Appendix B

Nutrient Neutrality Assessment – For Onsite WwTW

Onsite WwTW - OPA

Existing and Proposed Development Splits

Existing Land Use				
	Soilscapes classification			
	Freely draining	Slowly permeable (Impeded Drainage)	Naturally Wet	
Otterpool OPA Land Use				
Open urban land	7.62	0.00	18.09	
Greenspace	61.10	0.80	18.51	
Lowland	60.76	17.64	40.4	
Shrub	1.69	0.00	0.36	
Woodland	0.04	0.00	0.92	
Cereals	157.36	34.61	131.7	
	288.57	53.05	209.98	551.60

	Proposed Land Use				
		Soilscapes classification			
		Freely draining	Slowly permeable (Impeded Drainage)	Naturally Wet	
	Otterpool OPA Land Use				
Development Parcels	Residential urban land	145.21	13.16	98.25	
	Commercial/industrial urban land	14.50	1.50		
	Greenspace	25.63	2.32	17.34	
	community food growing	0.00	0.00	0.22	
Public Open Space	Open urban land	5.27	2.57	6.26	
	Greenspace	95.07	27.98	60.79	
	community food growing	2.69	0.00	4.07	
	Water - stormwater wetlands	0.23	2.00	14.96	
	Water - wastewater wetlands	0.00	3.51	8.08	
		288.60	53.04	209.97	551.61

Stage 1 Outputs

Scenario 1		
Stage 1 Results - Breakdown		
Total Annual Wastewater TP and TN Load		
	Scenario 1	
	TP (kgN/yr)	**TN (kgP/yr)**
Stage 1 - Residential Class C3 (110 l/p/d + 10% buffer)	74.4	5354.3
Stage 1 - Residential Class C2 (350 l/p/d)	17.8	1282.3
Stage 1 - Residential Class C1 (300 l/p/d)	2.3	166.2
Final Stage 1 Output	**94.5**	**6802.8**

Residential Class C3 (110 l/p/d + 10% buffer)

Stage 1

User Inputs

Date of first occupancy:		
Average occupancy rate:	2.40	
Water usage (litres/person/day):	120	
Development Proposal (dwellings/units):	7855	
Wastewater treatment works:	Package Treatment Plant user defined	
Wastewater treatment works P permit (mg TP/litre):	Please enter value in cell to the right:	0.09
Wastewater treatment works N permit (mg TN/litre):	Please enter value in cell to the right:	6.48

Stage 1 Calculated Loading

Additional population	18852	people
Wastewater by development	2262240	litres/day
Annual wastewater TP load	**74.37**	**kg TP/yr**
Annual wastewater TN load	**5354.31**	**kg TN/yr**

Residential Class C2 (350 l/p/d)

Stage 1

User Inputs

Date of first occupancy:		
Average occupancy rate:	2.40	
Water usage (litres/person/day):	350	
Development Proposal (dwellings/units):	645	
Wastewater treatment works:	Package Treatment Plant user defined	
Wastewater treatment works P permit (mg TP/litre):	Please enter value in cell to the right:	0.09
Wastewater treatment works N permit (mg TN/litre):	Please enter value in cell to the right:	6.48

Stage 1 Calculated Loading

Additional population	1548	people
Wastewater by development	541800	litres/day
Annual wastewater TP load	**17.81**	**kg TP/yr**
Annual wastewater TN load	**1282.34**	**kg TN/yr**

Residential Class C1 (300 l/p/d)

Stage 1

User Inputs

Date of first occupancy:		
Average occupancy rate:	2.00	
Water usage (litres/person/day):	300	
Development Proposal (dwellings/units):	117	
Wastewater treatment works:	Package Treatment Plant user defined	
Wastewater treatment works P permit (mg TP/litre):	Please enter value in cell to the right:	0.09
Wastewater treatment works N permit (mg TN/litre):	Please enter value in cell to the right:	6.48

Stage 1 Calculated Loading

Additional population	234	people
Wastewater by development	70200	litres/day
Annual wastewater TP load	**2.31**	**kg TP/yr**
Annual wastewater TN load	**166.15**	**kg TN/yr**

