

Legend

OPA Boundary

- Framework Masterplan Boundary
- ••• Arable
- Greenspace
- Lowland
- Shrub
- Woodland

Urban

- Open Urban Land
- Commercial/Industrial

Soilscapes Drainage Type Boundary

- Freely Draining
- Impeded drainage
- Naturally Wet

Notes.

1. Existing land use in 37.4 ha of the total OPA site area will be unchanged, which includes Westenhanger Castle area and existing roads/ buildings/ water bodies/ riparian buffers etc. Therefore such areas are fully excluded in this figure and associated nutrient budget calculations.

2. This figure only shows existing land use for 44.29 ha within the FMP boundary outside the total OPA site boundary. The remaining area will be unchanged, or to be integrated in the form of the proposed strategic greenspace elements, which have the same nutrient export values.

Revision	Date	Status	Author	Checker	Approver
01	15/7/22	FINAL	SCM	EBP	RG

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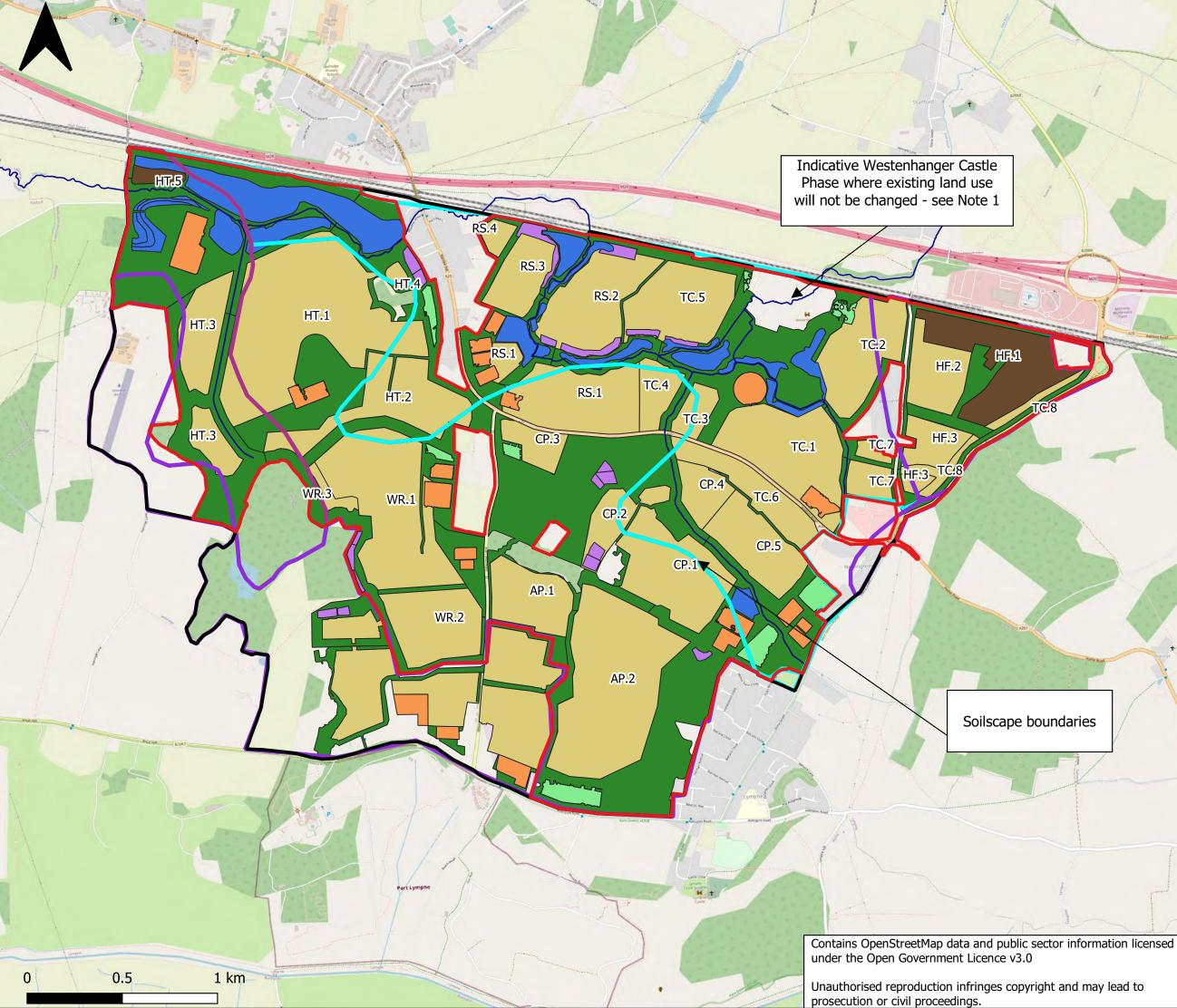
Arcadis 80 Fenchurch Street London EC3M 4BY



