
11	Total Dissolved Solids	ug/L	23,100,000	23100	7036474.062	0	0		0
12	Total Suspended Solids	ug/L	6,560	6.56	1998.23679	0	0		0
13	Phosphorus, Total	ug/L	404	0.404	123.0621438	0.404	123.062144		0
14	<i>Total Metals</i>			0	0	0	0		0
15	Aluminum	ug/L	155	0.155	47.21443635	0.155	47.2144363	0.064691	3.054359
16	Antimony	ug/L	5	0.005	1.523046334	0.005	1.52304633	0.01225	0.018657
17	Arsenic	ug/L	4.5	0.0045	1.3707417	0.0045	1.3707417	4.041333	5.539624
18	Barium	ug/L	163	0.163	49.65131048	0.163	49.6513105	0.001991	0.098844
19	Beryllium	ug/L	1	0.001	0.304609267	0.001	0.30460927	1.056604	0.321851
20	Boron	ug/L	279,000	279	84985.98543	279	84985.9854	0.008342	708.9248
21	Cadmium	ug/L	3.8	0.0038	1.157515214	0.0038	1.15751521	23.1168	26.75805
22	Calcium	ug/L	2,330,000	2330	709739.5916	2330	709739.592	0.000028	19.87271
23	Chromium	ug/L	9.1	0.0091	2.771944328	0.0091	2.77194433	0.075697	0.209827
24	Chromium (VI)	ug/L	5.3	0.0053	1.614429114	0	0	0.516558	0
25	Cobalt	ug/L	10	0.01	3.046092668	0.01	3.04609267	0.114286	0.348125
26	Copper	ug/L	2	0.002	0.609218534	0.002	0.60921853	0.634822	0.386745
27	Iron	ug/L	127	0.127	38.68537688	0.127	38.6853769	0.0056	0.216638
28	Lead	ug/L	1	0.001	0.304609267	0.001	0.30460927	2.24	0.682325
29	Magnesium	ug/L	3,340,000	3340	1017394.951	3340	1017394.95	0.000866	880.5891
30	Manganese	ug/L	13,600	13.6	4142.686028	13.6	4142.68603	0.070433	291.7818
31	Mercury	ug/L	0.17	0.00017	0.051783575	0.00017	0.05178358	117.118	6.06479
32	Molybdenum	ug/L	215	0.215	65.49099235	0.215	65.4909924	0.201439	13.19243
33	Nickel	ug/L	5.6	0.0056	1.705811894	0.0056	1.70581189	0.108914	0.185787
34	Selenium	ug/L	455	0.455	138.5972164	0.455	138.597216	1.121344	155.4152
35	Silver	ug/L	1	0.001	0.304609267	0.001	0.30460927	16.47073	5.017136
36	Sodium	ug/L	420,000	420	127935.892	420	127935.892	5.49E-06	0.702393
37	Thallium	ug/L	8.6	0.0086	2.619639694	0.0086	2.61963969	1.027059	2.690524
38	Tin	ug/L	100	0.1	30.46092668	0.1	30.4609267	0.301075	9.171032
39	Titanium	ug/L	10	0.01	3.046092668	0.01	3.04609267	0.029319	0.08931
40	Vanadium	ug/L	15	0.015	4.569139001	0.015	4.569139	0.035	0.15992
41	Zinc	ug/L	18	0.018	5.482966802	0.018	5.4829668	0.046886	0.257074
42									
43			Sum of loadings		13687805.98		6509991.6		2207.55

	A	B	C	D	E	F	G	H	I
1	Biological								
2	<i>Classicals</i>			mg/L	Calc, p. 10-2	mg/L	Calc, p. 10-2	TWF	GxH
3	Ammonia	ug/L	8,750	8.75	2665.331084	0	0	0.001349	0
4	Nitrate Nitrite as N	ug/L	79	0.079	24.06413207	0.079	24.06413207	0.0032	0.077005
5	Nitrogen, Kjeldahl	ug/L	12,100	12.1	3685.772128	0	0		0
6	Biochemical Oxygen Demand	ug/L	1,740	1.74	530.0201242	0	0		0
7	Chemical Oxygen Demand	ug/L	156,000	156	47519.04561	0	0		0