Scenario 2		
Stage 1 Results - Breakdown		
Total Annual Wastewater TP and TN Load		
	Scenario 2	
	TP (kgN/yr)	**TN (kgP/yr)**
Stage 1 - Residential Class C3 (110 l/p/d + 10% buffer)	74.4	5354.3
Stage 1 - Residential Class C2 (262.5 l/p/d)	13.4	963.6
Stage 1 - Residential Class C1 (225 l/p/d)	1.7	124.6
Final Stage 1 Output	**89.5**	**6442.5**

Residential Class C3 (110 l/p/d + 10% buffer)

Stage 1

User Inputs

Date of first occupancy:		
Average occupancy rate:	2.40	
Water usage (litres/person/day):	120	
Development Proposal (dwellings/units):	7855	
Wastewater treatment works:	Package Treatment Plant user defined	
Wastewater treatment works P permit (mg TP/litre):	Please enter value in cell to the right:	0.09
Wastewater treatment works N permit (mg TN/litre):	Please enter value in cell to the right:	6.48

Stage 1 Calculated Loading

Additional population	18852	people
Wastewater by development	2262240	litres/day
Annual wastewater TP load	**74.37**	**kg TP/yr**
Annual wastewater TN load	**5354.31**	**kg TN/yr**

Residential Class C2 (263 l/p/d)

Stage 1

User Inputs

Date of first occupancy:		
Average occupancy rate:	2.40	
Water usage (litres/person/day):	263	
Development Proposal (dwellings/units):	645	
Wastewater treatment works:	Package Treatment Plant user defined	
Wastewater treatment works P permit (mg TP/litre):	Please enter value in cell to the right:	0.09
Wastewater treatment works N permit (mg TN/litre):	Please enter value in cell to the right:	6.48

Stage 1 Calculated Loading

Additional population	1548	people
Wastewater by development	407124	litres/day
Annual wastewater TP load	**13.38**	**kg TP/yr**
Annual wastewater TN load	**963.59**	**kg TN/yr**

Residential Class C1 (225 l/p/d)

Stage 1

User Inputs

Date of first occupancy:		
Average occupancy rate:	2.00	
Water usage (litres/person/day):	225	
Development Proposal (dwellings/units):	117	
Wastewater treatment works:	Package Treatment Plant user defined	
Wastewater treatment works P permit (mg TP/litre):	Please enter value in cell to the right:	0.09
Wastewater treatment works N permit (mg TN/litre):	Please enter value in cell to the right:	6.48

Stage 1 Calculated Loading

Additional population	234	people
Wastewater by development	52650	litres/day
Annual wastewater TP load	**1.73**	**kg TP/yr**
Annual wastewater TN load	**124.61**	**kg TN/yr**

Stage 2 Outputs

Stage 2 Results - Breakdown

	TP (kg/yr)	TN (kg/yr)
Stage 2 - Freely Draining	40.0	6023.2
Stage 2 - Impeded Drainage	44.2	931.0
Stage 2 - Naturally wet	111.8	3765.0
Final Stage 2 Output	**196.0**	**10719.2**

Stage 2 - Freely Draining

Stage 2

User Inputs

Catchment:	Upper Stour
Soil drainage type:	Freely draining
Annual average rainfall (mm):	700.1 - 750
Within Nitrate Vulnerable Zone (NVZ):	Yes

Existing land use type(s)	Area (ha)	Annual phosphorus nutrient export (kg TP)	Annual nitrogen nutrient export (kg TN)
Open urban land	7.62	5.93	60.69
Greenspace	61.10	1.22	183.30
Lowland	60.76	6.82	867.44
Shrub	1.69	0.03	5.07
Woodland	0.04	0.00	0.11
Cereals	157.36	26.00	4906.60
Total:	**288.57**	**40.00**	**6023.21**

Stage 2 - Impeded Drainage

Stage 2

User Inputs

Catchment:	Upper Stour
Soil drainage type:	Impeded drainage
Annual average rainfall (mm):	700.1 - 750
Within Nitrate Vulnerable Zone (NVZ):	Yes

