Cambridge Waste Water Treatment Plant Relocation Project
Anglian Water Services Limited

Appendix 20.11: Milton Water Recycling Centre Discharge Consent: Water Quality and Ecological Assessment - Appendices

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APPENDICES

Appendix A: Water Body Screening Assessment

Water body Name	Water body ID	A/ HMWB Designation	Current WFD status (Cycle 2 2016)	Interim Permit Screened IN or OUT for further WFD Assessment	New Works Permit Screened IN or OUT for further WFD Assessment	Initial screening and reasoning	CDE Link
Cam	GB105033042750	HMWB	Moderate	**IN**	**IN**	The outfall for the existing Cambridge WRC and the proposed outfall for the new Cambridge WRC both lie within this water body. The variations in discharge proposed under an interim permit and new works permit have potential to impact upon the ecological and chemical status of this downstream water body. This water body has therefore been screened in for further assessment.	Cam
Ely Ouse (South Level)	GB205033000070	Artificial	Moderate	**IN**	**IN**	This water body is located approximately 15km directly downstream of the existing outfall for Cambridge WRC. The variations in discharge proposed under an interim permit and new works permit have potential to impact upon the ecological and chemical status of this downstream water body. This water body has therefore been screened in for further assessment.	Ely Ouse (South Level)
Cherry Hinton Brook	GB105033042670	HMWB	Moderate	**OUT**	**OUT**	This water body is located more than 2km upstream of the existing Cambridge WRC outfall and the new Cambridge WRC proposed outfall. Proposals to increase discharge directly into the Cam water body from the existing Water Recycling Centre at Milton as part of the interim permit and new works permit, are not anticipated to impact upon this water body due to distance upstream of the discharge location.	Cherry Hinton
Bottisham Lode – Quy Water	GB105033042700	HMWB	Moderate	**OUT**	**OUT**	This water body is a tributary of the Cam water body. Due to the direction of flow, there is no potential for adverse impact upon the status of this water body under the conditions of the interim permit and new works permit. This water body has therefore been screened out of any further assessment.	Bottisham Lode - Quy Water
Swaffham - Bulbeck Lode	GB105033042710	HMWB	Moderate	**OUT**	**OUT**	This water body is a tributary of the Cam water body. Due to the direction of flow, there is no potential for adverse impact upon the status of this water body under the conditions of the interim permit and new works permit. This water body has therefore been screened out of any further assessment.	Swaffham – Bulbeck Lode
Burwell Lode	GB105033042720	HMWB	Moderate	**OUT**	**OUT**	This water body is a tributary of the Cam water body. Due to the direction of flow, there is no potential for adverse impact upon the status of this water body under the conditions of the interim permit and new works permit. This water body has therefore been screened out of any further assessment.	Burwell Lode
Old West River	GB205033043375	HMWB	Moderate	**OUT**	**OUT**	This water body lies upstream of the Ely Ouse water body. Due to the direction of flow, there is no potential for adverse impact upon the status of this water body under the conditions of the interim permit and new works permit. This water body has therefore been screened out of any further assessment.	Old West River
Great Ouse	GB530503300300	HMWB	Poor	**OUT**	**OUT**	This transitional water body lies more than 45km downstream of the existing Cambridge WRC outfall and the new Cambridge WRC proposed outfall. Therefore, variations in discharge proposed under an interim permit and new works permit are not anticipated to impact upon this water body due to distance downstream of the discharge location. SIMCAT modelling undertaken has also indicated that at this point downstream, impacts from both permits would be negligible and likely to be diffuse in nature.	Great Ouse
Relief Channel	GB205033047665	Artificial	Poor	**OUT**	**OUT**	This water body lies more than 45km downstream of the existing Cambridge WRC outfall and the new Cambridge WRC proposed outfall. Therefore, variations in discharge proposed under an interim permit and new works permit are not anticipated to impact upon this water body due to distance downstream of the discharge location. SIMCAT modelling undertaken has also indicated that at this point downstream, impacts from both permits would be negligible and likely to be diffuse in nature.	Relief Channel
Polver Drain	GB105033047662	HMWB	Moderate	**OUT**	**OUT**	The proposals to increase discharge under the proposed interim and new works permit, are not anticipated to impact upon this water body due to distance downstream of the discharge location.	Polver Drain

Country Drain	GB105033047770	N/A	Poor	**OUT**	**OUT**	The proposals to increase discharge under the proposed interim and new works permit, are not anticipated to impact upon this water body due to distance downstream of the discharge location.	Country Drain
Nar downstream of Abbey Farm	GB105033047792	HMWB	Moderate	**OUT**	**OUT**	The proposals to increase discharge under the proposed interim and new works permit, are not anticipated to impact upon this water body due to distance downstream of the discharge location.	Nar downstream of Abbey Farm
Middleton Stop Drain	GB105033047670	HMWB	Moderate	**OUT**	**OUT**	The proposals to increase discharge under the proposed interim and new works permit, are not anticipated to impact upon this water body due to distance downstream of the discharge location.	Middleton Stop Drain
Gaywood River	GB105033047680	N/A	Good	**OUT**	**OUT**	The proposals to increase discharge under the proposed interim and new works permit, are not anticipated to impact upon this water body due to distance downstream of the discharge location.	Gaywood River
Babingley River	GB105033047620	HMWB	Moderate	**OUT**	**OUT**	The proposals to increase discharge under the proposed interim and new works permit, are not anticipated to impact upon this water body due to distance downstream of the discharge location.	Babingley River
Great Ouse	GB530503300300	HMWB	Poor	**OUT**	**OUT**	The proposals to increase discharge under the proposed interim and new works permit, are not anticipated to impact upon this water body due to distance downstream of the discharge location.	GREAT OUSE
Wash Inner	GB530503311300	N/A	Moderate	**OUT**	**OUT**	The proposals to increase discharge under the proposed interim and new works permit, are not anticipated to impact upon this water body due to distance downstream of the discharge location.	WASH INNER
Cam and Ely Ouse Woburn Sands	GB40501G445700	N/A	Good	**IN**	**IN**	The proposals to increase discharge under the proposed interim and new works permit, have potential to impact upon this groundwater water body due to proximity downstream from the discharge location.	Cam and Ely Ouse Woburn Sands
North west Norfolk Sandringham Sands	GB40501G400400	N/A	Good	**OUT**	**OUT**	The proposals to increase discharge under an interim and new works permit are not anticipated to impact on this groundwater body. Due to the distance from the source of discharge, this groundwater body has been screened out.	North west Norfolk Sandringham Sands
Ely Ouse and Cut-off Channel NVZ	S390	N/A	N/A	**IN**	**IN**	The proposals to increase discharge directly into the Cam water body under the proposed interim and new works permit, have potential to impact upon this Nitrate Vulnerable Zone (NVZ) due to proximity downstream from the discharge location.	N/A
Anglian Chalk NVZ	71	N/A	N/A	**IN**	**IN**	The proposals to increase discharge directly into the Cam water body under the proposed interim and new works permit, have potential to impact upon this NVZ due to proximity downstream from the discharge location.	N/A
Sandringham Sands South	150	N/A	N/A	**OUT**	**OUT**	The proposals to increase discharge under an interim and new works permit are not anticipated to impact on this NVZ. Due to the distance from the source of discharge, this groundwater body has been screened out.	N/A
River Cam	UKENRI91	N/A	N/A	**IN**	**IN**	This Eutrophic Sensitive Area overlaps with the WFD water body in which the permit variations are proposed and will therefore be screened in for further assessment for both the interim and new works permit.	N/A
Old West & Ely Ouse	UKENRI90	N/A	N/A	**IN**	**IN**	This Eutrophic Sensitive Area is directly downstream from the WFD water body in which the permit variations are proposed and will therefore be screened in for further assessment for both the interim and new works permit.	N/A

Cut Off and Relief Channel	UKENRI25	N/A	N/A	**OUT**	**OUT**	The proposed interim and new works permit are not anticipated to impact on this Eutrophic Sensitive Area. Due to the distance from the source of discharge, this protected area has been screened out.	N/A
Cut-off Channel	GB205033000040	N/A	N/A	**OUT**	**OUT**	The proposed interim and new works permit are not anticipated to impact on this Drinking Water Protected Area. Due to the distance from the source of discharge, this protected area has been screened out.	
Fenland Special Area of Conservation	UK0014782	N/A	N/A	**IN**	**IN**	This SAC has been screened into the WFD Compliance Assessment as the site lies 8.9km from the existing and proposed Cambridge WRC outfall and within 2km of the screened in Cam water body. The proposed interim and new works permit, therefore, have potential to impact upon this SAC. Initial assessment of the potential impacts on this site has also been undertaken in the HRA.	N/A
Ouse Washes Special Protection Area	UK9008041	N/A	N/A	**OUT**	**OUT**	This SPA has been screened out of the WFD Compliance assessment as it does not lie within the screened in Cam or Ely Ouse surface water bodies. Initial assessment of the potential impacts on this site has been undertaken in the HRA.	N/A
Ouse Washes Special Area of Conservation	UK0013011	N/A	N/A	**OUT**	**OUT**	This SAC has been screened out of the WFD Compliance assessment as it does not lie within the screened in Cam or Ely Ouse surface water bodies. Initial assessment of the potential impacts on this site has been undertaken in the HRA.	N/A
The Wash Special Protection Area	UK9008021	N/A	N/A	**OUT**	**OUT**	This SPA has been screened out of the WFD Compliance assessment as it does not lie within the screened in Cam or Ely Ouse surface water bodies. Initial assessment of the potential impacts on this site has been undertaken in the HRA.	N/A
The Wash and North Norfolk Coast Special Area of Conservation	UK0017075	N/A	N/A	**OUT**	**OUT**	This SAC has been screened out of the WFD Compliance assessment as it does not lie within the screened in Cam or Ely Ouse surface water bodies. Initial assessment of the potential impacts on this site has been undertaken in the HRA.	N/A

Appendix B: Baseline Data for Screened In Water Bodies

River Cam GB105033042750 28.617 km length, 36.815 km² catchment area | Heavily modified water body Moderate Ecological Potential (Draft Cycle 3 2019) | Good Chemical Status (Draft Cycle 3 2019) | Objective – Moderate by 2015 Protected Areas: Nitrates Directive, Urban Waste Water Treatment Directive				
WFD Quality Elements	**RMBP Cycle 2 (2016) Classification**	**Objectives**	**Additional baseline information**	**Source for baseline and evidence for assessment of potential effects**
Hydromorphological Supporting Elements	**Supports Good**	**Supports Good by 2015**		
Hydrological Regime	Supports Good	Supports Good by 2015	Supports good status maintained between 2013 and 2019.	Catchment Data Explorer (Environment Agency)
Supporting elements (surface water)	**Moderate**	**Good by 2027**		
Mitigation Measures Assessment	Moderate or less	Good by 2027	At moderate or less status. Disproportionately expensive to achieve Good status objective by 2027. The following heavily modified mitigation measures are listed as not in place: 40. Maintenance – prevent sediment transfer 6. In-channel morph diversity 16. Fish passes 36. Invasive species techniques 54. Educate landowners 39. Maintenance – minimise habitat impact 4. Remove or soften hard bank 38 Sediment management strategy 47.Align and attenuate flow 12. Floodplain connectivity	Catchment Data Explorer (Environment Agency)
Physico-chemical Quality Elements	**Moderate**	**Moderate by 2015**		
Acid Neutralising Capacity	High	Good by 2015	Currently at High status for 2019.	Catchment Data Explorer (Environment Agency)
Ammonia (Phys-chem)	High	Good by 2015	High status maintained between 2016 and 2019. Previously at Good status 2014-2015.	Catchment Data Explorer (Environment Agency)
Biochemical oxygen demand (BOD)	High	Good by 2015	High status maintained between 2013 and 2016.	Catchment Data Explorer (Environment Agency)
Temperature	High	Good by 2015	High status maintained between 2013 and 2019.	Catchment Data Explorer (Environment Agency)
Dissolved Oxygen (DO)	High	Good by 2015	High status maintained between 2013 and 2019.	Catchment Data Explorer (Environment Agency)
pH	High	Good by 2015	High status maintained between 2013 and 2019.	Catchment Data Explorer (Environment Agency)
Phosphate	Poor	Moderate by 2027	Poor status maintained between 2013 and 2019. RNAG - Issues related to point source pollution (continuous) from the water industry.	Catchment Data Explorer (Environment Agency)

River Cam GB105033042750 28.617 km length, 36.815 km² catchment area | Heavily modified water body Moderate Ecological Potential (Draft Cycle 3 2019) | Good Chemical Status (Draft Cycle 3 2019) | Objective – Moderate by 2015 Protected Areas: Nitrates Directive, Urban Waste Water Treatment Directive				
Specific Pollutants (Copper, Dimethoate, Linuron, Triclosan, Zinc)	High	High by 2015	This element is classified at High status which has been maintained since 2015. It was previously at Moderate status in 2014 due to a deterioration in Copper status from High to Moderate. The current High classification is due to High status for Dimethoate and Linuron. Triclosan and Zinc were not assessed in 2019.	Catchment Data Explorer (Environment Agency)
Chemical	**Fail**	**Good by 2063**		
Priority Substances (Cypermethrin, Fluroanthene, Lead and Its Compounds, Nickel and its Compounds)	Good	Good by 2015	This element was classified as Good in 2013, 2014 and 2019. Cypermethrin and Fluoranthene were classed as Good in 2019. It did not require assessment in 2015 and 2016. This water body was not assessed for Lead and its compounds and Nickel and its compounds in years 2015 to 2019.	Catchment Data Explorer (Environment Agency)
Other Pollutants	Does not require assessment	Does not require assessment		Catchment Data Explorer (Environment Agency)
Priority Hazardous Substances	**Fail**	Good by 2063	This element was classified as Good in 2013 and 2014, however, it has since deteriorated to Fail status in 2019 (following no assessment in 2015 and 2016). Perfluorooctane sulphonate (PFOS) and Polybrominated diphenyl ethers (PBDE) were the priority hazardous substances that are leading to the 'Fail' status.	Catchment Data Explorer (Environment Agency)
Biological Quality Elements		**Good by 2027**		
Fish	Not assessed			

River Cam GB105033042750 28.617 km length, 36.815 km² catchment area | Heavily modified water body Moderate Ecological Potential (Draft Cycle 3 2019) | Good Chemical Status (Draft Cycle 3 2019) | Objective – Moderate by 2015 Protected Areas: Nitrates Directive, Urban Waste Water Treatment Directive				
Invertebrates	Good	Good by 2015	Moderate status was achieved for this element in years 2013, 2015 and 2016. Good status was achieved in 2014. RNAG are related to phosphate (likely point source pollution related to wastewater treatment) and diffuse source organic pollution likely related to agriculture and rural land management. Macroinvertebrate surveys undertaken in 2018 by the Environment Agency. To summarise, the site had a BMWP score of 88 (Excellent) and an BMWP ASPT score of 4.91 (Fair). The biological quality of this water body can therefore be described as 'Good'. Dominant macroinvertebrates taxa recorded included *Aselllus* and *Chironomidae.* The following macroinvertebrates recorded to family level are listed below: - Caddis fly (*Limnephilidae, Polycentropodidae, Molannidae, Leptoceridae, Psychomyidae*); - Mayfly (*Caenidae, Baetidae, Ephemeridae*); - Freshwater snail (*Acroluxidae, Planorbidae, Lymnaeidae, Physidae, Valvatidae, Viviparidae, Bithyniidae*); - Water louse (*Asselidae*); - Damselfy (*Calopterygidae, Coenagrionidae*); - Chironomids (*Chironomidae*); - Amphipod shrimp (*Crangonyctidae*); - Freshwater leech (*Glossiphoniidae*); - Water bug (*Naucoridae*); - Freshwater clam (*Sphaeriidae*); - New Zealand mud snail (*Tateidae*); and, - Water boatman *(Corixidae)*	Catchment Data Explorer (Environment Agency)
Macrophytes and Phytobenthos (combined)	Not assessed		This biological quality element is not assessed for this water body, however the following macrophytes were recorded in April 2018. Floating pennywort (*Hydrocotyle ranunculoides*); and, Simplestem bur-reed (*Sparganium erectum*).	

Ely Ouse (South Level) GB205033000070 87.671 km length, 466.238 km² catchment area | Artificial water body Moderate Ecological Potential (Cycle 2) | Good Chemical Status (Cycle 2) | Objective – Moderate by 2015 Protected Areas: Nitrates Directive, Urban Waste Water Treatment Directive				
WFD Quality Elements	**RMBP Cycle 2 (2016) Classification**	**Objectives**	**Additional baseline information**	**Source for baseline and evidence for assessment of potential effects**
Hydromorphological Supporting Elements	**Supports Good**	**Supports Good by 2015**		
Hydrological Regime	Does Not Support Good	Supports Good by 2015	Does not support good status. RNAG due to flow being below the EFI. However, it is not causing an ecological failure.	Catchment Data Explorer (Environment Agency)
Physico-chemical Quality Elements	**Moderate**	**Moderate by 2015**		
Acid Neutralising Capacity	High	Good by 2015	Currently at High status for 2019.	Catchment Data Explorer (Environment Agency)
Ammonia (Phys-chem)	High	Good by 2015	Currently at High status. Previously at Good status 2013-2016.	Catchment Data Explorer (Environment Agency)
Biochemical oxygen demand (BOD)	High	Good by 2015	High status maintained between 2013 and 2016. The element was not assessed in 2019.	Catchment Data Explorer (Environment Agency)
Temperature	Good	Good by 2015	High status maintained between 2013 and 2016.	Catchment Data Explorer (Environment Agency)
Dissolved Oxygen (DO)	Good	Good by 2015	Good status maintained between 2013 and 2019.	Catchment Data Explorer (Environment Agency)
pH	High	Good by 2015	High status maintained between 2013 and 2019.	Catchment Data Explorer (Environment Agency)
Phosphate	Moderate	Moderate by 2015	Moderate status maintained between 2013 and 2019. RNAGs – Issues related to diffuse source from agriculture and rural land management. Point source issues related to the water industry.	Catchment Data Explorer (Environment Agency)
Specific Pollutants	High	High by 2015	This element is classified at High status between 2013 and 2019. Triclosan was not assessed in 2019.	Catchment Data Explorer (Environment Agency)
Chemical	**Fail**	**Good by 2063**		
Priority Substances	Good	Good by 2015	Good status in 2013 and maintained between 2016 and 2019. Previously failing in 2014 due to Nickel and its compounds.	Catchment Data Explorer (Environment Agency)
Other Pollutants	Good	Good by 2015	Good status maintained between 2013 and 2019. Tetrachloroethylene not assessed between 2016 and 2019.	Catchment Data Explorer (Environment Agency)
Priority Hazardous Substances	**Fail**	Good by 2063	This element failed in 2013 and 2014 due to Tributyltin compounds. Priority hazardous substances achieved Good status between 2015 and 2016. The element is currently failing due to Perfluorooctane sulphonate (PFOS) and Polybrominated diphenyl ethers (PBDE) were the priority hazardous substances that are leading to the 'Fail' status.	Catchment Data Explorer (Environment Agency)
Biological Quality Elements		**Good by 2027**		