8	Chloride	ug/L	6,720,000	6720	2046974.273	6720	2046974.273		0
9	Sulfate	ug/L	1,380,000	1380	420360.7881	1380	420360.7881	5.6E-06	2.35402
10	Cyanide, Total	ug/L	74	0.074	22.54108574	0	0	1.116923	0
11	Total Dissolved Solids	ug/L	14,100,000	14100	4294990.661	0	0		0
12	Total Suspended Solids	ug/L	8,210	8.21	2500.84208	0	0		0
13	Phosphorus, Total	ug/L	115	0.115	35.03006568	0.115	35.03006568		0
14	<i>Total Metals</i>			0	0	0	0		0
15	Aluminum	ug/L	155	0.155	47.21443635	0.155	47.21443635	0.064691	3.054359
16	Antimony	ug/L	2	0.002	0.609218534	0.002	0.609218534	0.01225	0.007463
17	Arsenic	ug/L	4.6	0.0046	1.401202627	0.0046	1.401202627	4.041333	5.662727
18	Barium	ug/L	323	0.323	98.38879316	0.323	98.38879316	0.001991	0.195868
19	Beryllium	ug/L	0.97	0.00097	0.295470989	0.00097	0.295470989	1.056604	0.312196
20	Boron	ug/L	125,000	125	38076.15835	125	38076.15835	0.008342	317.6186
21	Cadmium	ug/L	2.5	0.0025	0.761523167	0.0025	0.761523167	23.1168	17.60398
22	Calcium	ug/L	2,970,000	2970	904689.5223	2970	904689.5223	0.000028	25.33131
23	Chromium	ug/L	2.2	0.0022	0.670140387	0.0022	0.670140387	0.075697	0.050727
24	Chromium (VI)	ug/L	3	0.003	0.9138278	0	0	0.516558	0
25	Cobalt	ug/L	10	0.01	3.046092668	0.01	3.046092668	0.114286	0.348125
26	Copper	ug/L	2.7	0.0027	0.82244502	0.0027	0.82244502	0.634822	0.522106
27	Iron	ug/L	302	0.302	91.99199856	0.302	91.99199856	0.0056	0.515155
28	Lead	ug/L	1	0.001	0.304609267	0.001	0.304609267	2.24	0.682325
29	Magnesium	ug/L	741,000	741	225715.4667	741	225715.4667	0.000866	195.3642
30	Manganese	ug/L	1,960	1.96	597.0341628	1.96	597.0341628	0.070433	42.0509
31	Mercury	ug/L	0.067	0.000067	0.020408821	0.000067	0.020408821	117.118	2.390241
32	Molybdenum	ug/L	20	0.02	6.092185335	0.02	6.092185335	0.201439	1.227203
33	Nickel	ug/L	2.6	0.0026	0.791984094	0.0026	0.791984094	0.108914	0.086258
34	Selenium	ug/L	5	0.005	1.523046334	0.005	1.523046334	1.121344	1.707859
35	Silver	ug/L	2.3	0.0023	0.700601314	0.0023	0.700601314	16.47073	11.53941
36	Sodium	ug/L	46,100	46.1	14042.4872	46.1	14042.4872	5.49E-06	0.077096
37	Thallium	ug/L	1.9	0.0019	0.578757607	0.0019	0.578757607	1.027059	0.594418
38	Tin	ug/L	100	0.1	30.46092668	0.1	30.46092668	0.301075	9.171032
39	Titanium	ug/L	10	0.01	3.046092668	0.01	3.046092668	0.029319	0.08931
40	Vanadium	ug/L	5	0.005	1.523046334	0.005	1.523046334	0.035	0.053307
41	Zinc	ug/L	4.8	0.0048	1.46212448	0.0048	1.46212448	0.046886	0.068553
42									
43			Sum of loadings		8002721.656		3650806.529		638.7558

	A	B	C	D	E	F	G	H	I
1	Evaporation								
2	<i>Classicals</i>			mg/L	Calc, p. 10-2	mg/L	Calc, p. 10-2	TWF	GxH
3	Ammonia	ug/L	24,300	24.3	7402.00518	0	0	0.001349	0