Existing land use type(s)	Area (ha)	Annual phosphorus nutrient export (kg TP)	Annual nitrogen nutrient export (kg TN)
Open urban land	0.00	0.00	0.00
Greenspace	0.80	0.02	2.40
Lowland	17.64	11.99	166.91
Shrub	0.00	0.00	0.00
Woodland	0.00	0.00	0.00
Cereals	34.61	32.17	761.72
Total:	**53.048**	**44.18**	**931.02**

Stage 2 - Naturally Wet

Stage 2

User Inputs

Catchment:	Upper Stour
Soil drainage type:	Naturally wet
Annual average rainfall (mm):	700.1 - 750
Within Nitrate Vulnerable Zone (NVZ):	Yes

Existing land use type(s)	Area (ha)	Annual phosphorus nutrient export (kg TP)	Annual nitrogen nutrient export (kg TN)
Open urban land	18.09	14.08	144.06
Greenspace	18.51	0.37	55.53
Lowland	40.40	7.51	451.22
Shrub	0.36	0.01	1.08
Woodland	0.92	0.02	2.75
Cereals	131.70	89.83	3110.33
Total:	**209.99**	**111.82**	**3764.97**

Stage 3 Outputs

Stage 3 Results - Breakdown
Total Annual Phosphorous and Nitrogen Nutrient Export

	TP (kgN/yr)	TN (kgP/yr)
Stage 3 - Freely Draining	233.7	2517.4
Stage 3 - Impeded Drainage	23.3	299.9
Stage 3 - Naturally wet	150.8	1686.9
Final Stage 3 Output	**407.8**	**4504.2**

Stage 3 - Freely Draining

Stage 3

User Inputs

New land use type(s)	Area (ha)	Annual phosphorus nutrient export (kg TP)	Annual nitrogen nutrient export (kg TN)
Residential urban land	145.21	210.62	1961.59
Commercial/industrial urban land	14.50	15.39	104.47
Greenspace	25.63	0.51	76.89
Open urban land	5.27	4.10	41.97
Greenspace	95.07	1.90	285.21
Community food growing	2.69	1.19	47.27
Water	0.23	0.00	0.00
Total:	**288.59894**	**233.72**	**2517.40**

Stage 3 - Impeded Drainage

Stage 3

User Inputs

New land use type(s)	Area (ha)	Annual phosphorus nutrient export (kg TP)	Annual nitrogen nutrient export (kg TN)
Residential urban land	13.16	19.09	177.77
Commercial/industrial urban land	1.50	1.59	10.81
Greenspace	2.32	0.05	6.96
Open urban land	2.57	2.00	20.44
Greenspace	27.98	0.56	83.94
Water	2.00	0.00	0.00
Water	3.51	0.00	0.00
Total:	**53.032**	**23.28**	**299.92**

Stage 3 - Naturally Wet

Stage 3

User Inputs

New land use type(s)	Area (ha)	Annual phosphorus nutrient export (kg TP)	Annual nitrogen nutrient export (kg TN)
Residential urban land	98.25	142.51	1327.23
Community food growing	0.22	0.10	3.84
Greenspace	17.34	0.35	52.02
Open urban land	6.26	4.87	49.85
Greenspace	60.79	1.22	182.38
Community food growing	4.07	1.80	71.54
Water	14.96	0.00	0.00
Water	8.08	0.00	0.00
Total:	**209.97162**	**150.84**	**1686.86**

Please enter area in hectares.

Stage 4 Outputs and Sensitivity Tests

Stage 4 - Calculated Outputs

Total Annual Phosphorous and Nitrogen Load to Mitigate	Scenario 1		Scenario 2	
	TP (kgN/yr)	TN (kgP/yr)	TP (kgN/yr)	TN (kgP/yr)
Step 1: Nutrient Budget*	306.3	587.8	301.3	227.5
Step 2: Nutrient Budget* X 1.2	367.6	705.3	361.6	273.0
Stage 4 Final Nutrient Load	**367.60**	**705.3**	**361.58**	**273.0**

* Nutrient Budget = Final Stage 1 Output + (Final Stage 3 Output - Final Stage 2 Output)

Stage 4 - Calculated Outputs (Sensitivity Test - Land Use Nutrients Only)