Otterpool Park Nutrient Mitigation

Appendix A Figure 2: Revised Existing Land Use Types

Scale	Original Size	Datum	Grid	
1:15,000	A3	mAOD	OSGB 27700	



Legend

OPA Boundary

Framework Masterplan Boundary

Residential urban land



Commercial/industrial urban land Commercial/industrial

Open urban land

Sport Pitches

Public Open Space Greenspace

Community food growing

Allotments & Community orchards

Water

Wetlands

Additional Stormwater Wetlands

Soilscapes Drainage Type Boundary

- Freely Draining
- Impeded drainage
- Naturally Wet

Notes.

1. Existing land use in 37.4 ha of the total OPA site area will be unchanged, which includes Westenhanger Castle area and existing roads/buildings/ water bodies/ riparian buffers etc. Therefore such areas are fully excluded in this figure and associated nutrient budget calculations.

2. This figure only shows proposed land use for 44.29 ha within the FMP boundary outside the total OPA site boundary. The remaining area will be unchanged, or to be integrated in the form of the proposed strategic greenspace elements, which have the same nutrient export values.

3. Residential parcels also include approximately 15% of additional greenspace areas (including SuDS), which are not shown in this figure.

Revision	Date	Status	Author	Checker	Approver
01	13/10/22	FINAL	EBP	ML	RG



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Appendix A Figure 3: Revised Proposed Land Use Types

Scale	Original Size	Datum	Grid
1:15,000	A3	mAOD	OSGB 27700

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ASW2

ASW3

ASW4

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ASW7

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W2

ASW6

ÁSW8

ASW9

Legend

OPA Boundary	
Framework Masterplan Boundary	
Modelled Watercourses	
Existing Ponds/ Lakes	
Stormwater Wetlands	
Wastewater Wetlands	
Proposed stormwater wetland outline	
Deep open water zone	
Open water zone	
Proposed wastewater wetland outline	
Deep open water zone	
Open water zone	
Proposed Swales/ SuDS flow	
Wetland Bunding/ sub divisions	
Proposed Wetland inflow/outflows	\rightarrow

Notes.

1. This figure shows the latest proposed wetland locations to meet the nutrient budget requirements outlined in the October (2022) Nutrient Budget Analysis Update Report AUK-XX-XX-RP-CW-0046-03.