Ely Ouse (South Level) GB205033000070 87.671 km length, 466.238 km² catchment area | Artificial water body Moderate Ecological Potential (Cycle 2) | Good Chemical Status (Cycle 2) | Objective – Moderate by 2015 Protected Areas: Nitrates Directive, Urban Waste Water Treatment Directive				
Fish	High	Good by 2015	High status maintained between 2013 and 2019. The fish have been monitored within this water body at three sampling locations (Little Thetford, Sandhills Bridge and Ten Mile Bank). A range of species were identified during the surveys, including: - Roach x common bream hybrid (*Rutilus rutilus x Abramis brama*) at two sampling locations (Little Thetford and Sandhills Bridge); - Roach (*Rutilus rutilus*) at all three sampling locations; - Common bream (*Abramis brama*) at two sampling locations (Little Thetford and Sandhills Bridge); - Perch (*Perca fluviatilis*), at all three sampling locations; - Rudd (*Scardinius erythrophthalmus*), at two sampling locations (Little Thetford and Ten Mile Bank); - Silver bream (*Abramis bjoerkna*) at two locations (Little Thetford and Sandhills Bridge); - Spined loach (*Cobitis taenia*)**, at two sampling locations (Little Thetford and Sandhills Bridge) - Tench (*Tinca tinca*), at two sampling locations (Little Thetford and Sandhills Bridge); - Ruffe (*Gymnocephalus cernuus*), at all three sampling locations; - Bitterling (*Rhodeus sericeus*), at one sampling location (Little Thetford); - Zander (*Sander lucioperca*), at two sampling locations (Little Thetford and Sandhills Bridge); - 10-spined stickleback (*Pungitius pungitius*), at two sampling locations (Little Thetford and Sandhills Bridge); - Pike (*Esox Lucius*), at all three sampling locations; - Gudgeon (*Gobio gobio*), at one sampling location (Sandhills Bridge). - Bullhead (*Cottus gobio*)**, at two sampling locations (Sandhills Bridge and Ten Mile Bank). The data shows that the fish community in this water body is dominated by generalist species. Protected species are noted with an asterisk (**).	Catchment Data Explorer (Environment Agency) Ecology and Fish Data Explorer (Environment Agency)
Invertebrates	High	Good by 2015	High status maintained between 2013 and 2019. Macroinvertebrate surveys undertaken in April 2018 by the Environment Agency. To summarise, the site had a BMWP score of 122 (Excellent) and an BMWP ASPT score of 4.69 (Fair). The biological quality of this water body can therefore be described as 'Good'. The following macroinvertebrates recorded to family level are listed below: - Caddis fly (*Limnephilidae, Leptociradae*); - Mayfly (*Caenidae, Baetidae* - Damselfy (*Calopterygidae, Coenagrionidae* - Non-biting midge (*Chironomidae,* - Freshwater limpet (*Acroloxidae*); - Freshwater clam (*Sphaeriidae*); - Freshwater snail (*Valvatidae, Viviparidae, Lymnaeidae, Planorbidae, Bithyniidae, Planorbidae*); - Riffle beetle (*Elmidae*); - Water louse (*Asselidae*); - Amphipod shrimp (*Crangonyctidae*); - Zebra mussel (*Dreissenidae*); - Dagger fly (*Empididae*); - Common leech (*Erpobdellidae*); - Water skater (*Gerridae*); - Demon shrimp (*Gammaridae*); - Caspian mud shrimp (*Corophiidae*); and, - Oligochaetea;	Catchment Data Explorer (Environment Agency) Ecology and Fish Data Explorer (Environment Agency)

Ely Ouse (South Level) GB205033000070 87.671 km length, 466.238 km² catchment area | Artificial water body Moderate Ecological Potential (Cycle 2) | Good Chemical Status (Cycle 2) | Objective – Moderate by 2015 Protected Areas: Nitrates Directive, Urban Waste Water Treatment Directive				
Macrophytes and Phytobenthos (combined)	Not assessed	Not assessed	This biological quality element is not assessed for this water body; however the following species were recorded in April 2018. - Greater pond sedge (*Carex riparia*); - Reed sweet-grass (*Glyceria maxima);* - Yellow water-lily (*Nuphar lutea*); - Common reed-bed (*Phragmites australis*);	N/A

Cam and Ely Ouse Woburn Sands GB40501G445700 95.276 km length, 9527.594 ha catchment area Moderate Ecological Potential (Draft Cycle 3 2019) | Good Chemical Status (Draft Cycle 3 2019) | Poor by 2015 Protected Areas: Nitrates Directive, Drinking Water Protected Area				
WFD Quality Elements	**RMBP Cycle 2 (2016) Classification**	**Objectives**	**Additional baseline information**	**Source for baseline and evidence for assessment of potential effects**
Quantitative Status Elements				
Quantitative Saline Intrusion	Good	Good by 2027	Good status has been maintained for this element between 2013 and 2019.	Catchment Data Explorer (Environment Agency)
Quantitative Water Balance	Good	Good by 2027	Good status has been maintained for this element between 2013 and 2019.	Catchment Data Explorer (Environment Agency)
Quantitative GWDTEs test	Good	Good by 2027	Good status has been maintained for this element between 2013 and 2019.	Catchment Data Explorer (Environment Agency)
Quantitative Dependent Surface Water Body Status	Good	Good by 2027	Good status has been maintained for this element between 2013 and 2019.	Catchment Data Explorer (Environment Agency)
Chemical				
Chemical Drinking Water Protected Area	Good	Poor by 2027	This element is at Good status. It was previously at Poor status between 2013 and 2016.	Catchment Data Explorer (Environment Agency)
General Chemical Test	Good	Good by 2027	Good status has been maintained for this element between 2013 and 2019.	Catchment Data Explorer (Environment Agency)
Chemical GWDTEs test	Good	Good by 2027	Good status has been maintained for this element between 2013 and 2019.	Catchment Data Explorer (Environment Agency)
Chemical Dependent Surface Water Body Status	Good	Good by 2027	Good status has been maintained for this element between 2013 and 2019.	Catchment Data Explorer (Environment Agency)
Chemical Saline Intrusion	Good	Good by 2027	Good status has been maintained for this element between 2013 and 2019.	Catchment Data Explorer (Environment Agency)

Appendix C: SIMCAT Model Results

C.1 Total phosphorus

Table 14 shows the SIMCAT model concentrations for total phosphorus (TP) at the key points identified in the SIMCAT model.

Table 14 SIMCAT model concentrations for Total Phosphorus (TP) at key locations identified in the SIMCAT model

WFD Waterbody	SIMCAT Model Points	Mean future baseline concentration: TP (0.817mg/l)	Mean interim concentration: TP (1mg/l)	Mean proposed new works concentration: TP (0.5 mg/l)	Interim permit deterioration (mg/l)	Interim permit new works % deterioration	New works permit deterioration (mg/l)	New works permit % deterioration
Cam	End of Reach 333	0.26	0.26	0.255	0	0.00%	0.005	-1.92%
	u/s of Cambridge WRC	0.252	0.252	0.246	0	0.00%	0.006	-2.38%
	d/s of Cambridge WRC	0.37	0.407	0.312	-0.037	10.00%	0.058	-15.68%
	End of Reach 334	0.347	0.382	0.294	-0.035	10.09%	0.053	-15.27%
	u/s of Waterbeach WRC	0.347	0.381	N/A	-0.034	9.80%	0.347	-100.00%
	d/s of Waterbeach WRC	0.364	0.397	N/A	-0.033	9.07%	0.364	-100.00%
	End of Reach 335	0.357	0.39	0.291	-0.033	9.24%	0.066	-18.49%
	End of Reach 336 (u/s of Cam Washes)	0.329	0.359	0.269	-0.03	9.12%	0.06	-18.24%

WFD Waterbody	SIMCAT Model Points	Mean future baseline concentration: TP (0.817mg/l)	Mean interim concentration: TP (1mg/l)	Mean proposed new works concentration: TP (0.5 mg/l)	Interim permit deterioration (mg/l)	Interim permit new works % deterioration	New works permit deterioration (mg/l)	New works permit % deterioration
	End of Reach 337	0.246	0.267	0.205	-0.021	8.54%	0.041	-16.67%
Ely Ouse (South Level)	End of Reach 338 (d/s of Cam Washes)	0.226	0.243	0.193	-0.017	7.52%	0.033	-14.60%
	End of Reach 339	0.239	0.253	0.211	-0.014	5.86%	0.028	-11.72%
	End of Reach 358	0.209	0.219	0.191	-0.01	4.78%	0.018	-8.61%
	End of Reach 359	0.187	0.194	0.174	-0.007	3.74%	0.013	-6.95%
	End of Reach 360	0.175	0.181	0.163	-0.006	3.43%	0.012	-6.86%
	End of Reach 361	0.174	0.18	0.163	-0.006	3.45%	0.011	-6.32%
Great Ouse	End of Reach 368	0.15	0.153	0.146	-0.003	2.00%	0.004	-2.67%
	End of Reach 398	0.149	0.151	0.145	-0.002	1.34%	0.004	-2.68%
	End of Reach 406	0.147	0.149	0.142	-0.002	1.36%	0.005	-3.40%
Relief Channel	End of Reach 417	0.208	0.208	0.208	0	0.00%	0	0.00%
	End of Reach 418	0.171	0.171	0.171	0	0.00%	0	0.00%
Great Ouse	End of Reach 419	0.148	0.15	0.144	-0.002	1.35%	0.004	-2.70%

WFD Waterbody	SIMCAT Model Points	Mean future baseline concentration: TP (0.817mg/l)	Mean interim concentration: TP (1mg/l)	Mean proposed new works concentration: TP (0.5 mg/l)	Interim permit deterioration (mg/l)	Interim permit new works % deterioration	New works permit deterioration (mg/l)	New works permit % deterioration
	End of Reach 423	0.148	0.15	0.144	-0.002	1.35%	0.004	-2.70%
	End of Reach 430	0.147	0.149	0.143	-0.002	1.36%	0.004	-2.72%

C.2 Orthophosphate

As shown in Table 16 is the SIMCAT model concentrations for orthophosphate (Ortho-P) at the key points identified. WFD standards for comparison are shown in Table 15.

Table 15 WFD Orthophosphate standards (River Type 7) for the Cam and Ely Ouse (South Level) water bodies

WFD Waterbody	WFD 'High' Status	WFD 'Good' Status	WFD 'Moderate' Status	WFD 'Poor' Status
Cam	0.055	0.098	0.2275	1.1235
Ely Ouse -South Levels	0.055	0.098	0.228	1.124

Table 16 SIMCAT model concentrations for orthophosphate (90th percentile) in mg/L

WFD Waterbody	SIMCAT Model Points	Future Baseline Estimated ortho-P	Proposed Interim Permit (1mg/l) Estimated ortho-P	Proposed New Works Permit (0.5mg/l) Estimated ortho-P	Interim deterioration	% Interim deterioration	New works deterioration mg/l	% New works permit deterioration
Cam	End of Reach 333	0.164	0.164	0.164	0.000	0.00%	0.000	0.00%
	u/s of Cambridge WRC	0.158	0.158	0.158	0.000	0.00%	0.000	0.00%
	d/s of Cambridge WRC	0.258	0.288	0.215	0.026	-11.38%	-0.043	16.80%
	End of Reach 334	0.242	0.270	0.203	0.025	-11.27%	-0.039	16.18%
	u/s of Waterbeach WRC	0.242	0.269	-	0.024	-10.98%	-0.242	-

WFD Waterbody	SIMCAT Model Points	Future Baseline Estimated ortho-P	Proposed Interim Permit (1mg/l) Estimated ortho-P	Proposed New Works Permit (0.5mg/l) Estimated ortho-P	Interim deterioration	% Interim deterioration	New works deterioration mg/l	% New works permit deterioration
	d/s of Waterbeach WRC	0.253	0.280	-	0.023	-10.50%	-0.253	-
	End of Reach 335	0.249	0.274	0.201	0.000	10.11%	-0.048	-19.38%
	End of Reach 336	0.230	0.253	0.187	0.000	10.37%	-0.043	-18.60%
	End of Reach 337	0.173	0.190	0.144	0.029	10.12%	-0.029	-17.00%
Ely Ouse (South Levels)	End of Reach 338	0.159	0.173	0.135	0.027	8.81%	-0.024	-14.98%
	End of Reach 339	0.168	0.179	0.148	0.027	6.67%	-0.020	-12.08%
	End of Reach 358	0.147	0.155	0.134	0.027	5.24%	-0.013	-9.05%
	End of Reach 359	0.132	0.137	0.122	0.025	4.26%	-0.010	-7.45%
	End of Reach 360	0.123	0.127	0.114	0.024	4.00%	-0.008	-6.86%
	End of Reach 361	0.123	0.127	0.114	0.018	4.00%	-0.008	-6.86%
Great Ouse	End of Reach 368	0.106	0.108	0.102	0.014	1.99%	-0.004	-3.31%
	End of Reach 398	0.104	0.106	0.102	0.011	2.01%	-0.003	-2.68%
	End of Reach 406	0.103	0.105	0.100	0.008	2.04%	-0.003	-2.72%

WFD Waterbody	SIMCAT Model Points	Future Baseline Estimated ortho-P	Proposed Interim Permit (1mg/l) Estimated ortho-P	Proposed New Works Permit (0.5mg/l) Estimated ortho-P	Interim deterioration	% Interim deterioration	New works deterioration mg/l	% New works permit deterioration
Relief Channel	End of Reach 417	0.146	0.146	0.146	0.006	0.00%	0.000	0.00%
	End of Reach 418	0.120	0.120	0.120	0.005	0.00%	0.000	-0.00%
Great Ouse	End of Reach 419	0.104	0.106	0.102	0.005	1.34%	-0.003	-2.68%
	End of Reach 423	0.104	0.106	0.101	0.002	2.03%	-0.003	-2.70%
	End of Reach 430	0.103	0.104	0.100	0.002	1.36%	-0.003	-2.72%

Appendix D: Habitats Regulations Assessment

FINAL

Milton Recycling Centre Discharge Consent

Information to inform a Habitats Regulations Assessment (HRA)

Project no. 4020267

Prepared for: Anglian Water

Anglian Water

1st February 2022

Table of Contents

Details of document preparation and issue:

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1. Introduction

1.1 Background

Binnies UK Limited (BUKL) was commissioned by Anglian Water (AW) to undertake a Stage 1 Screening assessment to inform the Habitats Regulations Assessment (HRA) process for their proposed interim permit and their proposed new works permit for the Milton recycling centre. The purpose of this assessment is to inform the Competent Authority (CA) if any likely significant effects are anticipated to arise from the proposed interim permits and the proposed new works permit for the development of a new recycling centre and how this may affect designated sites and qualifying features adjacent to or downstream of the Milton recycling centre.

1.2 Site location and context

The current Milton water recycling centre (WRC) is located TL 47682 61575, just south of the A14, Milton, Cambridge.

A new recycling centre is planned to be developed within 22ha of farmland, at a site North of the A14 between Fen Ditton and Horningsea, Cambridgeshire. The development will be centrally located at TL 49509 61017; for further details see Site Location Plan, Appendix E.1.

There is no pre-defined guidance that dictates the spatial and/or physical scope of an HRA. Therefore, the assessment has been guided primarily by the identification of impact pathways rather than arbitrary zones in considering physical scope. For this assessment following network of national sites be included in the scope:

- All sites within the footprint of the works; and,
- Other sites shown to be linked to the work through known pathways.

1.3 Proposed Work

Binnies was asked to investigate two permitting scenarios:

1. Proposed interim permit limits for the current Milton WRC outlined by the Environment Agency (EA), include the following discharge consents:
    a. increase in flow (from existing permit of 37,330 m^3/d) to reflect the current discharge volume 44,851m^3/d until the new works is built (current best estimate 2027)
    b. Phosphorus – 0.5mg/l
    c. Biochemical Oxygen Demand (BOD) – 11mg/l
    d. Ammonia – 4mg/l
    e. Suspended solids – 17mg/l

2. Proposed new works permits to facilitate development of a new wastewater treatment works as part of the new recycling centre complex as well as the demobilisation of the current Milton sewage treatment works and recycling centre. The following changes in discharge limits as outlined by the EA, are also anticipated:

    a. Increase the flow to 55,000m^3/d
    b. Phosphorus – 0.4mg/l
    c. Biochemical Oxygen Demand (BOD) – 11mg/l
    d. Ammonia –3mg/l
    e. Suspended Solids –14mg/l

AW has assessed the permit limits set out by the EA and are seeking a change to the limits for phosphorus and suspended solids. AW would like to see phosphorus set to 1mg/l for the proposed interim permit and 0.5mg/l for the proposed new works permit. Likewise, AW would like to see suspended solids set to 20mg/l during the proposed interim permit and 20mg/l for the proposed new works permit.

The focus of this assessment, Stage 1 Screening to inform the HRA process, will evaluate both scenarios using the AW target limits for phosphorous (P) and Total Suspended Solids (TSS) only. No modelling has taken place for ammonia and BOD.

Works detailed above will hereafter be referred to as the 'Proposed Works'.

1.4 Scope of the Report

The brief provided to BUKL for this HRA, is as follows:

- Review and assess designated sites and their conservative objectives within a radius of the Proposed Works
- Review and assess the SIMCAT/GIS modelling outputs to determine levels of nutrient loading and suspended solids loading within the catchment
- Provide Stage 1 Screening to inform the client and CA of any significant effects likely anticipated by the Proposed Works.

1.5 Ecological Background

No ecological surveys and/or reports were provided to Binnies as part of this commission.

1.6 Legislation Context

European sites are protected by the Conservation of Habitats and Species Regulations 2017 (as amended[1]) (known as the Habitats Regulations). The network of national sites comprises:

- **Special Area of Conservation (SACs)** – sites designated for flora, fauna (except wild birds) and habitats of European importance; and
- **Special Protection Areas (SPAs)** - sites designated to conserve the habitat of protected wild birds to ensure their survival and reproduction in their area of distribution.

All sites in the process of being designated (candidate or possible sites) are also considered in the same way as fully designated sites.

Together, SACs and SPAs in the UK make up a national network of European sites, with the aim of ensuring the long-term survival of the most valuable and threatened species and habitats listed under the Habitats Regulations.

It is also English Government policy (ODPM Circular 06/05[2]) for sites designated under the convention on Wetlands of International Importance especially as Waterfowl Habitat (**Ramsar sites**) to be treated as having equivalent status of European sites.

Before allowing a proposed plan or project to proceed, competent authorities must carry out an assessment under the Habitats Regulations to assess whether it would have an adverse effect on the 'integrity' of a European site. ODPM Circular 06/05 takes this to mean 'the coherence of its [the sites] ecological structure and function, across its whole area, that enables it to sustain the habitat complex of habitats and/or the levels of population or the species for which it was classified'. This is known as a Habitats Regulations Assessment (HRA).

[1] As amended by the Conservation of Habitats and Species Regulations (Amendment) (EU Exit) Regulations 2019

[2] https://www.gov.uk/government/publications/biodiversity-and-geological-conservation-circular-06-2005

2. Methodology

2.1 Outline

This section outlines the methodology applied to the Proposed Works.

2.2 Defining the catchment

The Proposed Works are planned to discharge into the River Cam. The River Cam receives water from the Rivers Rhee and Granta upstream. Fifteen kilometres downstream of Cambridge, the River Cam joins the Ely Ouse which further downstream receives water from the Rivers Lark, Little Ouse and Wissey before discharging into the Wash.

For the purpose of this study, effects of the Proposed Works are only examined downstream of the River Cam, two upstream sampling points were used to provide a more comprehensive picture. The catchment area and sampling locations modelled to inform this HRA are displayed in Appendix E.2.

The catchment is predominantly freshwater, and the surrounding landscape is a mixture of agricultural land and infrastructure associated with market towns i.e. roads, dwelling etc. Water is taken from the River Cam for land irrigation via land drains controlled by internal drainage boards (IDB). The River Cam flows into the River Great Ouse, just before Ely. The River Great Ouse then meets Old Bedford drain and the New Bedford River/Hundred Foot Drain at Denver sluice, where the waterbody becomes tidally influenced. The River Great Ouse then spilt into a river channel of the same name and a relief channel, which is navigational channel heavily controlled by the sluices including Denver sluice.

2.3 Modelling approach

Water quality modelling scenarios have been developed in line with the pre application advice set out in Section 2.2 of the main report. These modelling calculations have been used to evaluate the scenarios and identify if they would cause an effect to designated sites and the WFD status. Four modelling scenarios considered were:

- Baseline (future)
- Interim permit
- Proposed permit
- Recent actual interim permit (this is a scenario as requested by AWS and results presented in the Addendum to the main report)

The EA's SIMCAT model was used for the assessment of phosphorus (Total Phosphorus and Orthophosphate). A separate mass-balance approach was used for the assessment of Suspended Solids (see Sections 3.1 and 4 of the main report).

The recent actual permit has not been assessed in terms of its effects on designated sites. The only scenarios that have been assessed for their effects have been the interim and proposed scenarios against the future baseline.

2.4 Summary of HRA process

Government guidance[3] on Habitats Regulations Assessment sets out that the process can have up to 3 stages, with the outcomes of each stage determining the need for the next one:

1. **Screening** - the process which initially identifies whether any European sites could be affected and considers whether any potential effects are likely to be significant, either alone or in combination with other plans or projects. If not, there is no need to go through the appropriate assessment stage.