Total Annual Phosphorous and Nitrogen Load to Mitigate	Scenario 1		Scenario 2	
	TP (kgN/yr)	TN (kgP/yr)	TP (kgN/yr)	TN (kgP/yr)
Step 1: Nutrient Budget*	211.84	-6215.02	211.84	-6215.02
Step 2: Nutrient Budget* X 1.2	254.21	-7458.02	254.21	-7458.02
Stage 4 Final Nutrient Load	**254.21**	**-7458.02**	**254.21**	**-7458.02**

* Nutrient Budget = Final Stage 1 Output + (Final Stage 3 Output - Final Stage 2 Output)

Stage 4 - Calculated Outputs (Sensitivity Test - WwTW Nutrients Only)

Total Annual Phosphorous and Nitrogen Load to Mitigate	Scenario 1		Scenario 2	
	TP (kgN/yr)	TN (kgP/yr)	TP (kgN/yr)	TN (kgP/yr)
Step 1: Nutrient Budget*	94.49	6802.80	89.48	6442.51
Step 2: Nutrient Budget* X 1.2	113.39	8163.36	107.38	7731.01
Stage 4 Final Nutrient Load	**113.39**	**8163.36**	**107.38**	**7731.01**

* Nutrient Budget = Final Stage 1 Output + (Final Stage 3 Output - Final Stage 2 Output)

Nutrient Mitigation - Wetland Area Requirement Summary	Scenario 1		Scenario 2	
	TP Wetland Area (ha)	TN Wetland Area (ha)	TP Wetland Area (ha)	TN Wetland Area (ha)
Final nutrient load/ Assumed Wetland TP/TN removal rate	30.63	0.76	30.13	0.29
Assumed Wetland TN removal rate	93 g/m2/yr			
Assumed Wetland TP removal rate	1.2 g/m2/yr			

Nutrient Mitigation - Wetland Area Requirement Summary (Sensitivity Test - Land Use Nutrients Only)	Scenario 1		Scenario 2	
	TP Wetland Area (ha)	TN Wetland Area (ha)	TP Wetland Area (ha)	TN Wetland Area (ha)
Final nutrient load/ Assumed Wetland TP/TN removal rate	21.18	-8.02	21.18	-8.02
Assumed Wetland TN removal rate	93 g/m2/yr			
Assumed Wetland TP removal rate	1.2 g/m2/yr			

Nutrient Mitigation - Wetland Area Requirement Summary (Sensitivity Test - WwTW Nutrients Only)	Scenario 1		Scenario 2	
	TP Wetland Area (ha)	TN Wetland Area (ha)	TP Wetland Area (ha)	TN Wetland Area (ha)
Final nutrient load/ Assumed Wetland TP/TN removal rate	9.45	8.78	8.95	8.31
Assumed Wetland TN removal rate	93 g/m2/yr			
Assumed Wetland TP removal rate	1.2 g/m2/yr			

Existing and Proposed Development Splits

Existing Land Use				
	Soilscapes classification			
	Freely draining	Slowly permeable (Impeded Drainage)	Naturally Wet	
Otterpool OPA Land Use				
Open urban land	7.62	0.00	18.09	
Greenspace	61.10	0.80	18.51	
Lowland	60.76	17.64	40.4	
Shrub	1.69	0.00	0.36	
Woodland	0.04	0.00	0.92	
Cereals	157.36	34.61	131.7	
	288.57	53.05	209.98	551.60
	Freely draining	Slowly permeable (Impeded Drainage)	Naturally Wet	
Additional Land Use in the Framework Masterplan				
Open urban land	2.96	0	0	
Greenspace	16.17	0	0	
Lowland	0.00	0	0	
Shrub	0.28	0	0	
Woodland	0.62	0	0	
Cereals	6.11	0	0	
Commercial/industrial urban land	18.17	0	0	
	44.31	0.00	0.00	44.31
TOTAL	**332.88**	**53.05**	**209.98**	**595.91**

Existing Land Use				
	Soilscapes classification			
	Freely draining	Slowly permeable (Impeded Drainage)	Naturally Wet	
Otterpool OPA + Additional Framework Masterplan Land Use				
Open urban land	10.58	0.00	18.09	
Greenspace	77.27	0.80	18.51	
Lowland	60.76	17.64	40.40	
Shrub	1.97	0.00	0.36	
Woodland	0.66	0.00	0.92	
Cereals	163.47	34.61	131.70	
Commercial/industrial urban land	18.17	0.00	0.00	
	332.88	**53.05**	**209.98**	**595.91**