Revision	Date	Status	Author	Checker	Approver		
03	13/10/22	FINAL	EBP	ML	RG		



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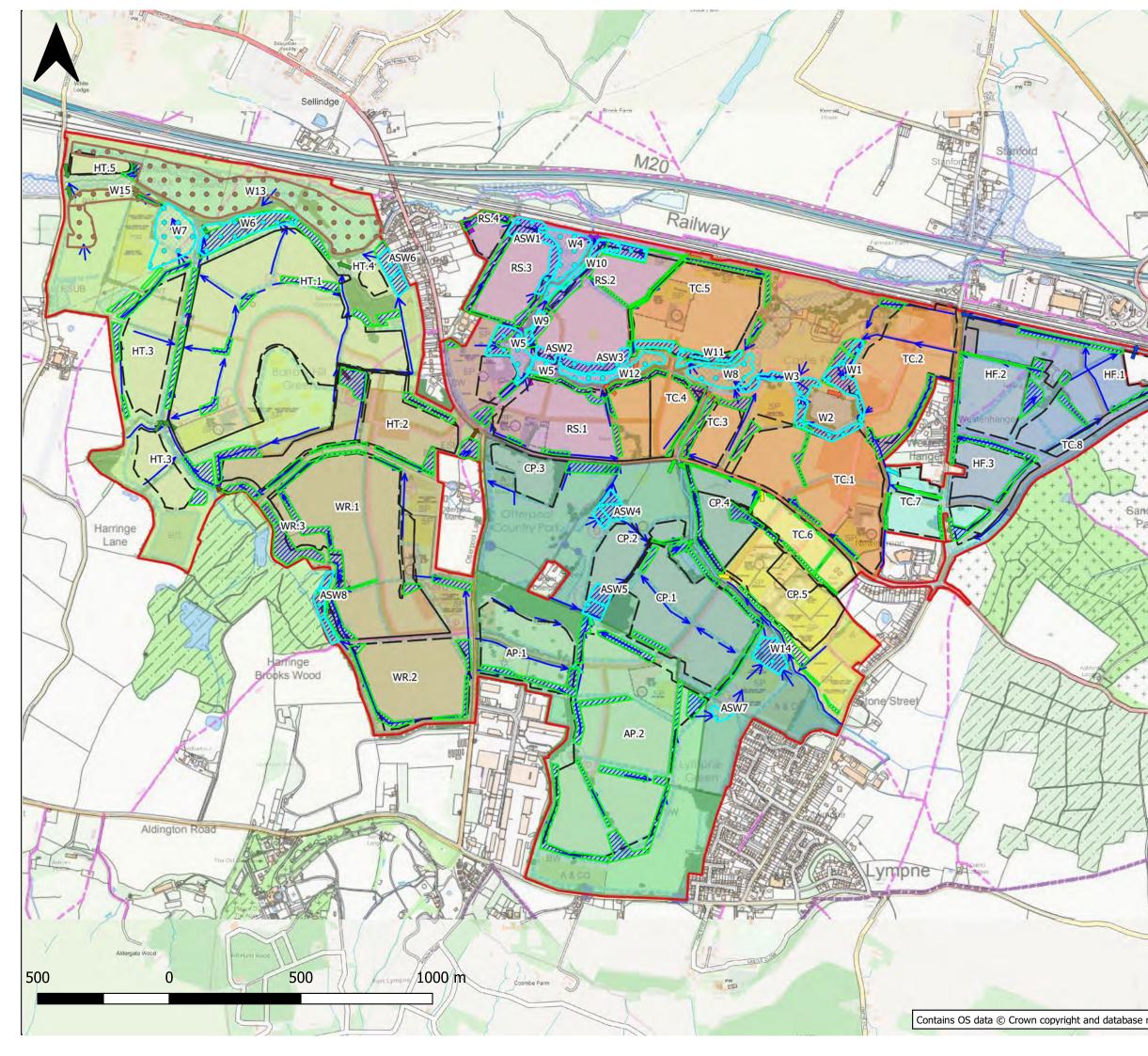