4	Nitrate Nitrite as N	ug/L	100	0.1	30.4609267	0.1	30.46092668	0.0032	0.097475
5	Nitrogen, Kjeldahl	ug/L	23,500	23.5	7158.31777	0	0		0
6				0	0	0	0		0
7	Chemical Oxygen Demand	ug/L	10,000	10	3046.09267	0	0		0
8	Chloride	ug/L	1,500	1.5	456.9139	1.5	456.9139001		0
9	Sulfate	ug/L	2,500	2.5	761.523167	2.5	761.5231669	5.6E-06	0.004265
10				0	0	0	0	1.116923	0
11	Total Dissolved Solids	ug/L	10,800	10.8	3289.78008	0	0		0
12	Total Suspended Solids	ug/L	2,000	2	609.218534	0	0		0
13	Phosphorus, Total	ug/L	25	0.025	7.61523167	0.025	7.615231669		0
14	<i>Total Metals</i>			0	0	0	0		0
15	Aluminum	ug/L	100	0.1	30.4609267	0.1	30.46092668	0.064691	1.970554
16	Antimony	ug/L	1	0.001	0.30460927	0.001	0.304609267	0.01225	0.003731
17	Arsenic	ug/L	2	0.002	0.60921853	0.002	0.609218534	4.041333	2.462055
18	Barium	ug/L	10	0.01	3.04609267	0.01	3.046092668	0.001991	0.006064
19	Beryllium	ug/L	1	0.001	0.30460927	0.001	0.304609267	1.056604	0.321851
20	Boron	ug/L	3,750	3.75	1142.28475	3.75	1142.28475	0.008342	9.528559
21	Cadmium	ug/L	2	0.002	0.60921853	0.002	0.609218534	23.1168	14.08318
22	Calcium	ug/L	200	0.2	60.9218534	0.2	60.92185335	0.000028	0.001706
23	Chromium	ug/L	4	0.004	1.21843707	0.004	1.218437067	0.075697	0.092232
24				0	0	0	0	0.516558	0
25	Cobalt	ug/L	10	0.01	3.04609267	0.01	3.046092668	0.114286	0.348125
26	Copper	ug/L	2	0.002	0.60921853	0.002	0.609218534	0.634822	0.386745
27	Iron	ug/L	100	0.1	30.4609267	0.1	30.46092668	0.0056	0.170581
28	Lead	ug/L	1	0.001	0.30460927	0.001	0.304609267	2.24	0.682325
29	Magnesium	ug/L	200	0.2	60.9218534	0.2	60.92185335	0.000866	0.05273
30	Manganese	ug/L	10	0.01	3.04609267	0.01	3.046092668	0.070433	0.214545
31	Mercury	ug/L	0.0103	1.03E-05	0.00313748	1.03E-05	0.003137475	117.118	0.367455
32	Molybdenum	ug/L	20	0.02	6.09218534	0.02	6.092185335	0.201439	1.227203
33	Nickel	ug/L	2	0.002	0.60921853	0.002	0.609218534	0.108914	0.066353
34	Selenium	ug/L	2	0.002	0.60921853	0.002	0.609218534	1.121344	0.683144
35	Silver	ug/L	1	0.001	0.30460927	0.001	0.304609267	16.47073	5.017136
36	Sodium	ug/L	5,000	5	1523.04633	5	1523.046334	5.49E-06	0.008362
37	Thallium	ug/L	1	0.001	0.30460927	0.001	0.304609267	1.027059	0.312852
38	Tin	ug/L	100	0.1	30.4609267	0.1	30.46092668	0.301075	9.171032
39	Titanium	ug/L	10	0.01	3.04609267	0.01	3.046092668	0.029319	0.08931
40	Vanadium	ug/L	5	0.005	1.52304633	0.005	1.523046334	0.035	0.053307
41	Zinc	ug/L	28.5	0.0285	8.6813641	0.0285	8.681364103	0.046886	0.407034
42									
43			Sum of loadings		25674.7567		4169.342476		47.82991

Merrimack Station Estimated Pollutant Removals/ Technology Option

	143 from data sheets	TWPE/year
Baseline	5098	
Chemical Precipitation	2208	2890
Biological	639	4459
Evaporation	49	5049