Proposed Land Use					
		Soilscapes classification			
		Freely draining	Slowly permeable (Impeded Drainage)	Naturally Wet	
	Otterpool OPA Land Use				
Development Parcels	Residential urban land	145.21	13.16	98.25	
	Commercial/industrial urban land	14.50	1.50		
	Greenspace	25.63	2.32	17.34	
	community food growing	0.00	0.00	0.22	
Public Open Space	Open urban land	5.27	2.57	6.26	
	Greenspace	95.07	27.98	60.79	
	community food growing	2.69	0.00	4.07	
	Water - stormwater wetlands	0.23	2.00	14.96	
	Water - wastewater wetlands	0.00	3.51	8.08	
		288.60	53.04	209.97	551.61
		Freely draining	Slowly permeable (Impeded Drainage)	Naturally Wet	
	Additional Land Use in the Framework Masterplan				
Development Parcels	Residential urban land	30.53	0	0	
	Commercial/industrial urban land	0.00	0	0	
Public Open Space	Open urban land	3.23	0	0	
	Greenspace	10.55	0	0	
		44.31	0.00	0.00	44.31
	TOTAL	**332.91**	**53.04**	**209.97**	**595.92**

Proposed Land Use				
	Soilscapes classification			
	Freely draining	Slowly permeable (Impeded Drainage)	Naturally Wet	
Otterpool OPA + Additional Framework Masterplan Land Use				
Development Parcels	Residential urban land	175.74	13.16	98.25
	Commercial/industrial urban land	14.50	1.50	0.00
	Greenspace	25.63	2.32	17.34
	community food growing	0.00	0.00	0.22
Public Open Space	Open urban land	8.50	2.57	6.26
	Greenspace	105.62	27.98	60.79
	community food growing	2.69	0.00	4.07
	Water - stormwater wetlands	0.23	2.00	14.96
	Water - wastewater wetlands	0.00	3.51	8.08
	332.91	**53.04**	**209.97**	**595.92**

Stage 1 Outputs

Scenario 1		
Stage 1 Results - Breakdown		
Total Annual Wastewater TP and TN Load		
	Scenario 1	
	TP (kgN/yr)	**TN (kgP/yr)**
Stage 1 - Residential Class C3 (110 l/p/d + 10% buffer)	82.4	5933.0
Stage 1 - Residential Class C2 (350 l/p/d)	35.8	2576.6
Stage 1 - Residential Class C1 (300 l/p/d)	2.3	166.2
Final Stage 1 Output	**120.5**	**8675.8**

Residential Class C3 (110 l/p/d + 10% buffer)

Stage 1

User Inputs

Date of first occupancy:		
Average occupancy rate:	2.40	
Water usage (litres/person/day):	120	
Development Proposal (dwellings/units):	8704	
Wastewater treatment works:	Package Treatment Plant user defined	
Wastewater treatment works P permit (mg TP/litre):	Please enter value in cell to the right:	0.09
Wastewater treatment works N permit (mg TN/litre):	Please enter value in cell to the right:	6.48

Stage 1 Calculated Loading

Additional population	20889.6	people
Wastewater by development	2506752	litres/day
Annual wastewater TP load	**82.40**	**kg TP/yr**
Annual wastewater TN load	**5933.03**	**kg TN/yr**

Residential Class C2 (350 l/p/d)

Stage 1

User Inputs

Date of first occupancy:		
Average occupancy rate:	2.40	
Water usage (litres/person/day):	350	
Development Proposal (dwellings/units):	1296	
Wastewater treatment works:	Package Treatment Plant user defined	
Wastewater treatment works P permit (mg TP/litre):	Please enter value in cell to the right:	0.09
Wastewater treatment works N permit (mg TN/litre):	Please enter value in cell to the right:	6.48

Stage 1 Calculated Loading

Additional population	3110.4	people
Wastewater by development	1088640	litres/day
Annual wastewater TP load	**35.79**	**kg TP/yr**
Annual wastewater TN load	**2576.61**	**kg TN/yr**