Otterpool Park Nutrient Mitigation

Appendix A Figure 4: Proposed Nutrient Management Strategy Updates

Scale Original Size		Datum	Grid	
1:15,000	A3	mAOD	OSGB 27700	

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44								
	Legen	d						
		OPA Site	Boundary					
		Propose	d_SuDS					
	\rightarrow	Propose	d Conveyance	Swales / SuDS	Flow Dir	rection		
115 1	Î	Indicativ	e Key Drainage	e Outfall Locati	ons			
1		Existing	Watercourses					
	<u> </u>	-	d Developmer	t Boundaries				
M	J		d Developmen					
MA		-	s Stormwater					
		Wetland	s Wastewater					
1111	Drainag	e Zones						
		Barrow	Hill					
		East Otterpool						
		East Tria	ngle					
VAT 6-		East Tria	ngle South					
		River Sto	our					
		South O	tterpool					
		West Ne	wingreen					
		West Ot	terpool					
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Appendix B

Nutrient Neutrality Assessment – For Onsite WwTW

Existing Land Us	Existing Land Use				
	Soilso	apes classification	n		
		Slowly permeable (Impeded Drainage)	Naturally Wet		
Otterpool OPA Land	, ,				
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		

Existing and Proposed Development Splits

	Proposed Land L	lse		
		Soilscapes cl	assification	
			Slowly	
			permeable	
			(Impeded	Naturally
		Freely draining	Drainage)	Wet
	Otterpool OPA Lan	d Use		
nt	Residential urban land	145.21	13.16	98.25
Development Parcels	Commercial/industrial urban land	14.50	1.50	
velopme Parcels	Greenspace	25.63	2.32	17.34
Pa	community food growing	0.00	0.00	0.22
ă				
	Open urban land	5.27	2.57	6.26
Open Ice	Greenspace	95.07	1	
O D ace	community food growing	2.69	0.00	4.07
Public Op Space	Water - stormwater wetlands	0.23	2.00	14.96
Pul	Water - wastewater wetlands	0.00	3.51	8.08
		288.60	53.04	209.97

Stage 1 Outputs

Scenario 1		
Stage 1 Results - Breakdown		
Total Annual Wastewater TP and TN Load		
	Scena	rio 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)

User Ing	outs	
Date of first occupancy:		0.0
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 Calcula	ited 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

Scenario 2		
Stage 1 Results - Breakdown		
Total Annual Wastewater TP and TN Load		
	Scena	rio 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)

User Ing	puts	
Date of first occupancy:	and the second se	1
Average occupancy rate:	2.40	
Water usage (litres/person/day):	120	1
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 Calcula	ited Loading	
Additional population	18852	people
Wastewater by development	2262240	litres/day
Annual wastewater TP load	74.37	kg TP/yr

Residential Class C2 (350 l/p/d)

User Ing	puts	
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:	0.0
Wastewater treatment works N permit (mg TN/litre):	Please enter value in cell to the right:	6.41

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

Residential Class C2 (263 l/p/d)

User In	puts	
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

Calculated Load age

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 (300 l/p/d)

User In	puts	
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:	0.0
Wastewater treatment works N permit (mg TN/litre):	Please enter value in cell to the right:	6.4

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

Residential Class C1 (225 l/p/d)

User In	puts	
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:	
Wastewater treatment works N permit (mg TN/litre):	Please enter value in cell to the right:	

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/y

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	t 196.0	10719.2

Stage 2 - Freely Draining

Stage 2 - Impeded Drainage

Stage 2 - Naturally Wet

	User	nputs			User	Inputs	
Catchment:		Upper Stour	*	Catchment:		Upper Stour	
Soil drainage type:		Freely draining		Soil drainage type:		Impeded drainage	
Annual average rainfall (mm)	:	700.1 - 750		Annual average rainfall (mm):		700.1 - 750	
Within Nitrate Vulnerable Zon	ne (NVZ):	Yes		Within Nitrate Vulnerable Zor	ne (NVZ):	Yes	
Existing land use type(s)	Area (ha)	Annual phosphorus nutrient export (kg TP)	Annual nitrogen nutrient export (kg TN)	Existing land use type(s)	Area (ha)	Annual phosphorus nutrient export (kg TP)	Annual nit nutrient e (kg TN)
Open urban land	7.62	5.93	60.69	Open urban land	0.00	0.00	0.00
Greenspace	61.10	1.22	183.30	Greenspace	0.80	0.02	2.40
Lowland	60.76	6.82	867.44	Lowland	17.64	11.99	166.91
Shrub	1.69	0.03	5.07	Shrub	0.00	0.00	0.00
Woodland	0.04	0.00	0.11	Woodland	0.00	0.00	0.00
Cereals	157.36	26.00	4906.60	Cereals	34.61	32.17	761.72

