Appendix 14A: Baseline Waste Assimilative Capacity Calculations

Calculated D/s Concentrations @ 95%ile River Flow and EQS

Shannon Flow	Measured U/s Concentrations (95%ile 2019-2021 results)			95%ile / Good Status EQS Limits			95%ile / High Status EQS Limits		
95%ile (m3/s)	BOD (mg/l O2)	Ortho-P (mg/l)	Ammonia (mg/l)	BOD (mg/l O2)	Ortho-P (mg/l)	Ammonia (mg/l)	BOD (mg/l O2)	Ortho-P (mg/l)	Ammonia (mg/l)
12.53	1.00	0.039	0.043	2.6	0.075	0.14	2.2	0.045	0.09

	WwTP Dishcarge @ Max. ELVs				Resulting D/s Concentrations		
PE	Hydraulic Load m3 /day	kg/day of BOD (ELV = 25mg/l)	kg/day of Ortho-P (ELV = 1mg/l)	kg/day of Ammonia (ELV = 5mg/l)	BOD mg/l	Orth-P mg/l	Ammonia mg/l
39000 (Current Status)[1]	6043	151.075	6.04	30.22	1.14	0.045	0.071
45000 (Design PE)	7500	187.5	7.50	37.50	1.17	0.046	0.078
77500 (+10 year)	10586.95	211.739	10.59	52.93	1.20	0.049	0.092
81100 (+25 year)	11385.7	227.714	11.39	56.93	1.21	0.050	0.096

Calculated D/s Concentrations @ Median River Flow and Mean EQS

Shannon Flow	Measured U/s Concentrations (Avg. 2019-2021 results)			Mean / Good Status EQS Limits			Mean / High Status EQS Limits		
Median (m3/s)	BOD (mg/l O2)	Ortho-P (mg/l)	Ammonia (mg/l)	BOD (mg/l O2)	Ortho-P (mg/l)	Ammonia (mg/l)	BOD (mg/l O2)	Ortho-P (mg/l)	Ammonia (mg/l)
20	1.05	0.016	0.022	1.5	0.035	0.065	1.3	0.025	0.04

	WwTP Dishcarge @ Max. ELVs				Resulting D/s Concentrations		
PE	Hydraulic Load m3 /day	kg/day of BOD (ELV = 25mg/l)	kg/day of Ortho-P (ELV = 1mg/l)	kg/day of Ammonia (ELV = 5mg/l)	BOD mg/l	Orth-P mg/l	Ammonia mg/l
39000 (Current Status)	6043	151.075	6.04	30.22	1.14	0.02	0.04
45000 (Design PE)	7500	187.5	7.50	37.50	1.16	0.02	0.04
77500 (+10 year)	10586.95	211.739	10.59	52.93	1.17	0.02	0.05
81100 (+25 year)	11385.7	227.714	11.39	56.93	1.18	0.02	0.05

Assimilative Capacity @ 95%ile River Flow and 95%ile EQS (Good Status)

	39000 PE (Current Status)	45,000 PE (Current Design at Capacity)	77,500 PE Future 10 year Scenario	81,100 PE Future 25 year Scenario
River Flow u/s (m3/sec)	12.53	12.53	12.53	12.53
River Flow u/s (m3/day)	1082592	1082592	1082592	1082592
Effluent outflow (m3/day)	6043	7475	10587	11386

	BOD	Ortho-P	Ammonia
EQS (95%ile/Good Status)	2.6	0.075	0.14
u/s Concs (2019-2021)	1.00	0.039	0.043
WWDL ELVs	25	1	5

Baseline Upstream			
Existing Capacity (Kg/day)	2815	81	152
Baseline capacity used (Kg/day)	1083	42	47
Capacity available	1732	39	105
% Remaining WAC in the River	62%	48%	69%
39000 PE (Current Status)			
Effluent load from WwTP	151	6	30
Total capacity used (Kg/day)	1234	48	77
Capacity available	1581	33	75
% Remaining WAC in the River	56%	41%	49%
45000 PE (Current Design Capacity)			
Effluent load from WwTP	187	7	37
Capacity used (Kg/day)	1269	50	84
Capacity available	1545	31	68
% Remaining WAC in the River	55%	39%	45%
77500 PE Future +10 year Scenario			
	BOD	**Ortho-P**	**Ammonia**
Effluent load	265	11	53
Capacity used (Kg/day)	1347	53	99
Capacity available	1467	28	52
% Remaining WAC in the River	52%	35%	34%
81100 PE Future +10 year Scenario			
	BOD	**Ortho-P**	**Ammonia**
Effluent load	285	11	57
Capacity used (Kg/day)	1367	54	103
Capacity available	1448	28	48
% Remaining WAC in the River	51%	34%	32%

Assimilative Capacity @ 95%ile River Flow and 95%ile EQS (High Status)

	39000 PE (Current Status)	45,000 PE (Current Design at Capacity)	77,500 PE Future 10 year Scenario	81,100 PE Future 25 year Scenario
River Flow u/s (m3/sec)	12.53	12.53	12.53	12.53
River Flow u/s (m3/day)	1082592	1082592	1082592	1082592
Effluent outflow (m3/day)	6043	7475	10587	11386