Residential Class C1 (300 l/p/d)

Stage 1

User Inputs

Date of first occupancy:		
Average occupancy rate:	2.00	
Water usage (litres/person/day):	300	
Development Proposal (dwellings/units):	117	
Wastewater treatment works:	Package Treatment Plant user defined	
Wastewater treatment works P permit (mg TP/litre):	Please enter value in cell to the right:	0.09
Wastewater treatment works N permit (mg TN/litre):	Please enter value in cell to the right:	6.48

Stage 1 Calculated Loading

Additional population	234	people
Wastewater by development	70200	litres/day
Annual wastewater TP load	**2.31**	**kg TP/yr**
Annual wastewater TN load	**166.15**	**kg TN/yr**

Scenario 2		
Stage 1 Results - Breakdown		
Total Annual Wastewater TP and TN Load		
	Scenario 2	
	TP (kgN/yr)	**TN (kgP/yr)**
Stage 1 - Residential Class C3 (110 l/p/d + 10% buffer)	82.4	5933.0
Stage 1 - Residential Class C2 (262.5 l/p/d)	26.9	1936.1
Stage 1 - Residential Class C1 (225 l/p/d)	1.7	124.6
Final Stage 1 Output	**111.0**	**7993.8**

Residential Class C3 (110 l/p/d + 10% buffer)

Stage 1

User Inputs

Date of first occupancy:		
Average occupancy rate:	2.40	
Water usage (litres/person/day):	120	
Development Proposal (dwellings/units):	8704	
Wastewater treatment works:	Package Treatment Plant user defined	
Wastewater treatment works P permit (mg TP/litre):	Please enter value in cell to the right:	0.09
Wastewater treatment works N permit (mg TN/litre):	Please enter value in cell to the right:	6.48

Stage 1 Calculated Loading

Additional population	20889.6	people
Wastewater by development	2506752	litres/day
Annual wastewater TP load	**82.40**	**kg TP/yr**
Annual wastewater TN load	**5933.03**	**kg TN/yr**

Residential Class C2 (263 l/p/d)

Stage 1

User Inputs

Date of first occupancy:		
Average occupancy rate:	2.40	
Water usage (litres/person/day):	263	
Development Proposal (dwellings/units):	1296	
Wastewater treatment works:	Package Treatment Plant user defined	
Wastewater treatment works P permit (mg TP/litre):	Please enter value in cell to the right:	0.09
Wastewater treatment works N permit (mg TN/litre):	Please enter value in cell to the right:	6.48

Stage 1 Calculated Loading

Additional population	3110.4	people
Wastewater by development	818035.2	litres/day
Annual wastewater TP load	**26.89**	**kg TP/yr**
Annual wastewater TN load	**1936.14**	**kg TN/yr**

Residential Class C1 (225 l/p/d)

Stage 1

User Inputs

Date of first occupancy:		
Average occupancy rate:	2.00	
Water usage (litres/person/day):	225	
Development Proposal (dwellings/units):	117	
Wastewater treatment works:	Package Treatment Plant user defined	
Wastewater treatment works P permit (mg TP/litre):	Please enter value in cell to the right:	0.09
Wastewater treatment works N permit (mg TN/litre):	Please enter value in cell to the right:	6.48

Stage 1 Calculated Loading

Additional population	234	people
Wastewater by development	52650	litres/day
Annual wastewater TP load	**1.73**	**kg TP/yr**
Annual wastewater TN load	**124.61**	**kg TN/yr**

Stage 2 Outputs

Stage 2 Results - Breakdown

	TP (kg/yr)	TN (kg/yr)
Stage 2 - Freely Draining	62.9	6419.4
Stage 2 - Impeded Drainage	44.2	931.0
Stage 2 - Naturally wet	111.8	3765.0
Final Stage 2 Output	**218.9**	**11115.4**

Stage 2 - Freely Draining

Stage 2

User Inputs

Catchment:	Upper Stour
Soil drainage type:	Freely draining
Annual average rainfall (mm):	700.1 - 750
Within Nitrate Vulnerable Zone (NVZ):	Yes