	User li	nputs	
Catchment:		Upper Stour	
Soil drainage type:		Naturally wet	
Annual average rainfall (mm):		700.1 - 750	
Within Nitrate Vulnerable Zone (I	NVZ):	Yes	
Existing land use type(s)	Area (ha)	Annual phosphorus nutrient export (kg TP)	Annual nitrogen nutrient export (kg TN)
Open urban land Greenspace Lowland Shrub Woodland Cereals	18.09 18.51 40.40 0.36 0.92 131.70	14.08 0.37 7.51 0.01 0.02 89.83	144.06 55.53 451.22 1.08 2.75 3110.33
Total:	209.99	111.82	3764.9

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

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

Stage 3 User In New land use type(s) Area (ha) 13.16 1.50 2.32 2.57 27.98 2.00 3.51 Residential urban land Commercial/industrial urban land Greenspace Open urban land Greenspace Water Water

Total:

Stage 3 - Impeded Drainage

User Inp	outs		
ea (ha)	Annual phosphorus nutrient export (kg TP)	Annual nitrogen nutrient export (kg TN)	New land use type(s)
3.16 50 32 57 7.98 00 51	19.09 1.59 0.05 2.00 0.56 0.00 0.00	177.77 10.81 6.96 20.44 83.94 0.00 0.00	Residential urban land Community food growing Greenspace Open urban land Greenspace Community food growing Water Water
53.032	2 23.28	299.92	

Stage 3

Stage 3 - Naturally Wet

User Ir	puts	
Area (ha)	Annual phosphorus nutrient export (kg TP)	Annual nitrogen nutrient export (kg TN)
98.25 0.22 17.34 6.26 60.79 4.07 14.96 8.08	142.51 0.10 0.35 4.87 1.22 1.80 0.00 0.00	1327.23 3.84 52.02 49.85 182.38 71.54 0.00 0.00
area	se enter in ares.	

Stage 4 Outputs and Sensitivity Tests

	Scenario 1		Scenario 2	
Total Annual Phosphorous and Nitrogen Load to				TN
Mitigate	TP (kgN/yr)	TN (kgP/yr)	TP (kgN/yr)	(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)				

Nutrients Only)	Scena	rio 1	Scena	ario 2
Total Annual Phosphorous and Nitrogen Load to Mitigate	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 Outp Final Stage 2 Output) Stage 4 - Calculated Outputs (Sensitivity Test - WwTW 				
Final Stage 2 Output)	Scena	rio 1	Scena	ario 2
Final Stage 2 Output) Stage 4 - Calculated Outputs (Sensitivity Test - WwTW				
Final Stage 2 Output) Stage 4 - Calculated Outputs (Sensitivity Test - WwTW Nutrients Only)	Scena	TN (kgP/yr)	TP (kgN/yr)	TN (kgP/yr)
Final Stage 2 Output) Stage 4 - Calculated Outputs (Sensitivity Test - WwTW Nutrients Only) Total Annual Phosphorous and Nitrogen Load to Mitigate	Scena TP (kgN/yr)	TN (kgP/yr) 6802.80	TP (kgN/yr) 89.48	TN (kgP/yr) 6442.51

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 Assumed Wetland TP removal rate		g/m2/yr 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 Assumed Wetland TP removal rate		g/m2/yr 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 Assumed Wetland TP removal rate		g/m2/yr g/m2/yr		