2. **Appropriate assessment** - the detailed consideration of the effects of the plan or project on a European site (or sites) either alone or in combination with other plans or projects, with respect to the site's conservation objectives and its structure and function. This is to determine whether there will be any adverse effects on the integrity of the site. If it can be concluded that there will not be any effect on integrity of the site there is no need to go through the derogation stage

3. **Derogation** - to consider if proposals that would have an adverse effect on a European site qualify for an exemption. To qualify, it must be demonstrated that no alternative solutions to the proposal exist and that adverse effects cannot be avoided; that the development is necessary for Imperative Reasons or Overriding Public Interest (IROPI); and, if so, that compensatory measures needed to maintain the overall coherence of the national network of European sites can be secured.

By completing the stages of assessment that are required under the Habitats Regulations, an audit trail is generated that clearly documents the decisions that are made and the rationale for them. This process is referred to as the Habitats Regulations Assessment (HRA).

Following the Sweetman case, known as 'People over Wind' (ECJ Case C-323/17), mitigation measures (referred to in the judgement as measures which are intended to avoid or reduce effects) should be assessed within the framework of an Appropriate Assessment; it is not permissible to take account of measures intended to avoid or reduce the harmful effects of the plan or project on a European site at the Screening stage. Therefore, mitigation has not been considered during the HRA Stage 1 Screening assessment.

[3] https://www.gov.uk/guidance/habitats-regulations-assessments-protecting-a-european-site

For the Appropriate Assessment, the decision on whether a proposed plan or project would have an adverse effect on the 'integrity' of a European site is based upon the implications of a plan on the conservation objectives of the site. These objectives set out the physical, chemical and biological thresholds, and limits of activity and disturbance, which must be met to maintain integrity. An adverse effect on integrity (AEOI) is likely to be one that results in a deterioration of conservation status regarding the qualifying feature(s) for which it was designated.

The assessment of effects on European sites applies a reserve burden of proof – if any doubt exists as to the effects (considering any necessary mitigation measures), then 'no adverse effect on integrity' (NAEOI) cannot be concluded. In this situation alternative solutions must be sought. Where feasible alternatives do not exist then the plan or project can only proceed based on IROPI. This must be agreed by the Secretary of State and compensatory measures to offset damage/loss and to maintain the overall coherence of the national network of designated site, must be secured and ecologically functional in advance of the damage. Consultation is required with the appropriate Government department throughout this process to ensure the overall integrity of the national network of designated sites is not detrimentally impacted.

2.5 Approach applied

This HRA comprises the first stages of the HRA process, an HRA Stage 1 Screening, further Stage 2 Appropriate Assessment may be required to demonstrate no impact to the national network of site integrity.

The Stage 1 Screening within Section 3 of this report has utilised screening matrices based upon a table template taken from the Design Manual for Roads and Bridges (2009). This template has been used as the basis to represent the screening data as it is a recognised, standard tool that allows for comparable and concise assessment.

2.6 Identifying designated sites

As the interim permit and the proposed new works permit are not going through the planning process Sites of Special Scientific Interest (SSSI) have also been included in this assessment.

Pathways are routes by which a change in activity can lead to an effect upon a protected site. For this work no arbitrary radius has been used for this assessment; designated sites have been assessed and scoped in if within 2km of the existing site and the proposed new site as well as designated sites with a hydrological connection.

The scoping in of designated sites has also been informed by the SIMCAT model and anticipated levels at sampling locations downstream of the discharge points. If there is an anticipated increase in nutrient levels, when compared to the current baseline, at any of the sample locations this could have a likely significant effect, either alone or in combination with other nutrients on the designated sites and/or qualifying features. Designated sites that are assessed in the below chapter are displayed in Appendix E.3

2.7 Determining Likely Significant Effects (LSE)

The test of Likely Significant effects (LSE) is identified through the first part of the HRA screening process as described in Section 2.5. In determining LSE, the following steps have been undertaken:

- Identification of the hazards potentially created by the works;
- Identification of the interest features potentially exposed to the hazards; and,
- Consideration of the potential exposure to the hazard and whether there is likely to be a significant effect on the relevant interest feature.

3. Assessment

3.1 Outline

The following section identifies the designated sites scoped in, as well as the potential hazards and impacts the works may have on European sites and their designable features.

3.2 Identification of designation sites

This section outlines the designated sites to be assessed and reason for designation.

Proposed interim permit

There are no designated sites within 0.5 km and 2 km.

Proposed new development

There are no designated sites a within 0.5 km. Two designated sites are within 2 km of the Proposed Works, details are listed below in Table 1, displayed in Appendix E.3.

Table 1 Designated sites within the zone of influence for the Proposed Works

Designated sites	Reason for designation	Proximity to site
Stow-cum-guy SSSI	Floristically rich calcareous loam pasture. Currently in unfavourable condition.	1.2 km Upstream on the discharge locations along the River Cam.
Wilbraham Fen SSSI	Fenland and neutral grassland. Currently in unfavourable declining condition.	1.4 km This site is located downstream of the River Cam and therefore hydrologically connected to the proposed new development

Hydrological connection

The permits both discharge into the River Cam and therefore, both have a hydrological connection to a range of designated sites. The table below details the designated sites downstream of the proposed interim permit and the proposed new development; see Appendix E.2. To allow for a proportionate assessment, screened in designated sites are informed by the SIMCAT/SIMGIS model outputs.

Table 2 Designated sites with a hydrological connection downstream of the proposed interim permit and the proposed new development.

Designated site	Reason for designation	Proximity of site
Cam Washes SSSI	Agricultural unimproved pasture with high floristic nature which is seasonally flooded. It an important area for breeding waders, particularly for snipe *Gallinago gallinago*. Currently in favourable condition	6.9 km
Wicken Fen SSSI	Marshland habitat which is used by a range of over wintering bird species. Contains a range of aquatic flora include march orchids.	7.9 km
Fenland SAC	Great crested newt *Triturus cristatus*, spined loach *Cobitis taenia*	8.9 km
Upware South Pit SSSI	Earth heritage, currently in favourable condition. This site is designated for its geological features.	10 km
Upware bridge Pit North SSSI	Standing open water and canals. Currently in unfavourable – recovering conditions.	11.2 km
Ely Pits and Meadows SSSI	Designated for the best fossil reptile locality in the northern outcrop of the Kimmeridge Clay and for its breeding bird assemblage of lowland open waters and their margins as well as for breeding and wintering bitterns *Botaurus stellaris*. Currently in favourable condition.	19.1 km
Chettisham meadows SSSI	This site is an example of ridge and furrow neutral grassland on calcareous clays. One of the few remaining examples in Cambridgeshire and is one of the best of its kind nationally. Currently in unfavourable – recovering condition.	20.7 km
Ouse Washes Ramsar	The site is an area of seasonally flooded washland habitat managed in a traditional agricultural manner. The washlands supports nationally and internationally important numbers of wintering waterfowl and nationally important numbers of breeding waterfowl. The site is an example of unimproved neutral grassland communities which it holds and for the richness of the aquatic flora within associated watercourses.	38.8 km
Ouse Washes SAC	Designated for spined loach *Cobitis taenia* with its clear water and abundant macrophytes, is particularly important, and a	

Designated site	Reason for designation	Proximity of site
	healthy population of spined loach is known to occur.	
Ouse Washes SPA	Ruff *Philomachus pugnax*, bewick's swan *Cygnus cohtnrbarius*, whooper swan *Cygnus Cygnus*, hen harrier *Circus cyaneus*, gadwall *Anas Strepera*, mallard *Anas platyrhynchus*, garganey *Anas querquedula*, shoveler *Anas clypeata* and black-tailed godwit *Limosa limosa*.	17.7 km
The Wash and North Norfolk SAC	Designed for a range of intertidal and transitional habitats including, large shallow inlets and bays, mudflats and sandflats covered by sea water all the time and reefs. Additionally, the citation also includes coastal lagoons and harbour seal.	61.9 km

3.3 Determining the need for an HRA

Table 3 summarises the decision-making process for determining if an HRA is required.

Table 3 Outlining the decision-making process to determine the need for an HRA.

Decision making	Decision
Is the whole of the project directly connected with or necessary to the management of one or more national network of designated sites, for the purposes of conserving the habitats or species for which the national network site(s) is/are designated?	**Yes**
Is there a possibility that the project could affect a different national network of designated site to the one(s) the project is intended to conserve?	**Yes**
Is it necessary to carry out an HRA?	**Yes**

3.4 Assessment of Likely Significant Effects

As the outcome of Table 3 has determined an HRA is required, the following key potential hazards have been identified that could arise from the Proposed Works: water quality change, hydrological change, habitat loss/disturbance.

Table 4 contains a summary of the European designated sites and the relevant hazards which are likely to have a detrimental effect on the sites' qualifying features.

Table 4 Hazard identification in relation to the designated sites likely to be affected by the Proposed Works

	HAZARDS		
European / Nationally designated sites	Deterioration in Water quality	Hydrological change	Deterioration in habitat
Wicken Fen SSSI	Scoped in	Scoped in	Scoped in
Wilbraham Fen SSSI			
Cam Washes SSSI			
Fenland SAC			
Upware Bridge Pit North SSSI			
Ely Pits and Meadows SSSI			
Chettisham Meadows SSSI			
Ouse Washes Ramsar			
Ouse Washes SAC			
Ouse Washes SPA			
Upware South Pit SSSI	Scoped out – site is designated for its geological features		
The Wash and North Norfolk Coast SAC	Scoped out – effects are diffuse at this point		
Stow-cum-guy SSSI	Scoped out – upstream of the discharge locations, so not effected		

Further assessment of the potential impact pathways each hazard scoped in in Table 4 will have on the designable features and its conservation objective is detailed below, in Table 5.

Table 5 Screening assessment of potential impact pathways against the designable features and their associated conservation objectives.

3.2.2 Screening assessment

Colour coding has been used in the 'impact pathway' column II as follows:

There is no impact pathway from the proposal to the qualifying feature

There is an impact pathway in principle, but significant effects from the proposal when considered alone can be ruled out

There is an impact pathway and significant effects cannot be ruled out.

Qualifying Feature	Assessment of likelihood of significant effect	
	I Relevant conservation objectives	II Potential impact pathway
Cam washes SSSI Snipe Unimproved grassland pasture **Fenland SAC** Great crested newts Spined loach **Wicken Fen SSSI** Marshland habitat **Upware bridge pit SSSI** Standing open water **Ely pits meadows** Wintering bittern Wintering bird assemblage **Chettisham meadows** Neutral grassland **Ouse Washes Ramsar**	Ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the Favourable Conservation Status of its Qualifying Features, by maintaining or restoring; ○ The extent and distribution of qualifying natural habitats and habitats of qualifying species, ○ The structure and function (including typical species) of qualifying natural habitats, ○ The structure and function of the habitats of qualifying species, ○ The supporting processes on which qualifying natural habitats and the habitats of qualifying species rely,	**Water quality** **Proposed Interim Permit** The target levels of TSS and P for the proposed interim permit have been modelled against the current baseline in the catchment and are displayed in Appendix F2: Figure 5 and Appendix F5: Figure 15. Both graphs show an increase in P and TSS throughout the catchment under the interim permit, except in the Hundred Foot River with regards to TSS. Water quality reduces in terms of P in the River Cam by an average 0.028mg/l, Ely-Ouse by an average 0.012mg/l and Great Ouse by an average 0.003mg/l, the relief channel which is controlled by Denver sluice showed no change in the model, however this needs further exploration to determine if there is a likely change. TSS will also deteriorate under this scenario with the River Cam reducing water quality by an average of 1.34mg/lEly-Ouse by an average of 0.39mg/l and Great Ouse by an average of 0.14mg/l (node 368). Water quality which underpins a range of designable features is predicted to deteriorate under this new scenario. The source apportionment outputs displayed in the previous report by Atkins[4] shows that sewage treatment works is responsible for the increase of P in the catchment. Milton is one of seven sewage treatment works that are directly adjacent to the catchment. As such, it can be derived

[4] Atkins (2018) Cambridge WRC Relocation report

Washland habitat Wintering bird assemblage Aquatic flora **Ouse Washes SAC** Spined Loach **Ouse Washes SPA** Ruff, Whooper swan, Hen Harrier, Gadwell, Mallard and; Black tailed godwit. **Wilbraham Fen** Neutral grassland	○ The populations of qualifying species, and, ○ The distribution of qualifying species within the site.	from the model that the proposed interim permit discharge will increase of P and TSS in the catchment. Whilst the influence of the discharge becomes reduced with distance downstream, increases of P and TSS can still be attributed to the discharge regime under the proposed interim permit. The reduction in water quality could influence both the diversity of macrophyte and aquatic invertebrate communities in the catchment. Generally, a reduction in water quality favours more pollutant tolerant macrophyte and aquatic invertebrate species. This in turn could have a knock-on effect to fish species, namely spined loach and bird species, by reducing the food supply. **Therefore, it is anticipated that without mitigation there could be a likely significant effect on a range of designable habitats and features for a number of designated site due to the deterioration of water quality from the proposed interim permit.**	
		Water quality **Proposed New Permit** The target levels of TSS and P for the proposed interim permit have been modelled against the current baseline in the catchment and are displayed in Appendix F2: Figure 7 and Appendix F5: Figure 15. Figure 15 shows an improvement in P within the catchment, whilst TSS is set to deteriorate in Figure 7 under the new works permit, except in the Hundred Foot River. Water quality in terms of P improves in the River Cam by 0.111mg/l, Ely-Ouse by 0.020mg/l and Great Ouse by 0.005mg/l, the relief channel which is controlled by Denver sluice showed no change in the model, however this need further exploration to determine if there is a likely change. However, TSS is predicted to deteriorate under this scenario with the River Cam reducing water quality by an average of 0.1.60mg/l, Ely-Ouse by an average of 0.48mg/l and Great Ouse by an average of 0.17mg/l. Water quality which underpins a range of designable features is predicted to deteriorate in terms of TSS under this new scenario. The improvement in P could influence both the diversity of macrophyte and aquatic invertebrate communities in the catchment, positively. However, any improvement in P is lost by the deterioration of TSS. The reduction from TSS could influence both the diversity of macrophyte and aquatic invertebrate communities in the catchment. Generally, a reduction in water quality favours more pollutant tolerant macrophyte and aquatic invertebrate species. This in turn	

		could have a knock-on effect to fish species, namely spined loach and bird species, by reducing the food supply. **Therefore, it is anticipated that without mitigation there could be a likely significant effect on a range of designable habitats and features for a number of designated site due to the deterioration of water quality from the proposed interim permit.**	
		Hydrological Change **Proposed Interim Permit** Under the target levels proposed in the interim permit there is an anticipated change in flow. Under the interim permit this would lead to an increase in flow from the existing permit of 37,330 m^3/d to 44, 851 m^3/d. This has the potential to cause hydrological change to designated sites and their qualifying features. Results of flood modelling undertaken to assess effects on designated sites are presented within the Addendum to this report in Appendix G. Detailed geomorphological assessment has not been undertaken about how sediment moves in this system. Therefore, using the precautionary principle, hydrological change will occur as part of the proposed interim permit. **It is anticipated that without mitigation there could be an impact to the qualifying features of a range of designated sites.** **Hydrological Change** **Proposed New works Permit** Under the target levels proposed new works permit there is an anticipated change in flow. An increase in flow from the interim permit of 44,851 m^3/d to 55, 000 m^3/d is anticipated. Modelling undertaken has shown that mean flow under the proposed permit scenario would lead to a maximum increase of 4.20% and an average increase of 1.45% from the future baseline and interim mean flow rates (please refer to Section 4 (c) of the main report). This change in flow has the potential to cause hydrological change to designated sites and their qualifying features. Results of flood modelling undertaken to assess effects on designated sites are also presented within the Addendum to this report in Appendix G.	

		. Detailed geomorphological assessment has not been undertaken about how sediment moves in this system Therefore, using the precautionary principle, hydrological change will occur as part of the proposed new works permit. **It is anticipated that without mitigation there could be an impact to the qualifying features of a range of designated sites.**	
		<u>Deterioration in Habitat</u> **Proposed interim permit** As previously discussed, the model currently predicts a deterioration in water quality for P and TSS, see Appendix F2: Figure 6 and Appendix F5: Figure 15 for further details. Water quality in terms of P reduces in the River Cam by 0.028mg/l, Ely-Ouse by 0.012mg/l and Great Ouse by 0.003mg/l, the relief channel which is controlled by Denver sluice showed no change in the model, however this need further exploration to determine if there is a likely change. TSS will also deteriorates under this scenario with the River Cam reducing water quality by an average of 1.34mg/l, Ely-Ouse by an average of 0.39mg/l and Great Ouse by an average of 0.14mg/l. Water quality which underpins a range of designable features is predicted to deteriorate under this new scenario. The source apportionment outputs displayed in the previous report by Atkins[5] shows that sewage treatment works are responsible for the increase of P in the catchment. Milton is one of seven sewage treatment works that are directly adjacent to the catchment. As such, it can be derived from the model that proposed interim permit discharge will increase of P and TSS in the catchment. Whilst the influence of the discharge becomes reduced with distance downstream, increases of P and TSS can still be attributed to the discharge regime under the proposed interim permit. The proposed permit levels could influence both the diversity of macrophyte, wetland habitats and mesotrophic grassland	

[5] Atkins (2018) Cambridge WRC Relocation report

		communities in the catchment. Generally, a reduction in water quality favours more pollutant tolerant macrophyte, terrestrial plant species, aquatic and terrestrial invertebrate species. This in turn could lead to a reduction in diversity in qualifying habitats, it also could cause simplification and/or loss of qualifying habitats due to changes in water quality. **It is anticipated that without mitigation there could be an impact to the qualifying features of a range of designated sites.**	
		<u>Habitat loss</u> **Proposed New Works Permit** The target levels of P and TSS for the proposed new works permit have been modelled against the current baseline in the catchment and are displayed in Appendix F2: Figure 7 and Appendix F5: 15. Both graphs show an increase in P and TSS throughout the catchment under the interim permit. Water quality in terms of P improves in the River Cam by 0.111mg/l, Ely-Ouse by 0.020mg/l and Great Ouse by 0.005mg/l, the relief channel which is controlled by Denver sluice showed no change in the model, however this need further exploration to determine if there is a likely change. However, TSS is predicted to deteriorate under this scenario with the River Cam reducing water quality by an average of 1.60mg/l, Ely-Ouse by an average of 0.48mg/l and Great Ouse by an average of 0.17mg/l. Water quality which underpins a range of designable features is predicted to improve under this new scenario. The improvement in P could have influence both the diversity of macrophyte and aquatic invertebrate communities in the catchment, positively. However, any improvement in P is lost by the deterioration of TSS. The proposed permit could influence both the diversity of macrophyte and aquatic invertebrate communities in the catchment. Generally, a reduction in water quality favours more pollutant tolerant macrophyte, terrestrial plant species, aquatic and terrestrial invertebrate species. This in turn could lead to a reduction in diversity in qualifying habitats, it also could cause simplification and/or loss of qualifying habitats due to changes in water quality. **It is anticipated that without mitigation there could be an impact to the qualifying features of a range of designated sites.**	

4. Conclusion

This Stage 1 assessment evaluated the likely significant effects the proposed interim permit and the proposed new works permits would have on a range of designated sites and their qualifying features.

It has concluded that the proposed interim permit and the proposed new works permits has the potential to affect a range of designated sites through a deterioration on water quality, hydrological change due to changes in flow regime and habitat loss due to changes in the water environment. As such this Stage 1 assessment has concluded in the absence of mitigation the proposed permits will have a likely significant effect on a range of designated sites and their qualifying features.