Existing land use type(s)	Area (ha)	Annual phosphorus nutrient export (kg TP)	Annual nitrogen nutrient export (kg TN)
Open urban land	7.62	5.93	60.69
Greenspace	61.10	1.22	183.30
Lowland	60.76	6.82	867.44
Shrub	1.69	0.03	5.07
Woodland	0.04	0.00	0.11
Cereals	157.36	26.00	4906.60
Open urban land	2.96	2.30	23.57
Greenspace	16.17	0.32	48.51
Lowland	0.00	0.00	0.00
Shrub	0.28	0.01	0.84
Woodland	0.62	0.01	1.86
Cereals	6.11	1.01	190.51
Commercial/industrial urban land	18.17	19.28	130.91
Total:	**332.88**	**62.94**	**6419.41**

Stage 2 - Impeded Drainage

Stage 2

User Inputs

Catchment:	Upper Stour
Soil drainage type:	Impeded drainage
Annual average rainfall (mm):	700.1 - 750
Within Nitrate Vulnerable Zone (NVZ):	Yes

Existing land use type(s)	Area (ha)	Annual phosphorus nutrient export (kg TP)	Annual nitrogen nutrient export (kg TN)
Open urban land	0.00	0.00	0.00
Greenspace	0.80	0.02	2.40
Lowland	17.64	11.99	166.91
Shrub	0.00	0.00	0.00
Woodland	0.00	0.00	0.00
Cereals	34.61	32.17	761.72
Total:	**53.048**	**44.18**	**931.02**

Stage 2 - Naturally Wet

Stage 2

User Inputs

Catchment:	Upper Stour
Soil drainage type:	Naturally wet
Annual average rainfall (mm):	700.1 - 750
Within Nitrate Vulnerable Zone (NVZ):	Yes

Existing land use type(s)	Area (ha)	Annual phosphorus nutrient export (kg TP)	Annual nitrogen nutrient export (kg TN)
Open urban land	18.09	14.08	144.06
Greenspace	18.51	0.37	55.53
Lowland	40.40	7.51	451.22
Shrub	0.36	0.01	1.08
Woodland	0.92	0.02	2.75
Cereals	131.70	89.83	3110.33
Total:	**209.99**	**111.82**	**3764.97**

Stage 3 Outputs

Stage 3 Results - Breakdown
Total Annual Phosphorous and Nitrogen Nutrient Export

	TP (kgN/yr)	TN (kgP/yr)
Stage 3 - Freely Draining	280.7	2987.2
Stage 3 - Impeded Drainage	23.3	299.9
Stage 3 - Naturally wet	150.8	1686.9
Final Stage 3 Output	**454.8**	**4974.0**

Stage 3 - Freely Draining

Stage 3

User Inputs

New land use type(s)	Area (ha)	Annual phosphorus nutrient export (kg TP)	Annual nitrogen nutrient export (kg TN)
Residential urban land	145.21	210.62	1961.59
Commercial/industrial urban land	14.50	15.39	104.47
Greenspace	25.63	0.51	76.89
Open urban land	5.27	4.10	41.97
Greenspace	95.07	1.90	285.21
Community food growing	2.69	1.19	47.27
Water	0.23	0.00	0.00
Residential urban land	30.53	44.28	412.42
Commercial/industrial urban land	0.00	0.00	0.00
Greenspace	10.55	0.21	31.65
Open urban land	3.23	2.51	25.72
Total:	**332.908942**	**280.72**	**2987.19**

Stage 3 - Impeded Drainage

Stage 3

User Inputs

New land use type(s)	Area (ha)	Annual phosphorus nutrient export (kg TP)	Annual nitrogen nutrient export (kg TN)
Residential urban land	13.16	19.09	177.77
Commercial/industrial urban land	1.50	1.59	10.81
Greenspace	2.32	0.05	6.96
Open urban land	2.57	2.00	20.44
Greenspace	27.98	0.56	83.94
Water	2.00	0.00	0.00
Water	3.51	0.00	0.00
Total:	**53.032**	**23.28**	**299.92**

Stage 3 - Naturally Wet

Stage 3

User Inputs

New land use type(s)	Area (ha)	Annual phosphorus nutrient export (kg TP)	Annual nitrogen nutrient export (kg TN)
Residential urban land	98.25	142.51	1327.23
Community food growing	0.22	0.10	3.84
Greenspace	17.34	0.35	52.02
Open urban land	6.26	4.87	49.85
Greenspace	60.79	1.22	182.38
Community food growing	4.07	1.80	71.54
Water	14.96	0.00	0.00
Water	8.08	0.00	0.00
Total:	**209.97162**	**150.84**	**1686.86**

Please enter area in hectares.