	BOD	Ortho-P	Ammonia
EQS (95%ile/ High Status)	2.2	0.045	0.09
u/s Concs (2019-2021)	1.00	0.039	0.043
WWDL ELVs	25	1	5

Baseline Upstream			
Existing Capacity (Kg/day)	2382	49	97
Baseline capacity used (Kg/day)	1083	42	47
Capacity available	1299	6	51
% Remaining WAC in the River	55%	13%	52%
39000 PE (Current Status)			
Effluent load from WwTP	151	6	30
Total capacity used (Kg/day)	1234	48	77
Capacity available	1148	0	21
% Remaining WAC in the River	48%	1%	21%
45000 PE (Current Design Capacity)			
Effluent load from WwTP	187	7	37
Capacity used (Kg/day)	1269	50	84
Capacity available	1112	-1	14
% Remaining WAC in the River	47%	-2%	14%
77500 PE Future +10 year Scenario			
	BOD	**Ortho-P**	**Ammonia**
Effluent load	265	11	53
Capacity used (Kg/day)	1347	53	99
Capacity available	1034	-4	-2
% Remaining WAC in the River	43%	-8%	-2%
81100 PE Future +10 year Scenario			
	BOD	**Ortho-P**	**Ammonia**
Effluent load	285	11	57
Capacity used (Kg/day)	1367	54	103
Capacity available	1014	-5	-6
% Remaining WAC in the River	43%	-10%	-6%

Assimilative Capacity @ Median River Flow and Mean EQS (Good Status)

	39000 PE (Current Status)	45,000 PE (Current Design at Capacity)	77500 PE Future 10 year Scenario	PE 81,100 Future 25 year Scenario
River Flow u/s (m3/sec)	20	20	20	20
River Flow u/s (m3/day)	1728000	1728000	1728000	1728000
Effluent outflow (m3/day)	6043	7475	10587	11386

	BOD	Ortho-P	Ammonia
EQS (Mean/Good Status)	1.5	0.035	0.065
u/s Concs (2019-2021)	1.08	0.016	0.022
WWDL ELVs	25	1	5

Baseline Upstream			
Existing Capacity (Kg/day)	2592	60	112
Baseline capacity used (Kg/day)	1861	28	38
Capacity available	731	33	74
% Remaining WAC in the River	28%	54%	66%
39000 PE (Current Status)			
Effluent load from WwTP	151	6	30
Total capacity used (Kg/day)	2012	34	68
Capacity available	580	27	44
% Remaining WAC in the River	22%	44%	39%
45000 PE (Current Design Capacity)			
Effluent load from WwTP	187	7	37
Capacity used (Kg/day)	2048	35	75
Capacity available	544	25	37
% Remaining WAC in the River	21%	42%	33%
77500 PE Future 10 year Scenario			
	BOD	**Ortho-P**	**Ammonia**
Effluent load	265	11	53
Capacity used (Kg/day)	2126	38	91
Capacity available	466	22	21
% Remaining WAC in the River	18%	37%	19%
81100 PE Future 10 year Scenario			
	BOD	**Ortho-P**	**Ammonia**
Effluent load	285	11	57
Capacity used (Kg/day)	2146	39	95
Capacity available	446	21	17
% Remaining WAC in the River	17%	35%	15%

Assimilative Capacity @ Median River Flow and Mean EQS (High Status)

	39000 PE (Current Status)	45,000 PE (Current Design at Capacity)	77500 PE Future 10 year Scenario	PE 81,100 Future 25 year Scenario
River Flow u/s (m3/sec)	20	20	20	20
River Flow u/s (m3/day)	1728000	1728000	1728000	1728000
Effluent outflow (m3/day)	6043	7475	10587	11386

	BOD	Ortho-P	Ammonia
EQS (Mean/High Status)	1.3	0.025	0.04
u/s Concs (2019-2021)	1.08	0.016	0.022
WWDL ELVs	25	1	5

Baseline Upstream			
Existing Capacity (Kg/day)	2246	43	69
Baseline capacity used (Kg/day)	1861	28	38
Capacity available	385	16	31
% Remaining WAC in the River	17%	36%	45%
39000 PE (Current Status)			
Effluent load from WwTP	151	6	30
Total capacity used (Kg/day)	2012	34	68
Capacity available	234	10	1
% Remaining WAC in the River	10%	22%	1%
45000 PE (Current Design Capacity)			
Effluent load from WwTP	187	7	37
Capacity used (Kg/day)	2048	35	75
Capacity available	198	8	-6
% Remaining WAC in the River	9%	19%	-9%
77500 PE Future 10 year Scenario			
	BOD	**Ortho-P**	**Ammonia**
Effluent load	265	11	53
Capacity used (Kg/day)	2126	38	91
Capacity available	121	5	-22
% Remaining WAC in the River	5%	11%	-32%
81100 PE Future 10 year Scenario			
	BOD	**Ortho-P**	**Ammonia**
Effluent load	285	11	57
Capacity used (Kg/day)	2146	39	95
Capacity available	101	4	-26
% Remaining WAC in the River	4%	10%	-37%