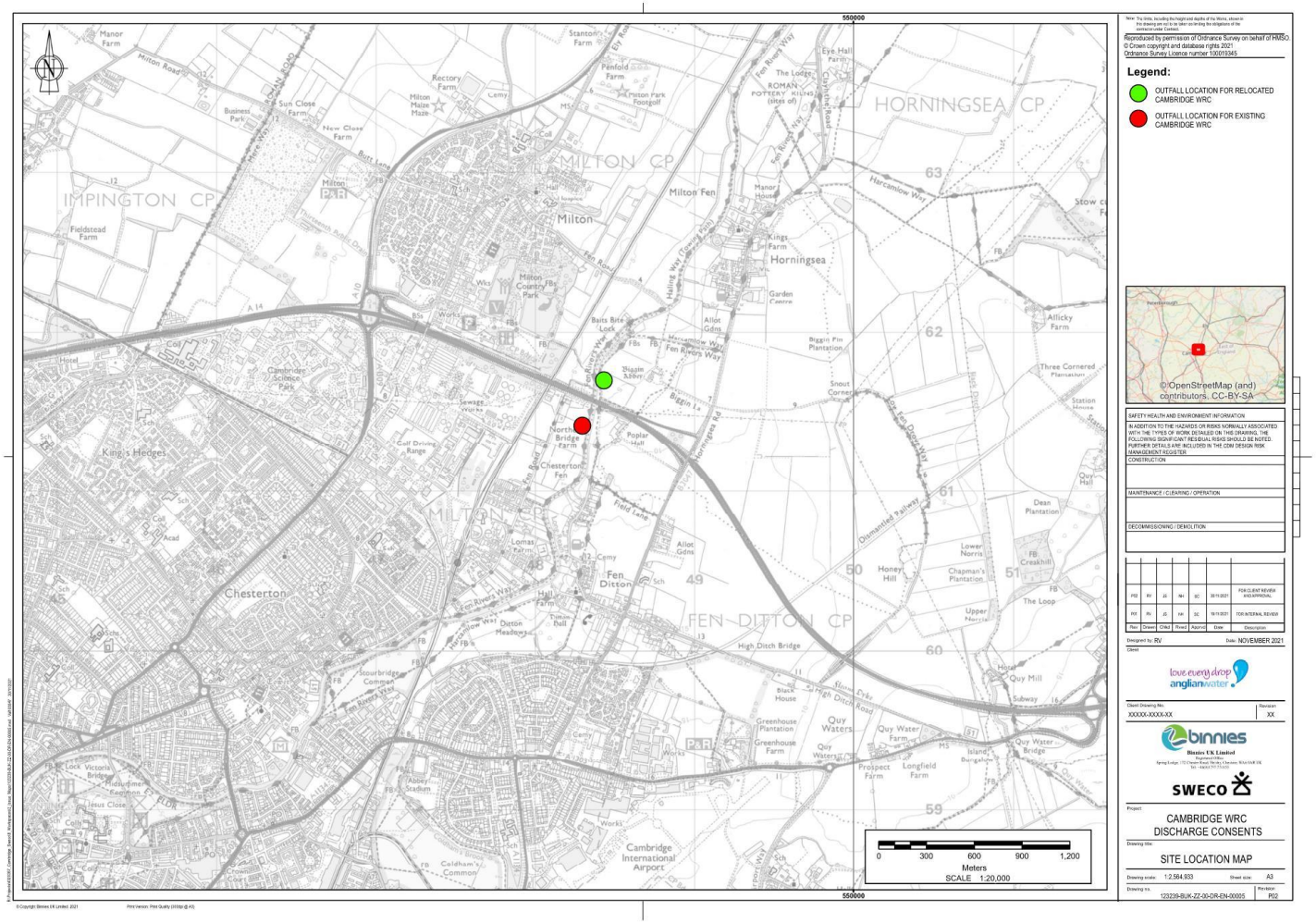
Figures

References refer to main report

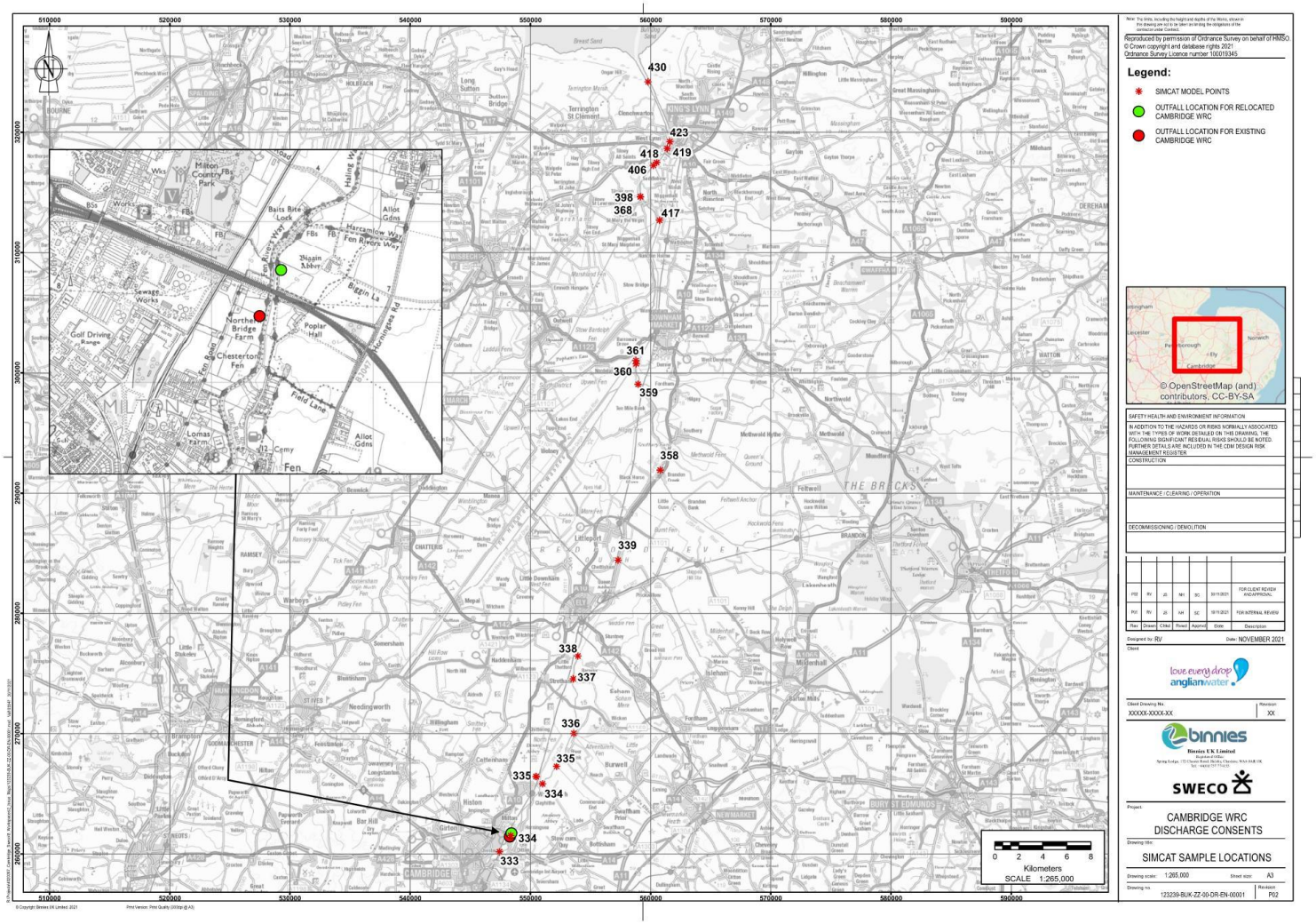
Figure	Description
Appendix E.1	Site Location Plan
Appendix E.2	SIMCAT Sampling location Plan
Appendix E.3	Designated sites plan
Appendix E.4	WFD surface waterbodies
Appendix E.5	WFD groundwater waterbodies
Appendix F.2 Figure 6	Mass balance model results at all SIMCAT data points for TSS for interim permit scenarios (17mg/l and 20 mg/l).
Appendix F.2 Figure 7	Mass balance model results for TSS at all SIMCAT data points for new work permit scenarios (14mg/l and 20mg/l)
Appendix F.4 Figure 13	Modelled Total Phosphorus concentrations (mg/l) for the future baseline and the proposed interim permit scenarios at each SIMCAT model node from upstream of Cambridge WRC (existing and new site) to the Wash.
Appendix F.4 Figure 14	Modelled orthophosphate concentrations (mg/l) for the baseline and the proposed interim and new works scenarios at each SIMCAT model node from upstream of Cambridge WRC (existing and new site) to Wash.

Appendix E: Drawings

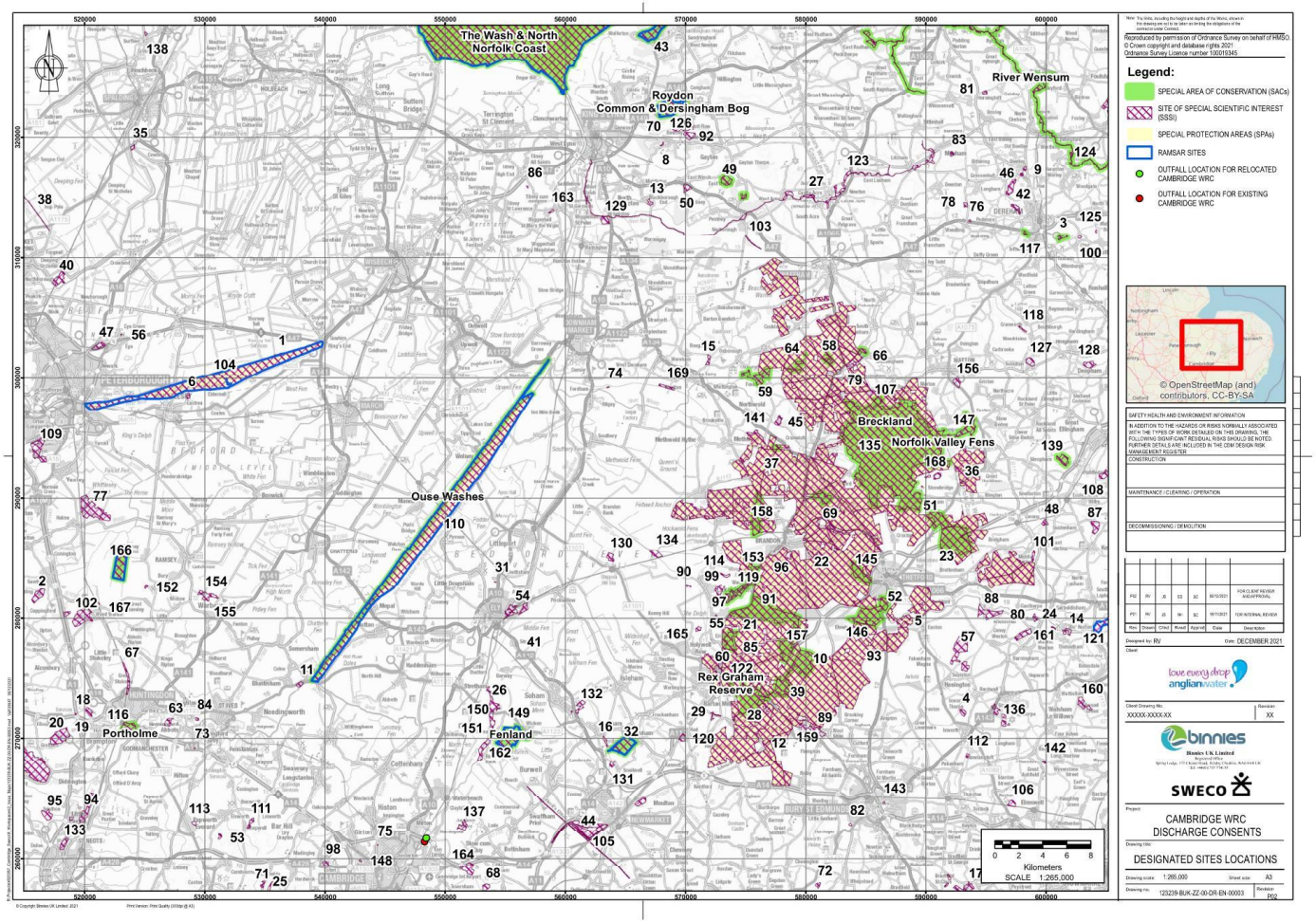
E.1 Site Location Map



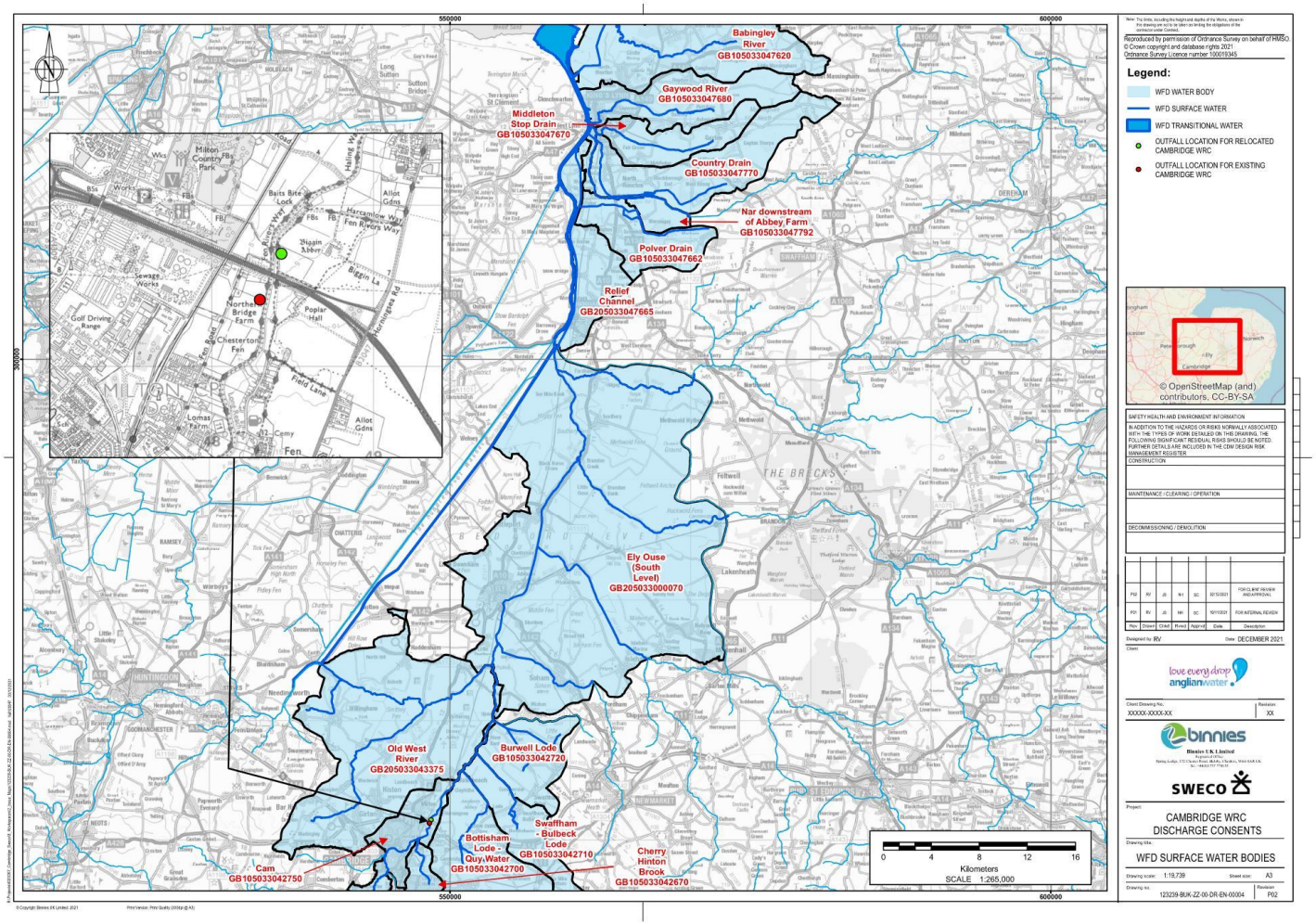
E.2 SIMCAT Sample Locations



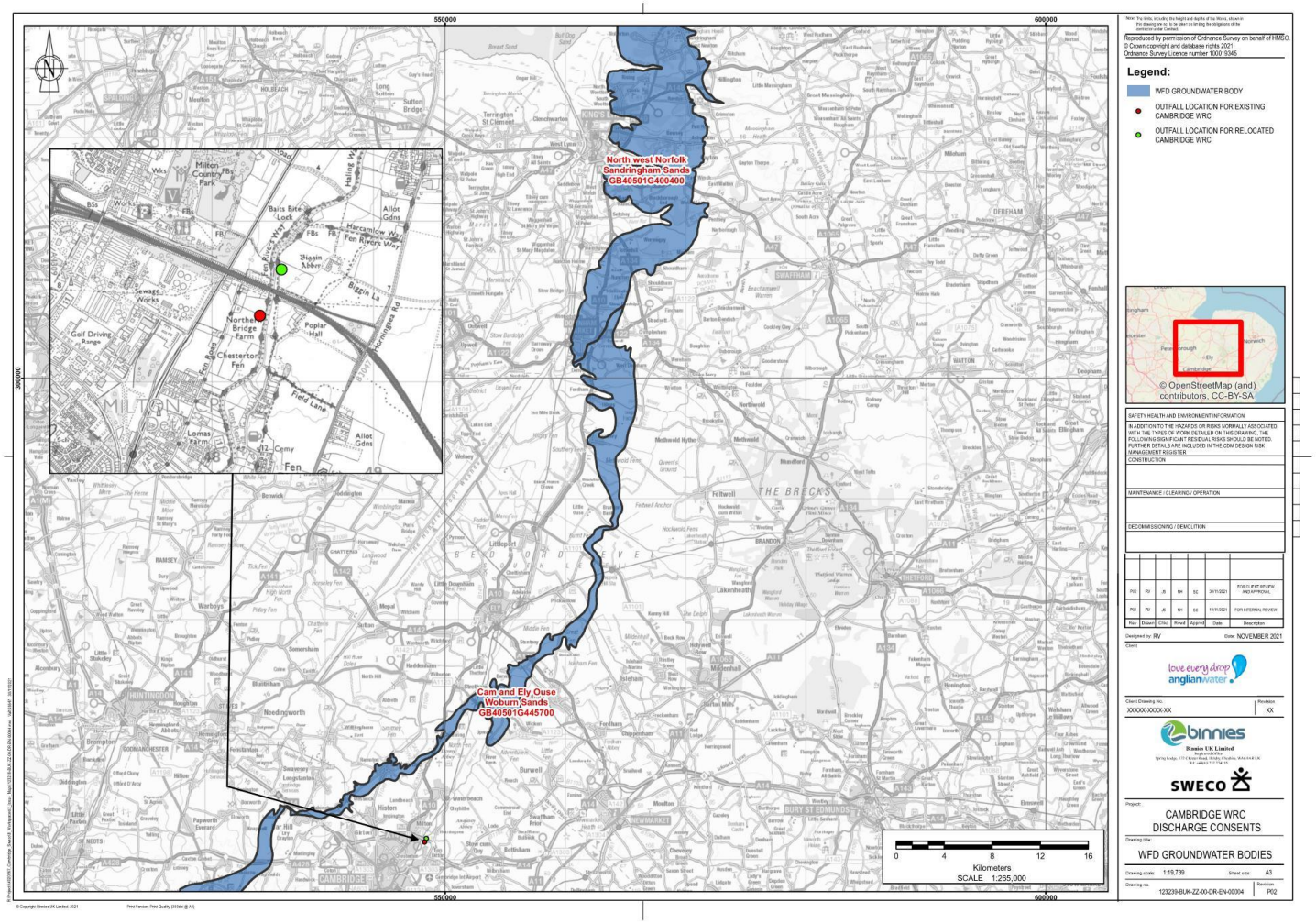
E.3 Designated Sites Locations



E.4 WFD Surface Water Bodies



E.5 WFD Groundwater Bodies



E.6 Total Phosphorus Heat Map Modelled Future Baseline

E.7 Total Phosphorus Heat Map Modelled Proposed Interim Permit

E.8 Total Phosphorus Heat Map Modelled Proposed New Works Permit

Appendix F: Water Quality Assessment

F.1 WIMS TSS Data

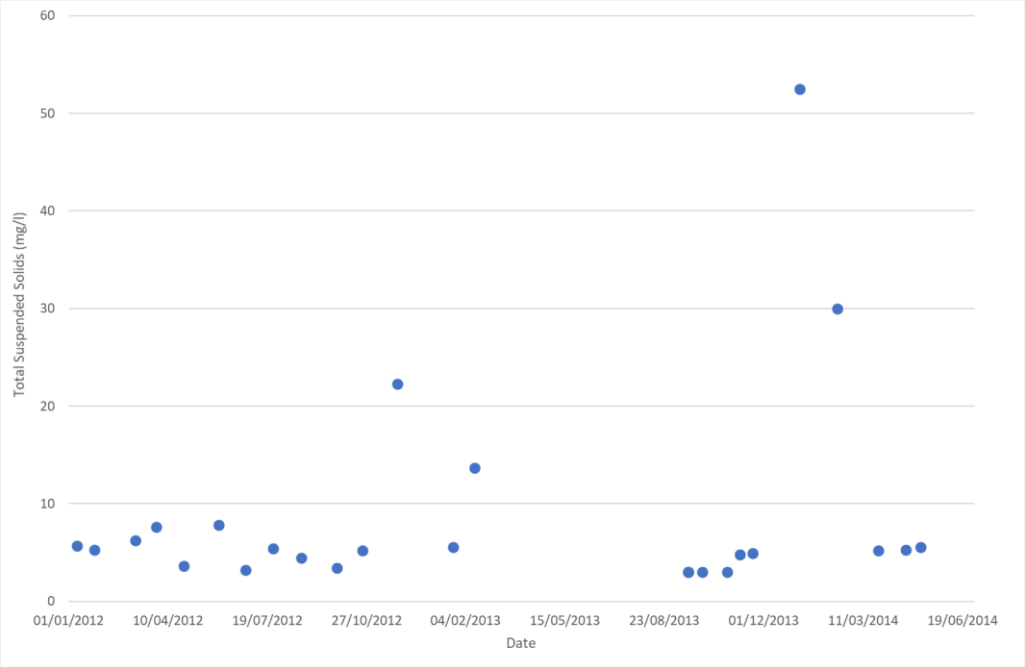


Figure 4 TSS data at River Cam at Bottisham Lock from 2012 to 2014.