Stage 4 Outputs and Sensitivity Tests

Stage 4 - Calculated Outputs

Total Annual Phosphorous and Nitrogen Load to Mitigate	Scenario 1		Scenario 2	
	TP (kgN/yr)	TN (kgP/yr)	TP (kgN/yr)	TN (kgP/yr)
Step 1: Nutrient Budget*	356.4	2534.4	346.9	1852.4
Step 2: Nutrient Budget* X 1.2	427.7	3041.2	416.3	2222.8
Stage 4 Final Nutrient Load	**427.7**	**3041.2**	**416.3**	**2222.8**

* Nutrient Budget = Final Stage 1 Output + (Final Stage 3 Output - Final Stage 2 Output)

Stage 4 - Calculated Outputs (Sensitivity Test - Land Use Nutrients Only)

Total Annual Phosphorous and Nitrogen Load to Mitigate	Scenario 1		Scenario 2	
	TP (kgN/yr)	TN (kgP/yr)	TP (kgN/yr)	TN (kgP/yr)
Step 1: Nutrient Budget*	235.90	-6141.43	235.90	-6141.43
Step 2: Nutrient Budget* X 1.2	283.08	-7369.72	283.08	-7369.72
Stage 4 Final Nutrient Load	**283.08**	**-7369.72**	**283.08**	**-7369.72**

* Nutrient Budget = Final Stage 1 Output + (Final Stage 3 Output - Final Stage 2 Output)

Stage 4 - Calculated Outputs (Sensitivity Test - WwTW Nutrients Only)

Total Annual Phosphorous and Nitrogen Load to Mitigate	Scenario 1		Scenario 2	
	TP (kgN/yr)	TN (kgP/yr)	TP (kgN/yr)	TN (kgP/yr)
Step 1: Nutrient Budget*	120.50	8675.79	111.02	7993.78
Step 2: Nutrient Budget* X 1.2	144.60	10410.95	133.22	9592.54
Stage 4 Final Nutrient Load	**144.60**	**10410.95**	**133.22**	**9592.54**

* Nutrient Budget = Final Stage 1 Output + (Final Stage 3 Output - Final Stage 2 Output)

Nutrient Mitigation Outputs and Sensitivity Tests

Nutrient Mitigation - Wetland Area Requirement Summary	Scenario 1		Scenario 2	
	TP Wetland Area (ha)	TN Wetland Area (ha)	TP Wetland Area (ha)	TN Wetland Area (ha)
Final nutrient load/ Assumed Wetland TP/TN removal rate	35.64	3.27	34.69	2.39
Assumed Wetland TN removal rate	93 g/m2/yr			
Assumed Wetland TP removal rate	1.2 g/m2/yr			

Nutrient Mitigation - Wetland Area Requirement Summary (Sensitivity Test - Land Use Nutrients Only)	Scenario 1		Scenario 2	
	TP Wetland Area (ha)	TN Wetland Area (ha)	TP Wetland Area (ha)	TN Wetland Area (ha)
Final nutrient load/ Assumed Wetland TP/TN removal rate	23.59	-7.92	23.59	-7.92
Assumed Wetland TN removal rate	93 g/m2/yr			
Assumed Wetland TP removal rate	1.2 g/m2/yr			

Nutrient Mitigation - Wetland Area Requirement Summary (Sensitivity Test - WwTW Nutrients Only)	Scenario 1		Scenario 2	
	TP Wetland Area (ha)	TN Wetland Area (ha)	TP Wetland Area (ha)	TN Wetland Area (ha)
Final nutrient load/ Assumed Wetland TP/TN removal rate	12.05	11.19	11.10	10.31
Assumed Wetland TN removal rate	93 g/m2/yr			
Assumed Wetland TP removal rate	1.2 g/m2/yr			