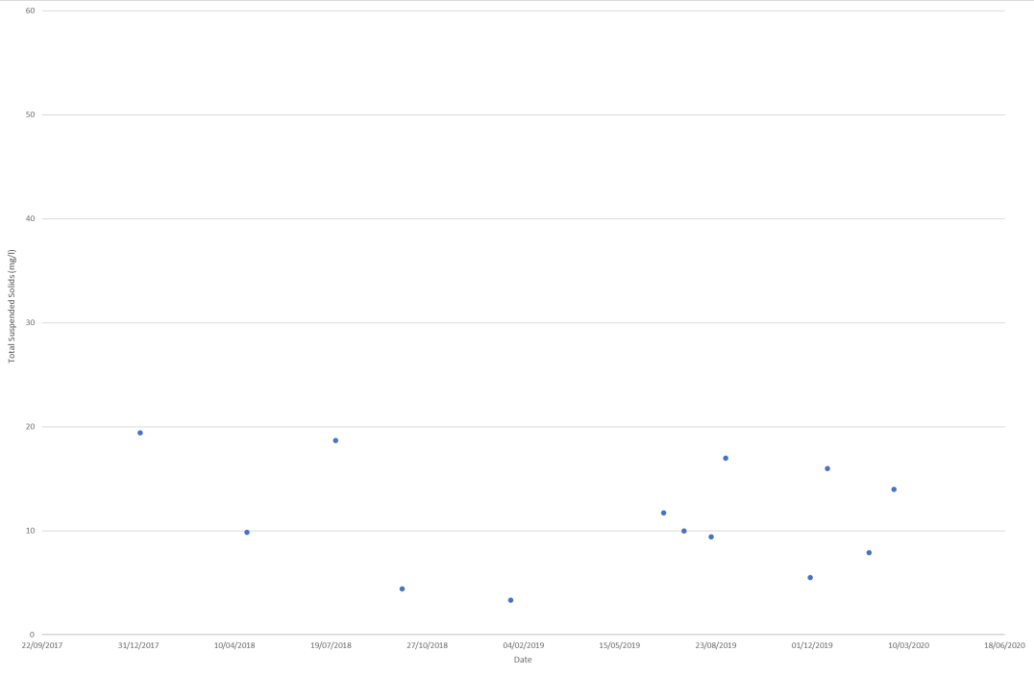


Figure 5 TSS data at Ten Mile R. Denver Sluice from 2017 to 2020.

F.2 Modelled Total Suspended Solids results

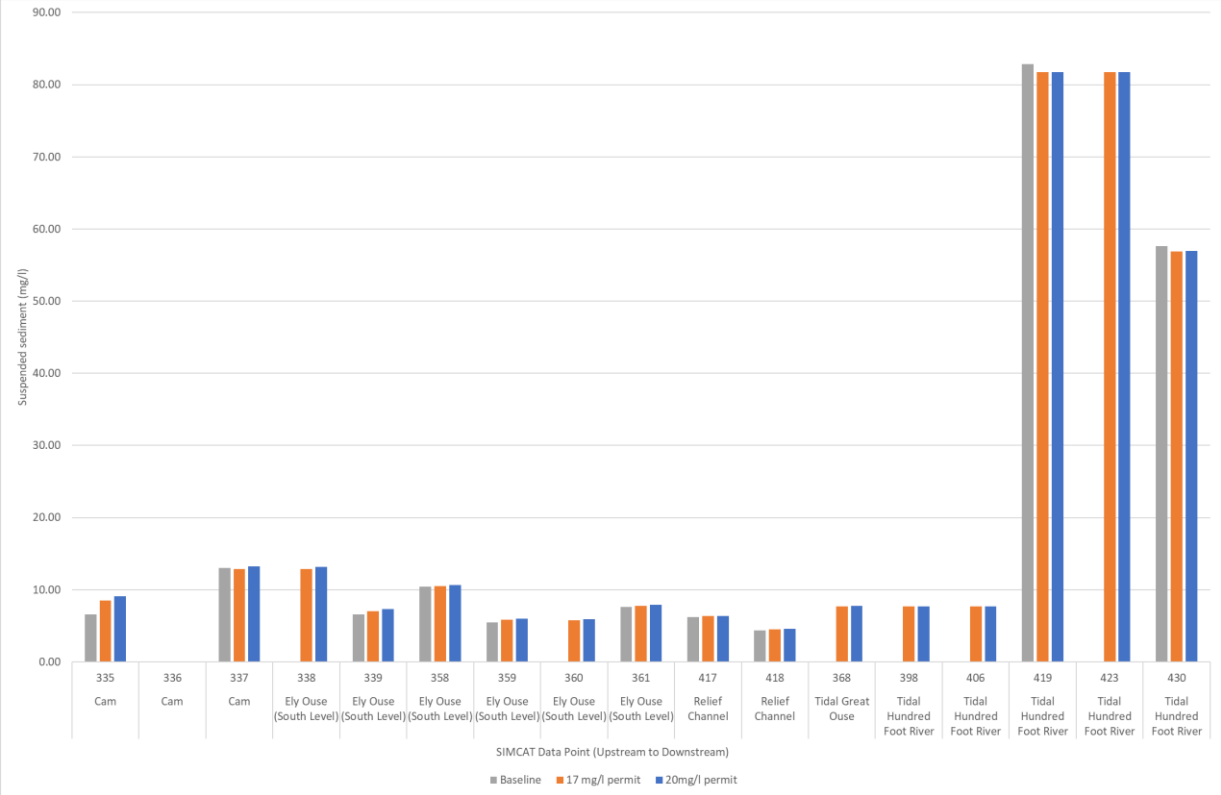


Figure 6 Mass balance model results for Total Suspended Solids at all SIMCAT data points for the interim permit scenarios (17mg/l and 20 mg/l).

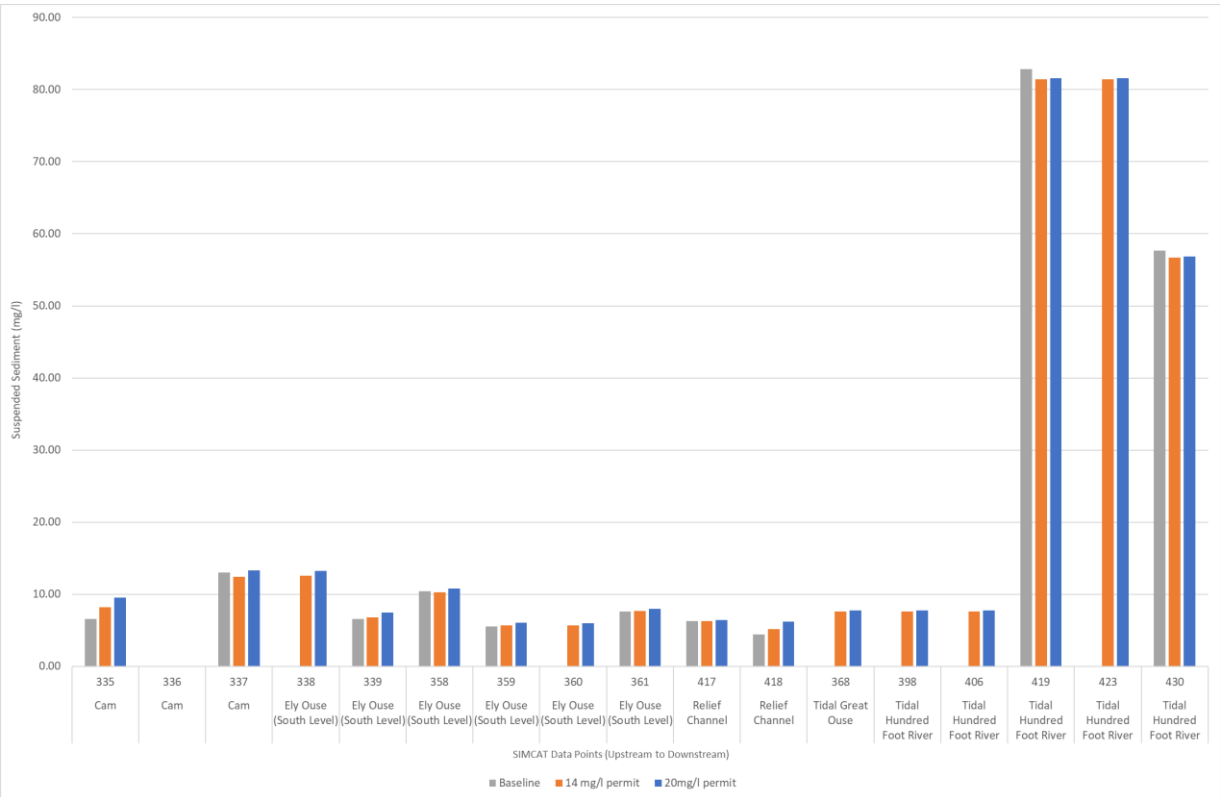


Figure 7 Mass balance model results for Total Suspended Solids at all SIMCAT data points for the new works proposed permit scenarios (14mg/l and 20mg/l).

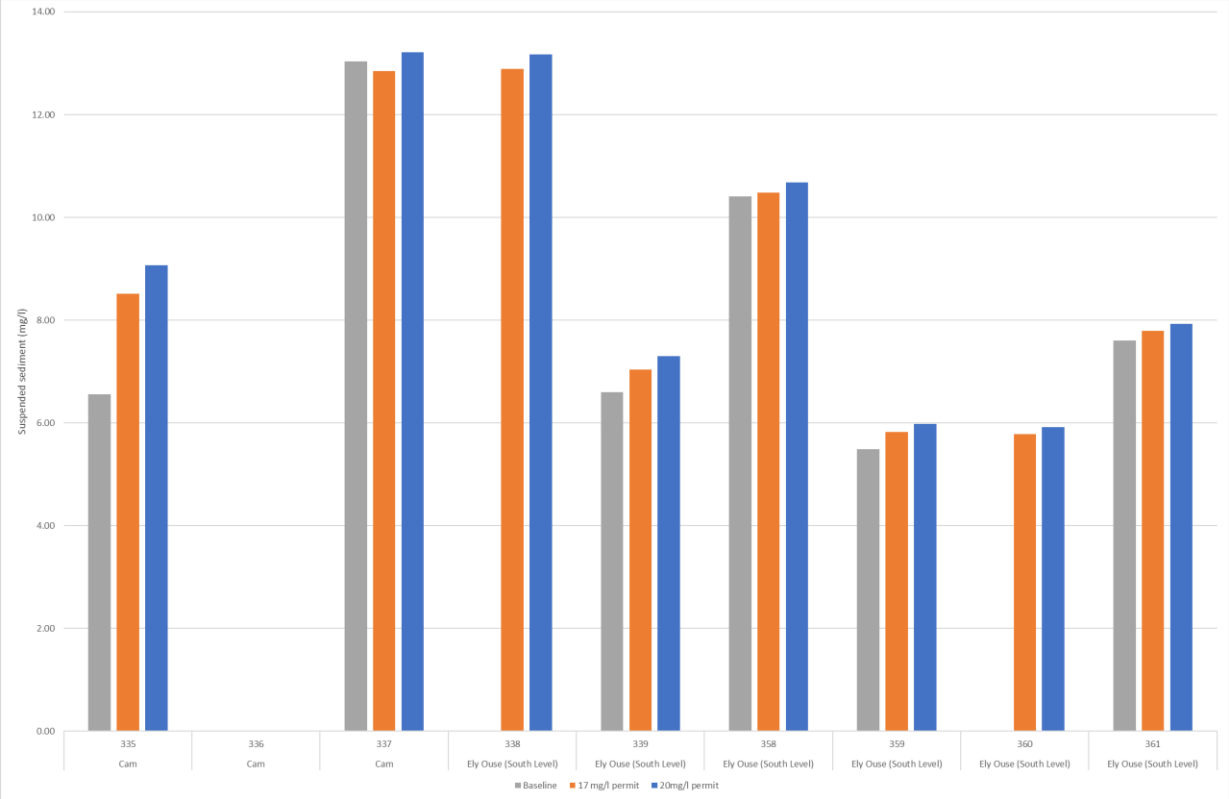


Figure 8 Mass balance model results for Total Suspended Solids within the Cam and Ely Ouse (South Level) water bodies for the baseline and proposed interim permit scenarios (17mg/l and 20mg/l).

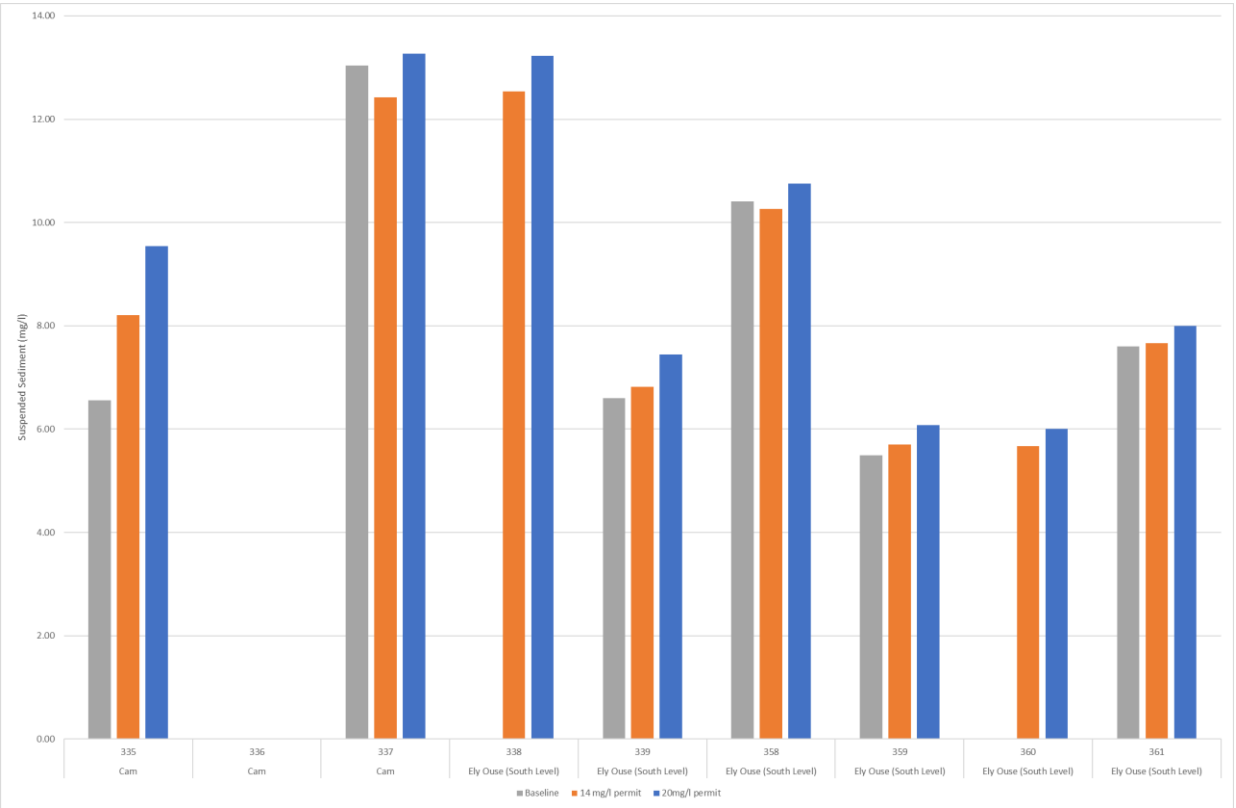


Figure 9 Mass balance model results for Total Suspended Solids within the Cam and Ely Ouse (South Level) water bodies for the baseline and proposed new works permit scenarios (14mg/l and 20mg/l).

F.3 WIMS Orthophosphate Data

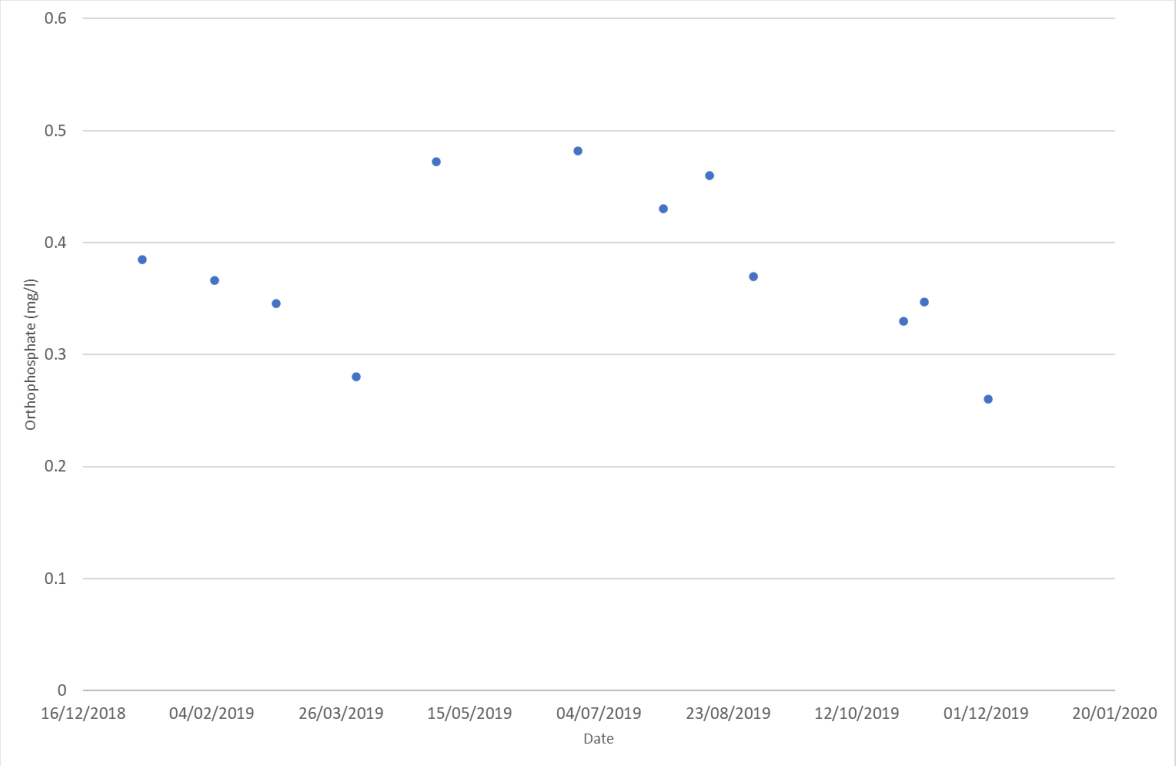


Figure 10 Orthophosphate concentrations (mg/l) at R. Cam at Bottisham Lock from December 2018 to January 2020.

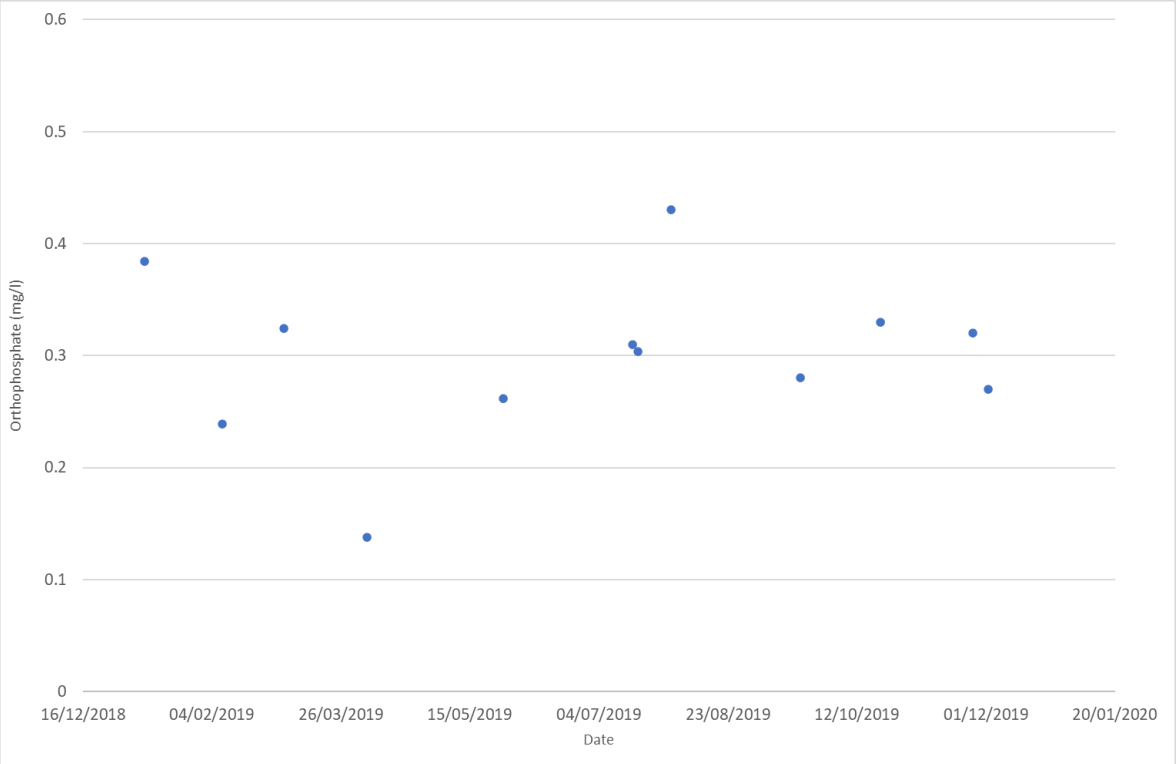


Figure 11 Orthophosphate concentrations (mg/l) at R. Cam Dimmocks Cote Road Bridge from December 2018 to January 2020.

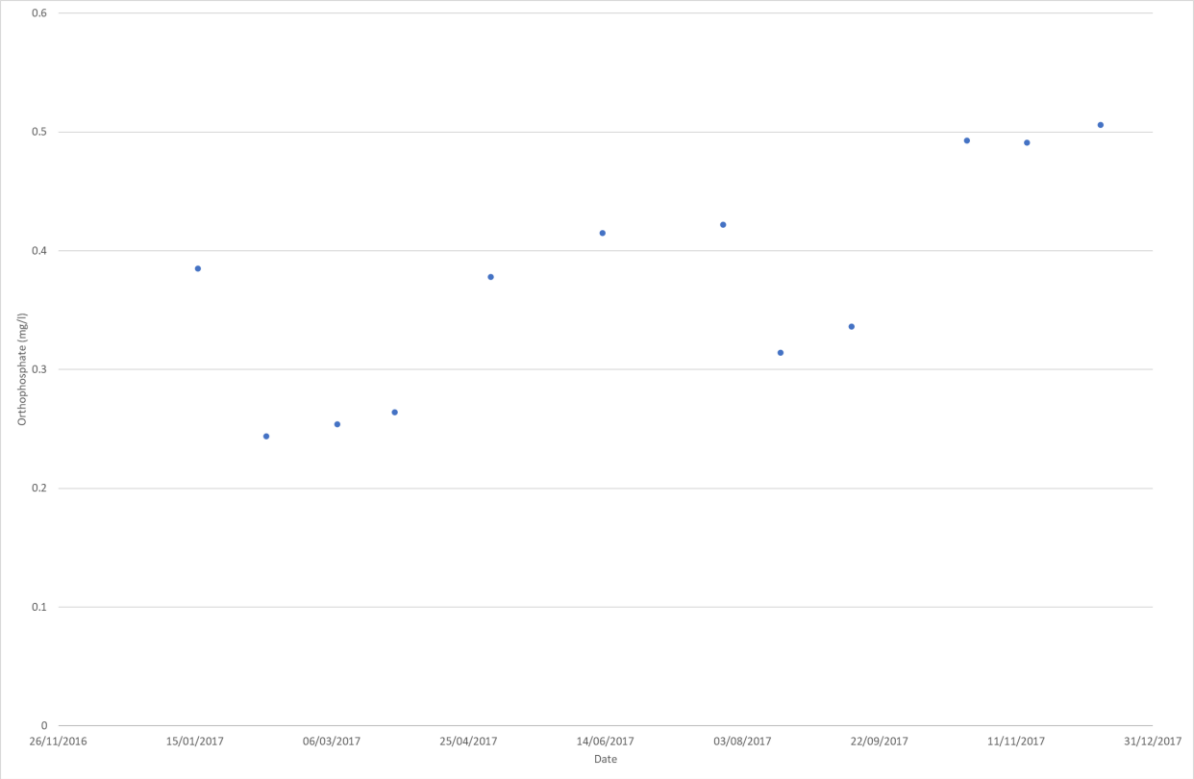


Figure 12 Orthophosphate concentrations (mg/l) at Ely Ouse Ely High Road Bridge from November 2016 to December 2017.

F.4 Modelled Total Phosphorus and Orthophosphate concentrations

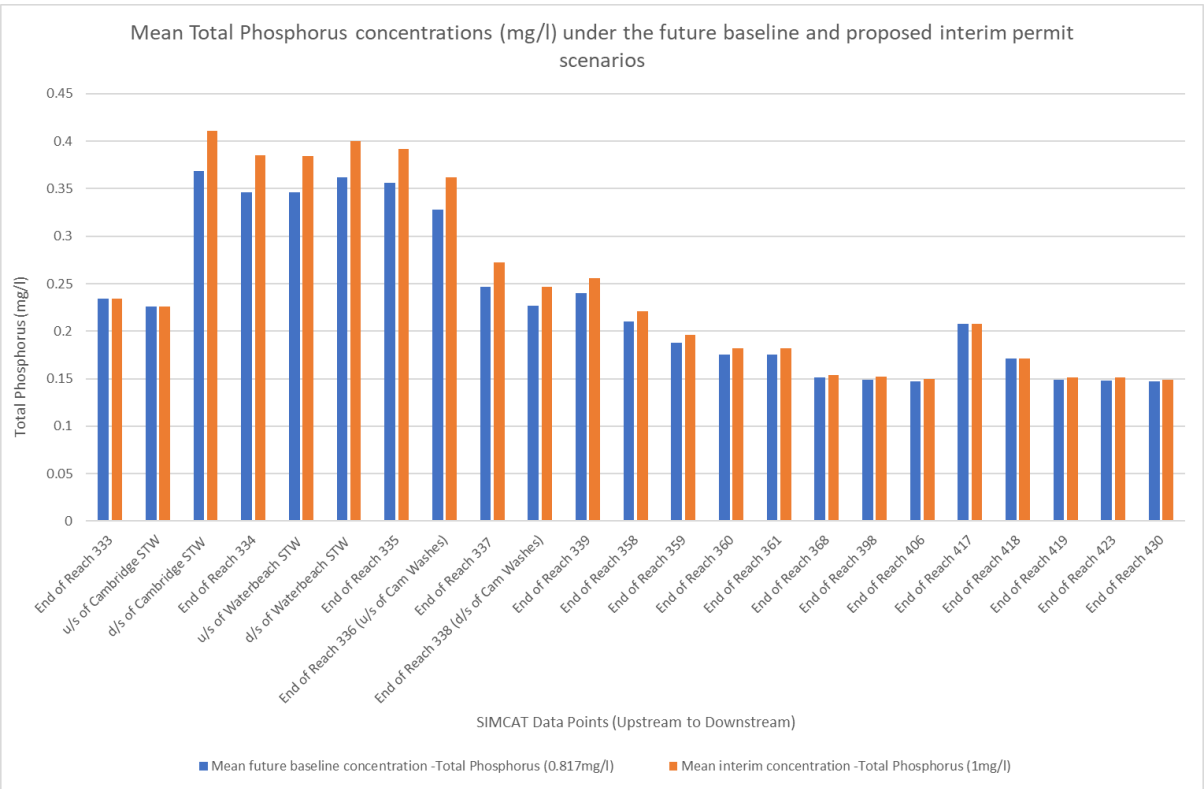


Figure 13 Modelled Total Phosphorus concentrations (mg/l) for the future baseline and the proposed interim permit scenarios at each SIMCAT model node from upstream of Cambridge WRC (existing and new site) to the Wash.

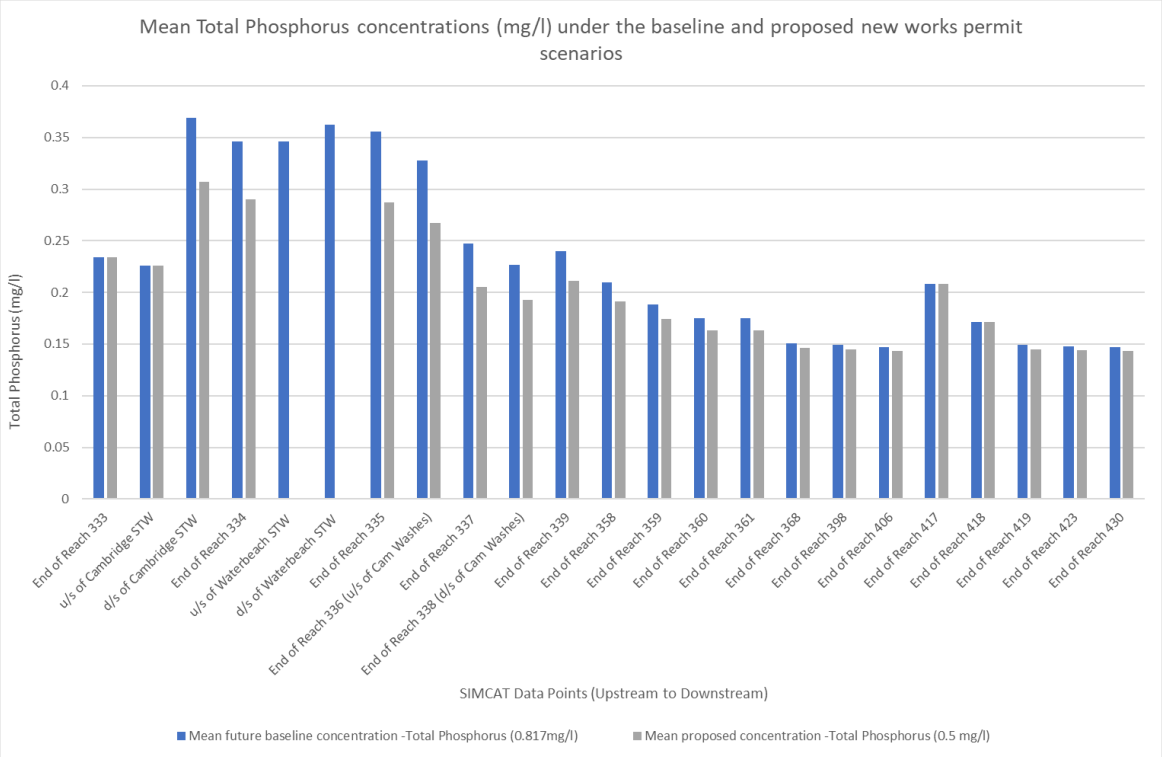


Figure 14 Modelled Total Phosphorus concentrations (mg/l) for the future baseline and the proposed new works permit scenarios at each SIMCAT model node from upstream of Cambridge WRC (existing and new site) to the Wash.

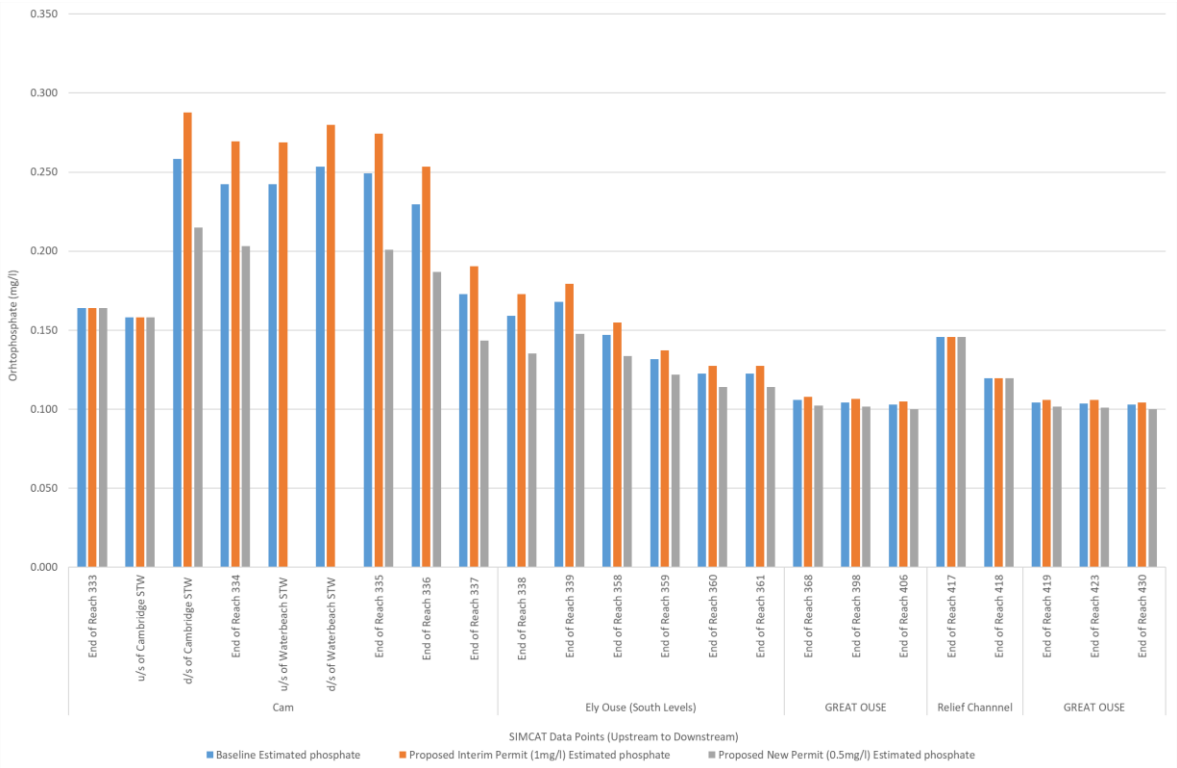


Figure 15 Modelled orthophosphate concentrations (mg/l) for the baseline and the proposed interim and new works scenarios at each SIMCAT model node from upstream of Cambridge WRCWRC (existing and new site) to Wash.

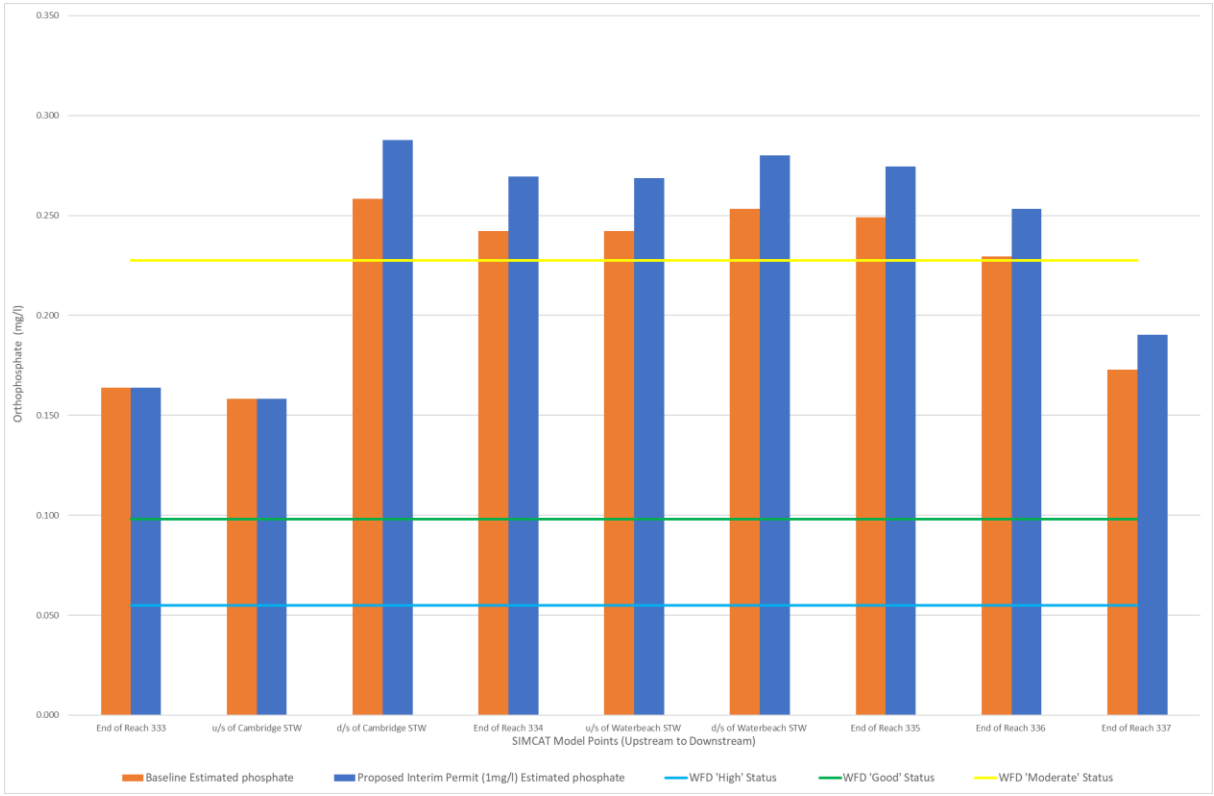


Figure 16 Modelled orthophosphate concentrations (mg/l) for the future baseline and proposed interim permit (1mg/l TP) within the Cam WFD water body against WFD classification boundaries. The 'Poor' WFD classification boundary is 1.124mg/l.

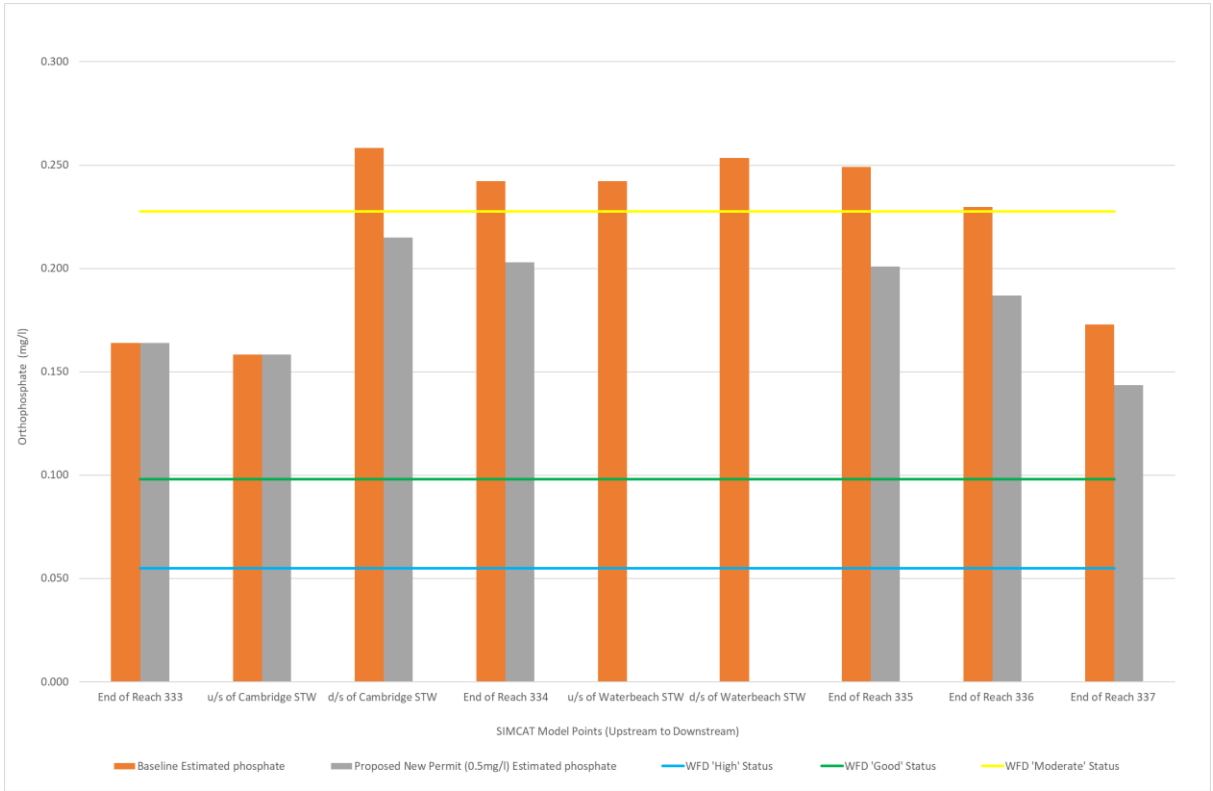


Figure 17 Modelled orthophosphate concentrations (mg/l) for the baseline and proposed new works permit (0.5mg/l TP) within the Cam WFD water body against WFD classification boundaries. The 'Poor' WFD classification boundary is 1.124mg/l.

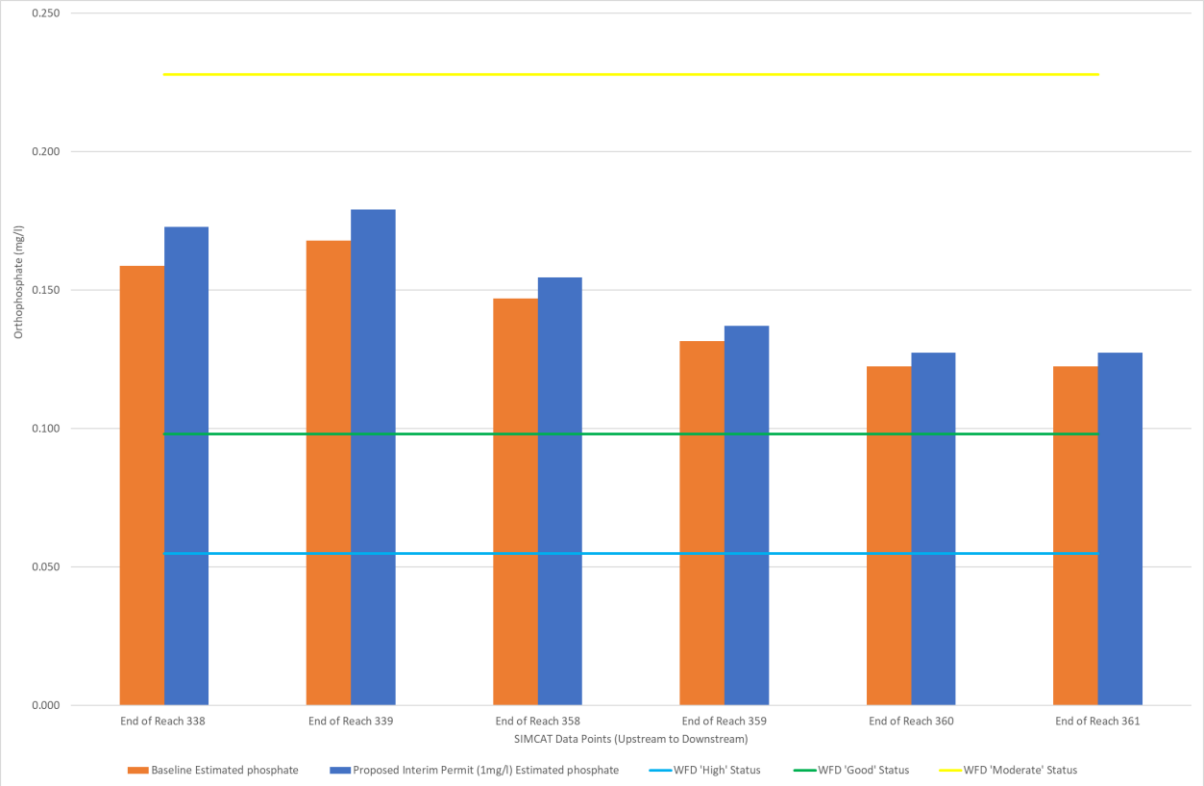


Figure 18 Modelled orthophosphate concentrations (mg/l) for the baseline and proposed interim permit (1mg/l TP) within the Ely Ouse (South Level) WFD water body against WFD classification boundaries. The 'Poor' WFD classification boundary is 1.124mg/l.

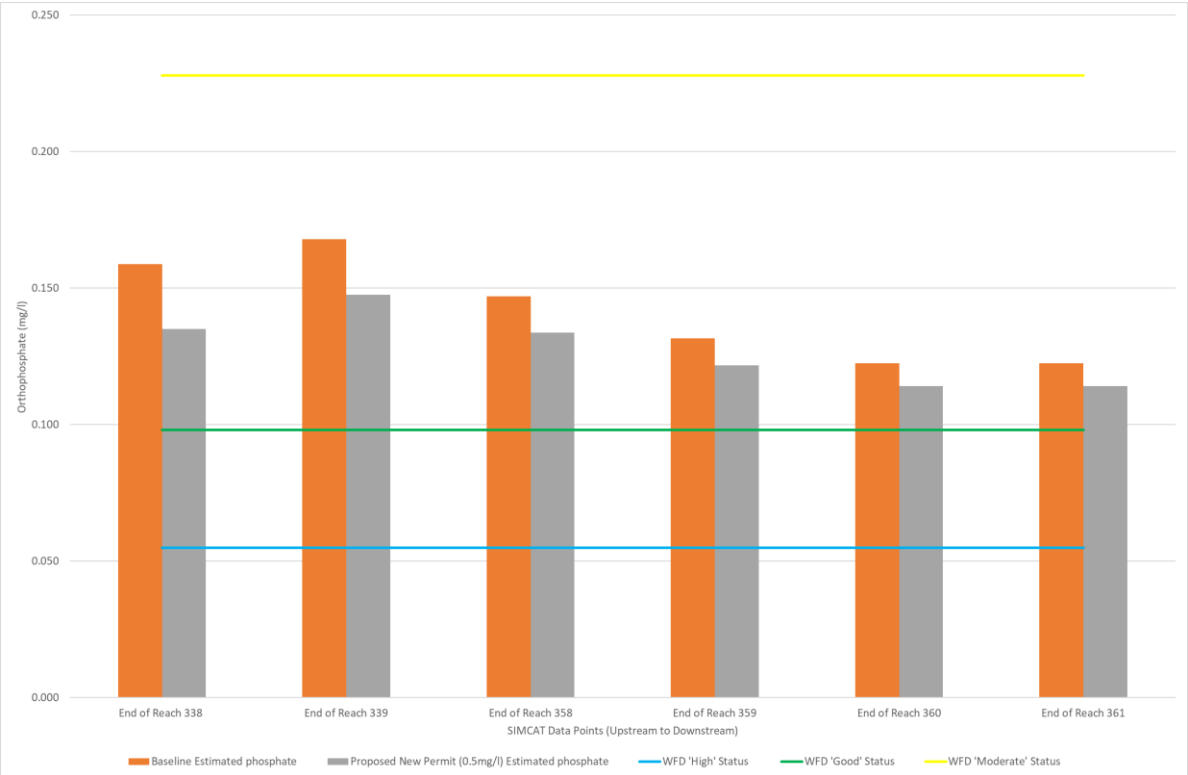


Figure 19 Modelled orthophosphate concentrations (mg/l) for the baseline and proposed new works permit (0.5mg/l TP) within the Ely Ouse (South Level) WFD water body against WFD classification boundaries. The 'Poor' WFD classification boundary is 1.124mg/l.

Appendix G: Water Quality and Ecological Assessment: Addendum

Milton Recycling Centre Discharge Consent: Water Quality and Ecological Assessment

Addendum

Anglian Water

FINAL

MILTON RECYCLING CENTRE RELOCATION PROJECT: WATER QUALITY AND ECOLOGICAL ASSESSMENT

Addendum

Project no. 4020267

Prepared for:

Anglian Water

Date: 1st February 2022

Table of contents

Details of document preparation and issue:

Version no.	Prepared	Checked	Reviewed	Approved	Issue date	Issue status
1	Nick Hill	Jenny Marshall-Evans	Simon Clarke	Simon Clarke	21/12/2021	Draft
2	Nick Hill	Jenny Marshall-Evans	Simon Clarke	Simon Clarke	01/02/2022	Final

Project no. 4020267

1. Background and purpose of this addendum

A water quality and ecological investigation was undertaken by Binnies and SWECO to assess the potential impact of proposed interim and revised permits on levels of phosphorus and suspended solids in the receiving waters downstream of the Cambridge Water Recycling Centre (WRC) at Milton. For Total Phosphorus (TP), an assessment of SAGIS-SIMCAT model results was made for a future baseline scenario (0.817mg/l) against proposed interim (1mg/l) and new (relocated Milton WRC) works permit scenarios (0.5mg/l).

This addendum provides further results and assessment for an additional modelled interim scenario with a TP value of 0.653mg/l. It also sets out justification for use of a TP:ortho-P ratio of 0.7:1. This addendum also assesses results from a flood model for the River Cam and the Tidal Great Ouse in relation to potential impact on designated sites.

2. Water Quality Assessment

2.1 Interim actual scenario

To provide further evidence of the potential change in TP concentrations under the proposed interim and new works permit scenarios, additional TP modelling has since been undertaken for an additional interim scenario ('interim actual') with a mean flow of 52,574 M^3/d and a TP value of 0.653mg/l. This is based on measured 2017-2021 data at Cambridge WRC. Results presented in Figure 2-1 and Table 2-2 show a betterment compared with predicted concentrations under the proposed interim permit (1mg/l) scenario and future baseline scenario. As with all other scenarios modelled, the interim actual values would remain within the 'Poor' phosphate WFD classification boundary.

At the model node points where a 10% deterioration exceedance is predicted under the proposed interim scenario (from downstream of Cambridge WRC to end of reach 337), the recent 'interim actual' scenario predicts an average improvement of 9.60% from the future baseline scenario (0.817mg/l) (Table 2-3). When comparing the average for these model node points between the recent 'interim actual' scenario and the proposed interim permit scenario, there is a 18.32% reduction in predicted phosphorus concentrations.

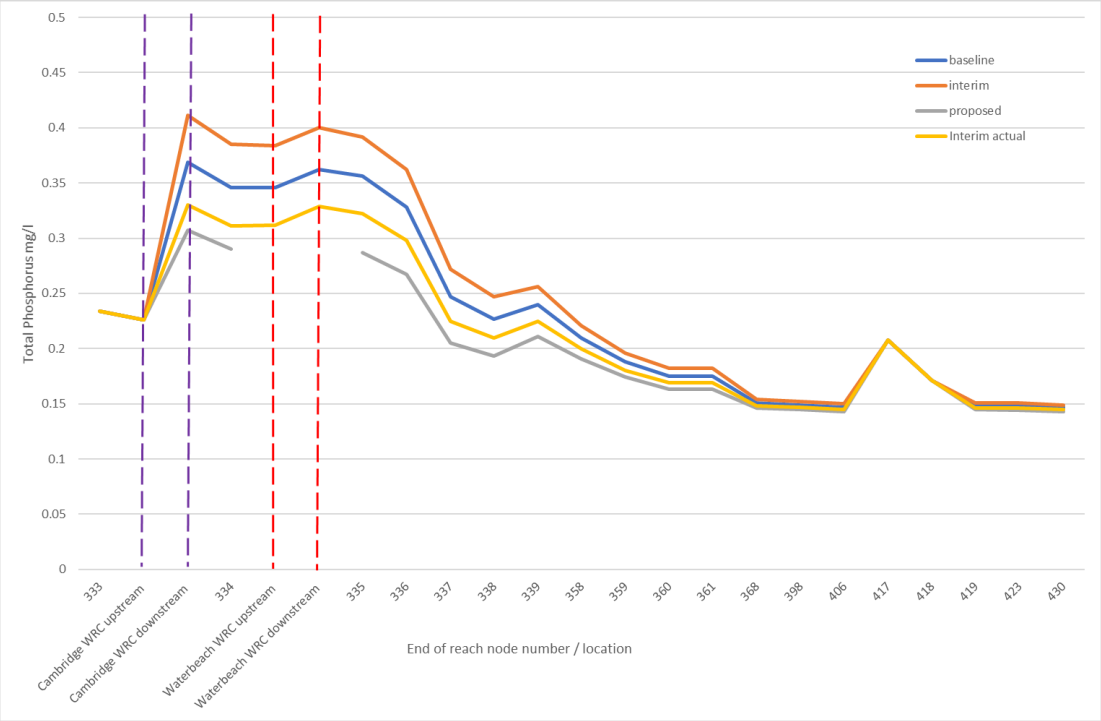


Figure 2-1 Total Phosphorus (TP) concentrations (mg/l) for the future baseline, interim, proposed and interim actual scenarios for each SAGIS-SIMCAT model node.

2.2 Ortho-P:TP ratio

A conversion factor was applied to TP concentrations (mg/l) to estimate ortho-P concentrations (mg/l). For assessment against WFD phosphate classifications for the Cam and Ely-Ouse water bodies (Table 2-1), orthophosphate (ortho-P) values were previously estimated by applying an ortho-P:TP ratio of 0.7:1 (OP=TP). The Environment Agency (EA) have requested that a more conservative ortho-P:TP ratio of 1:1 is applied.

TP and ortho-P recorded each month at Cambridge WRC between 2017 and 2021 (shown in Figure 2-2) showed an average ortho-P:TP ratio of 0.42:1. Table 2-2 presents all ortho-P results using ortho-P:TP ratios of 0.7:1 and 1:1. However, given a considerably lower ratio was measured at the works, it can be argued that 0.42:1 is a more appropriate ratio for this location and its downstream modelling points. The results presented using an ortho-P:TP ratio of 1:1 is considered to overestimate the predicted ortho-P concentrations for all permit scenarios and are too precautionary. Therefore, a ratio of 0.7:1 is regarded as the most appropriate estimate.

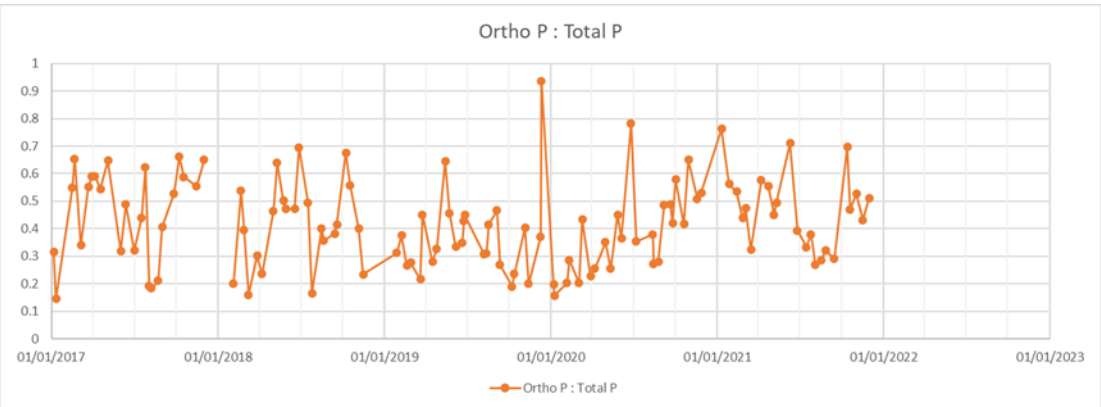


Figure 2-2 Ortho-P:TP ratio from data at Cambridge WRC between 2017 and 2021.

Table 2-1 WFD Orthophosphate standards for the Cam and Ely Ouse (South Level) water bodies

WFD Waterbody	WFD 'High' Status Boundary	WFD 'Good' Status Boundary	WFD 'Moderate' Status Boundary	WFD 'Poor' Status Boundary
Cam	0.055	0.098	0.228	1.124
Ely Ouse -South Levels	0.055	0.098	0.228	1.124

Table 2-2 Mean ortho-P concentrations (mg/l) for each SIMCAT modelled scenario. Ortho-P values were estimated using an ortho-P:TP ratio of 0.7:1 and 1:1 (OP=TP).

WFD Waterbody	SIMCAT Model Points	Future baseline (0.817mg/l) mean ortho-P concentration:		Interim (1mg/l) mean ortho-P concentration		Interim actual scenario (0.653mg/l) mean ortho-P concentrations		Proposed new works permit (0.5mg/l) mean ortho-P concentration	
		1:1 Ortho-P:TP (OP=TP)	0.7:1 Ortho-P:TP	1:1 Ortho-P:TP (OP=TP)	0.7:1 Ortho-P:TP	1:1 Ortho-P:TP (OP=TP)	0.7:1 Ortho-P:TP	1:1 Ortho-P:TP (OP=TP)	0.7:1 Ortho-P:TP
Cam	End of Reach 333	0.234	0.164	0.234	0.164	0.234	0.164	0.234	0.164
	u/s of Cambridge WRC	0.226	0.158	0.226	0.158	0.226	0.158	0.226	0.158
	d/s of Cambridge WRC	0.369	0.258	0.411	0.288	0.307	0.231	0.33	0.215
	End of Reach 334	0.346	0.242	0.385	0.270	0.29	0.218	0.311	0.203
	u/s of Waterbeach WRC	0.346	0.242	0.384	0.269	0.287	0.218	0.312	-
	d/s of Waterbeach WRC	0.362	0.253	0.4	0.280	0.267	0.230	0.329	-
	End of Reach 335	0.356	0.249	0.392	0.274	0.205	0.225	0.322	0.201
	End of Reach 336 (u/s of Cam Washes)	0.328	0.230	0.362	0.253	0.193	0.209	0.298	0.187
	End of Reach 337	0.247	0.173	0.272	0.190	0.211	0.158	0.225	0.144
Ely Ouse (South Level)	End of Reach 338 (d/s of Cam Washes)	0.227	0.159	0.247	0.173	0.191	0.147	0.21	0.135
	End of Reach 339	0.24	0.168	0.256	0.179	0.174	0.158	0.225	0.148
	End of Reach 358	0.21	0.147	0.221	0.155	0.163	0.140	0.2	0.134
	End of Reach 359	0.188	0.132	0.196	0.137	0.163	0.126	0.18	0.122
	End of Reach 360	0.175	0.123	0.182	0.127	0.146	0.118	0.169	0.114
	End of Reach 361	0.175	0.123	0.182	0.127	0.145	0.118	0.169	0.114
Great Ouse	End of Reach 368	0.151	0.106	0.154	0.108	0.143	0.104	0.148	0.102
	End of Reach 398	0.149	0.104	0.152	0.106	0.208	0.103	0.147	0.102
	End of Reach 406	0.147	0.103	0.15	0.105	0.171	0.102	0.145	0.100
Relief Channel	End of Reach 417	0.208	0.146	0.208	0.146	0.145	0.146	0.208	0.146
	End of Reach 418	0.171	0.120	0.171	0.120	0.144	0.120	0.171	0.120
Great Ouse	End of Reach 419	0.149	0.104	0.151	0.106	0.143	0.102	0.146	0.102
	End of Reach 423	0.148	0.104	0.151	0.106	0.234	0.102	0.146	0.101
	End of Reach 430	0.147	0.103	0.149	0.104	0.226	0.102	0.145	0.100

Table 2-3 Percentage change from future baseline to proposed interim (0.817mg/l), proposed new works (0.5mg/l) permit and interim actual (0.653mg/l) for both 0.7:1 and 1:1 ortho-P:TP ratios (the differences are the same), and percentage change from proposed interim to interim actual. Red cells show where concentrations are predicted to exceed 10% deterioration.

WFD Waterbody	SIMCAT Model Points	Change from future baseline (0.817mg/l) to proposed interim permit (1mg/l) (%)	Change from future baseline (0.817mg/l) to interim actual scenario (0.653mg/l) (%)	Change from future baseline (0.817mg/l) to proposed new works permit (%)	Change from interim permit scenario (1mg/l) to interim actual scenario (0.653mg/l) (%)
Cam	End of Reach 333	0.00%	0.00%	0.00%	0.00%
	u/s of Cambridge WRC	0.00%	0.00%	0.00%	0.00%
	d/s of Cambridge WRC	11.38%	-10.57%	-16.80%	-19.71%
	End of Reach 334	11.27%	-10.12%	-16.18%	-19.22%
	u/s of Waterbeach WRC	10.98%	-9.83%	-	-18.75%
	d/s of Waterbeach WRC	10.50%	-9.12%	-	-17.75%
	End of Reach 335	10.11%	-9.55%	-19.38%	-17.86%
	End of Reach 336 (u/s of Cam Washes)	10.37%	-9.15%	-18.60%	-17.68%
	End of Reach 337	10.12%	-8.91%	-17.00%	-17.28%
Ely Ouse (South Level)	End of Reach 338 (d/s of Cam Washes)	8.81%	-7.49%	-14.98%	-14.98%
	End of Reach 339	6.67%	-6.25%	-12.08%	-12.11%
	End of Reach 358	5.24%	-4.76%	-9.05%	-9.50%
	End of Reach 359	4.26%	-4.26%	-7.45%	-8.16%
	End of Reach 360	4.00%	-3.43%	-6.86%	-7.14%
	End of Reach 361	4.00%	-3.43%	-6.86%	-7.14%
Great Ouse	End of Reach 368	1.99%	-1.99%	-3.31%	-3.90%
	End of Reach 398	2.01%	-1.34%	-2.68%	-3.29%
	End of Reach 406	2.04%	-1.36%	-2.72%	-3.33%
Relief Channel	End of Reach 417	0.00%	0.00%	0.00%	0.00%
	End of Reach 418	0.00%	0.00%	0.00%	0.00%
Great Ouse	End of Reach 419	1.34%	-2.01%	-2.68%	-3.31%
	End of Reach 423	2.03%	-1.35%	-2.70%	-3.31%
	End of Reach 430	1.36%	-1.36%	-2.72%	-2.68%

3. Flood model output assessment

As specified in the project scope, an assessment of the impact of flood flows on designated sites under the interim and proposed new works permits is required. A fluvial flood model provided by the EA was ran for the River Cam (5-year, 50-year and 100-year return periods) and a tidal flood model ran for the Tidal Great Ouse (10, 20, 30, 75, 100 and 200-year return periods). The fluvial model for the Great Ouse (between the Cam and the tidal limit) was not available and therefore has not been assessed.

Figure 1: to Figure 3: show the flood output for the River Cam under the 5, 50 and 100 year flood events. For a 5-year flood event, the majority of the Cam Washes SSSI is predicted to be inundated with only some areas of the eastern floodplain, near Padney, remaining dry. Under the 50-year and 100-year flood events, almost all the SSSI boundary would be inundated. Given that an increase in phosphorus concentrations is predicted for the proposed interim permit (1mg/l), there is a risk of adverse impacts to the favourable condition status of Cam Washes SSSI. Therefore, a more detailed Stage 2 assessment of the flood event impacts on the site will be required.

Figure 4: to Figure 6: show the flood output for the Tidal Great Ouse under 10, 20, 30, 75, 100 and 200-year return periods. For a 10-year tidal flood event, the Ouse Washes SSSI is partially inundated. An increasing level of inundation for the other return periods is predicted. There is therefore a risk of adverse impacts to the Ouse Washes SSSI, SAC, SPA and Ramsar from changes to the Cambridge WRC permit, and further assessment at Stage 2 is required.

4. Conclusion

This addendum has provided updates to the water quality and WFD compliance assessment presented in the main report. Further modelling under an interim actual scenario (0.65mg/l) was undertaken to provide further evidence of the potential change in TP concentrations under the proposed interim and new works permit scenarios. Results showed a betterment compared with predicted concentrations under the proposed interim permit (1mg/l) scenario and future baseline scenario.

As measured TP and ortho-P data at Cambridge WRC showed an ortho-P:TP ratio of 0.42, it is considered that an ortho-P:TP ratio of 1:1 provides an overestimation of ortho-P results. It is therefore considered that a ratio of 0.7:1 provides the most appropriate and cautious estimate for ortho-P values.

A fluvial and tidal flood model was run for the River Cam and the Tidal Great Ouse respectively. Flood extent maps have identified the potential for adverse impact on the Cam Washes SSSI and Ouse Washes SSSI. Further assessment at Stage 2 will be required.

FIGURES

Figure 1: 1 in 5 Flood Event – River Cam

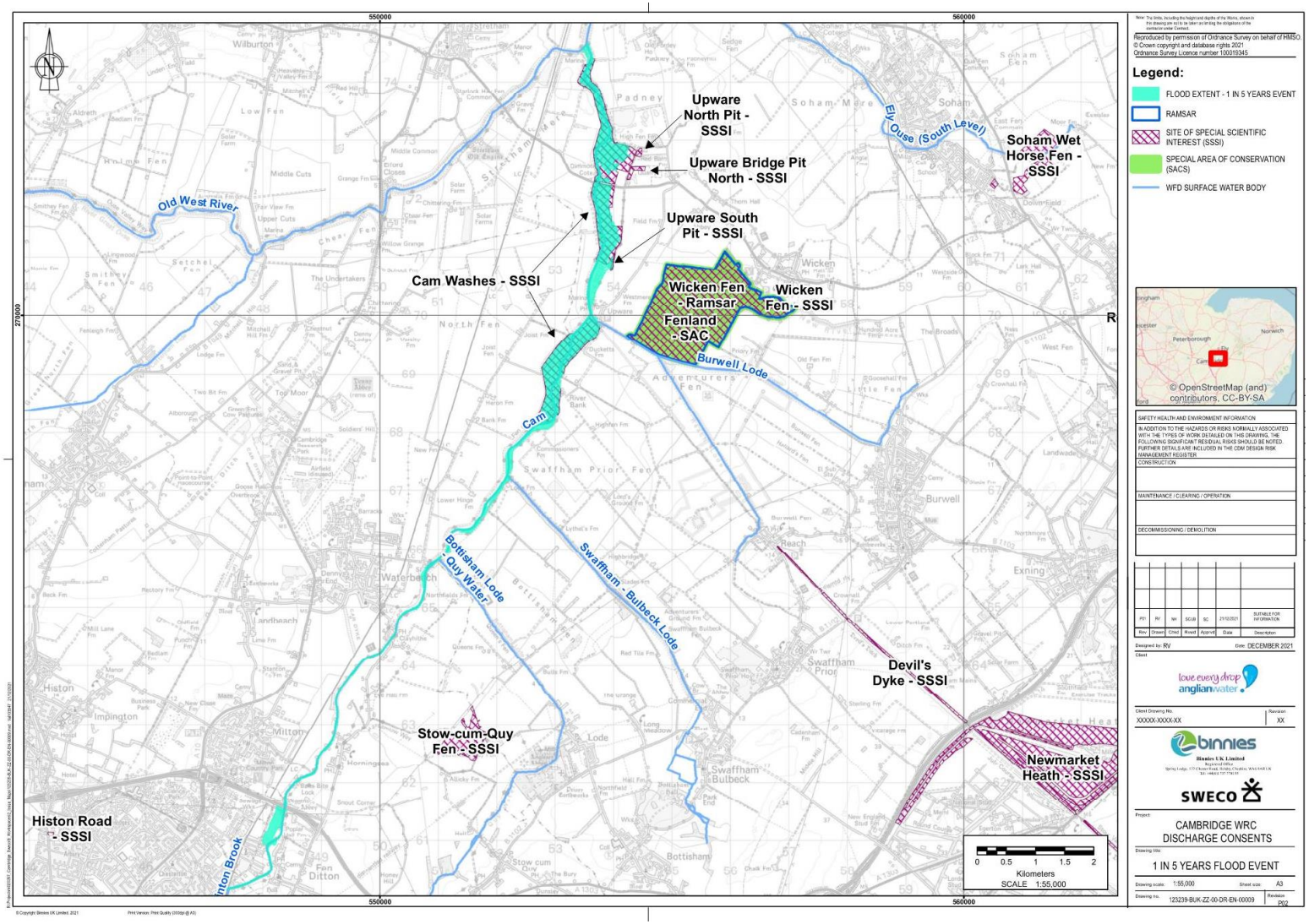


Figure 2: 1 in 50 Flood Event – River Cam

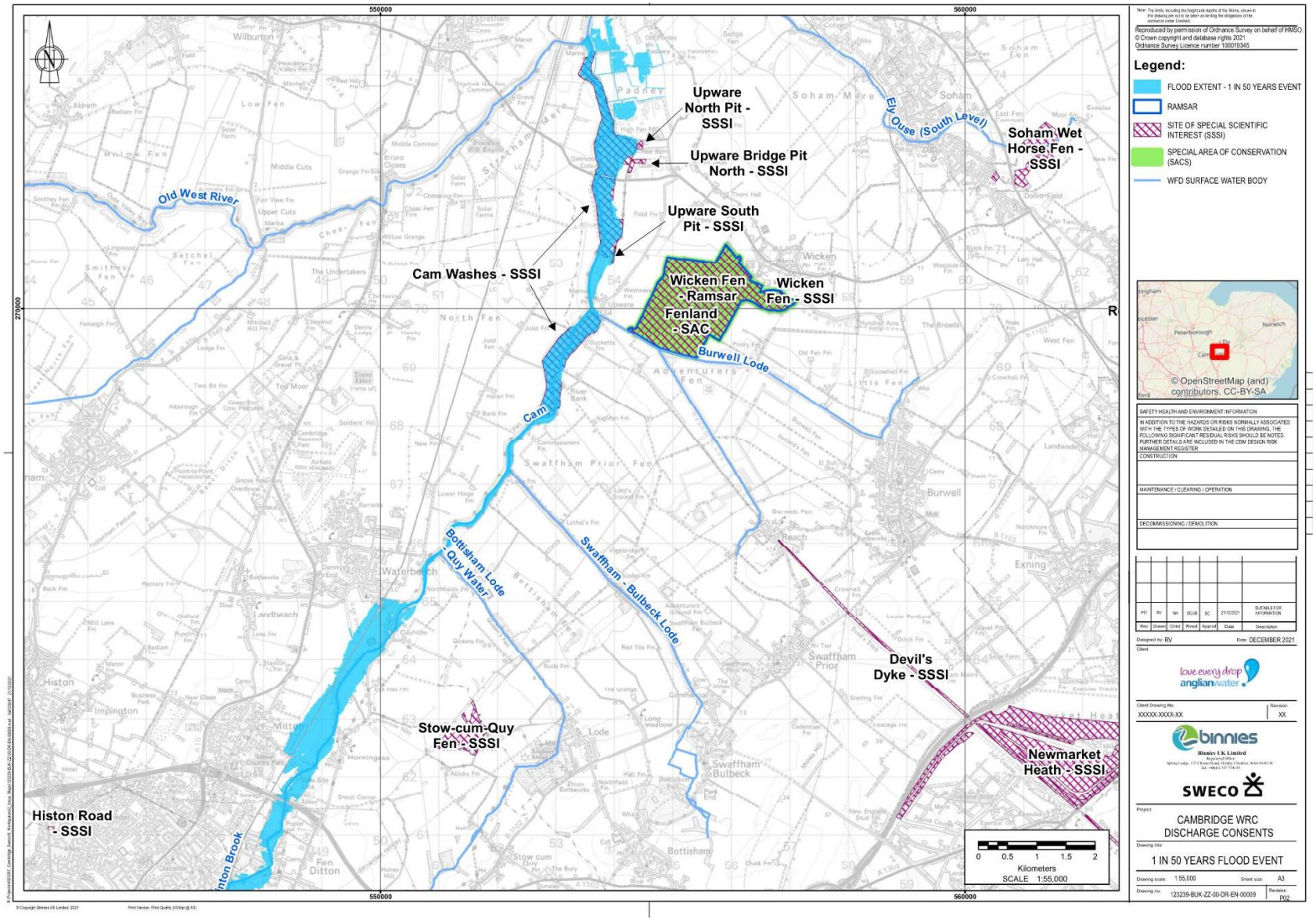


Figure 3: 1 in 100 Flood Event – River Cam

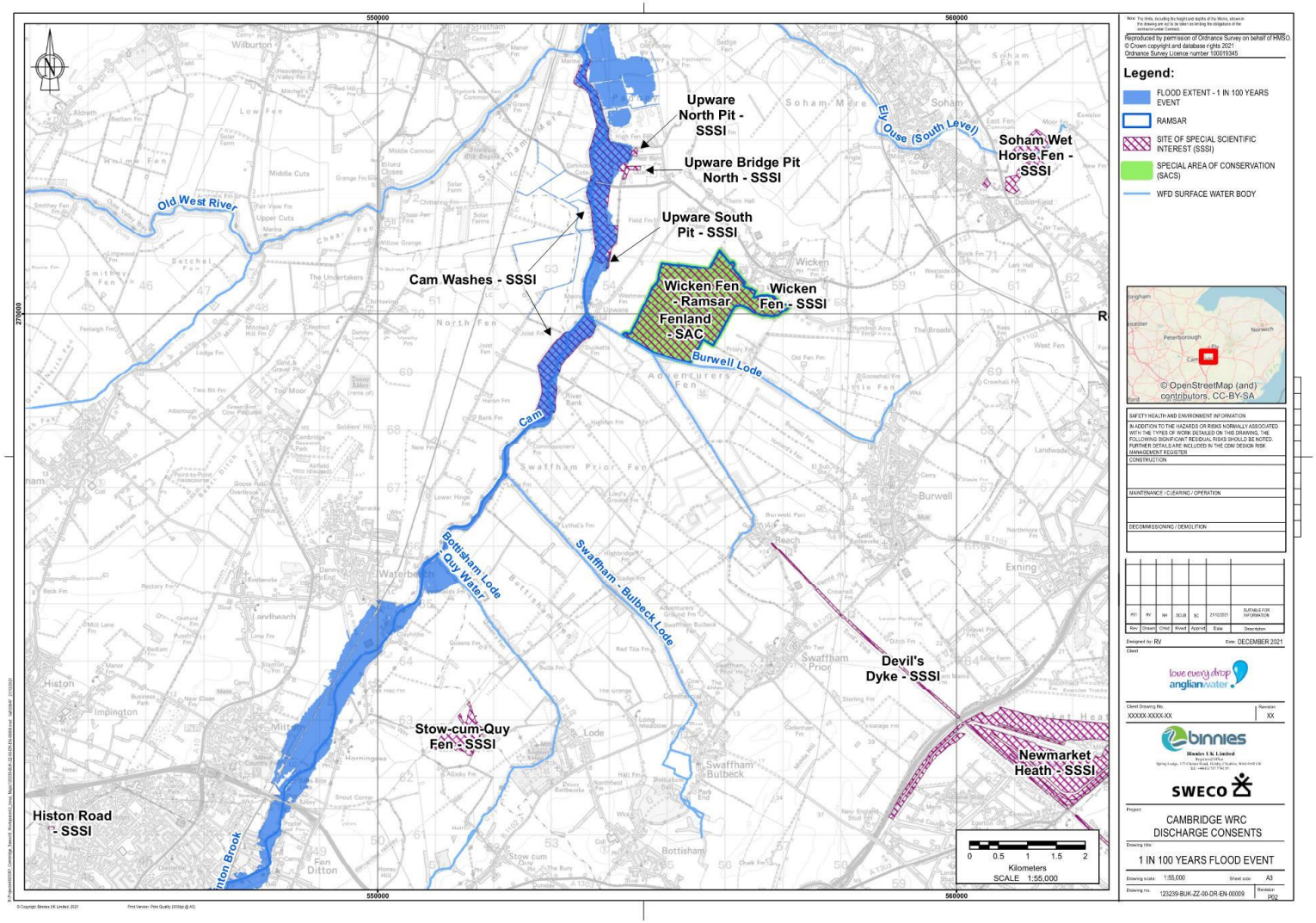


Figure 4: 1 in 10, 20, 30 and 75 Flood Event – Tidal Great Ouse

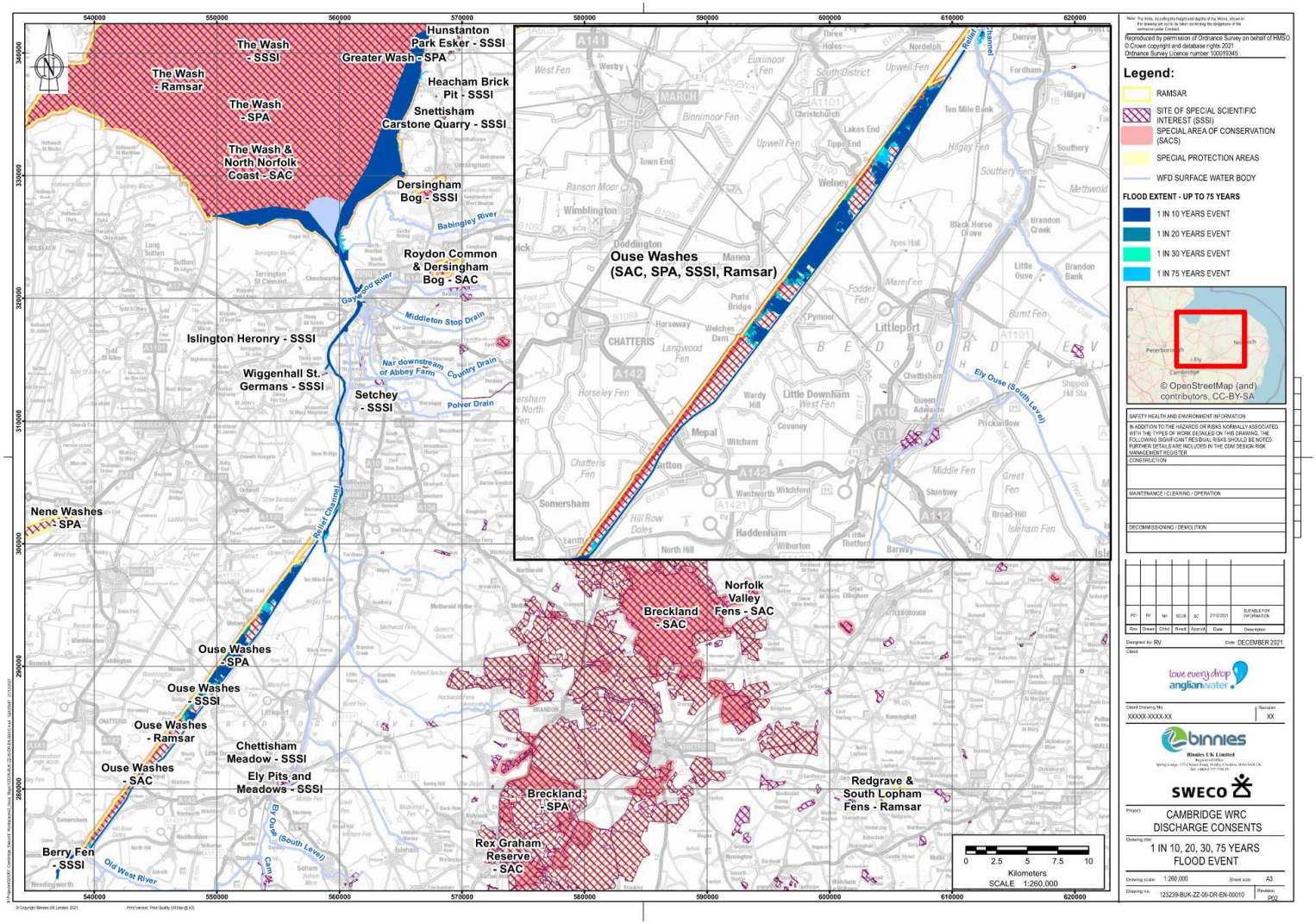


Figure 5: 1 in 100 Flood Event – Tidal Great Ouse

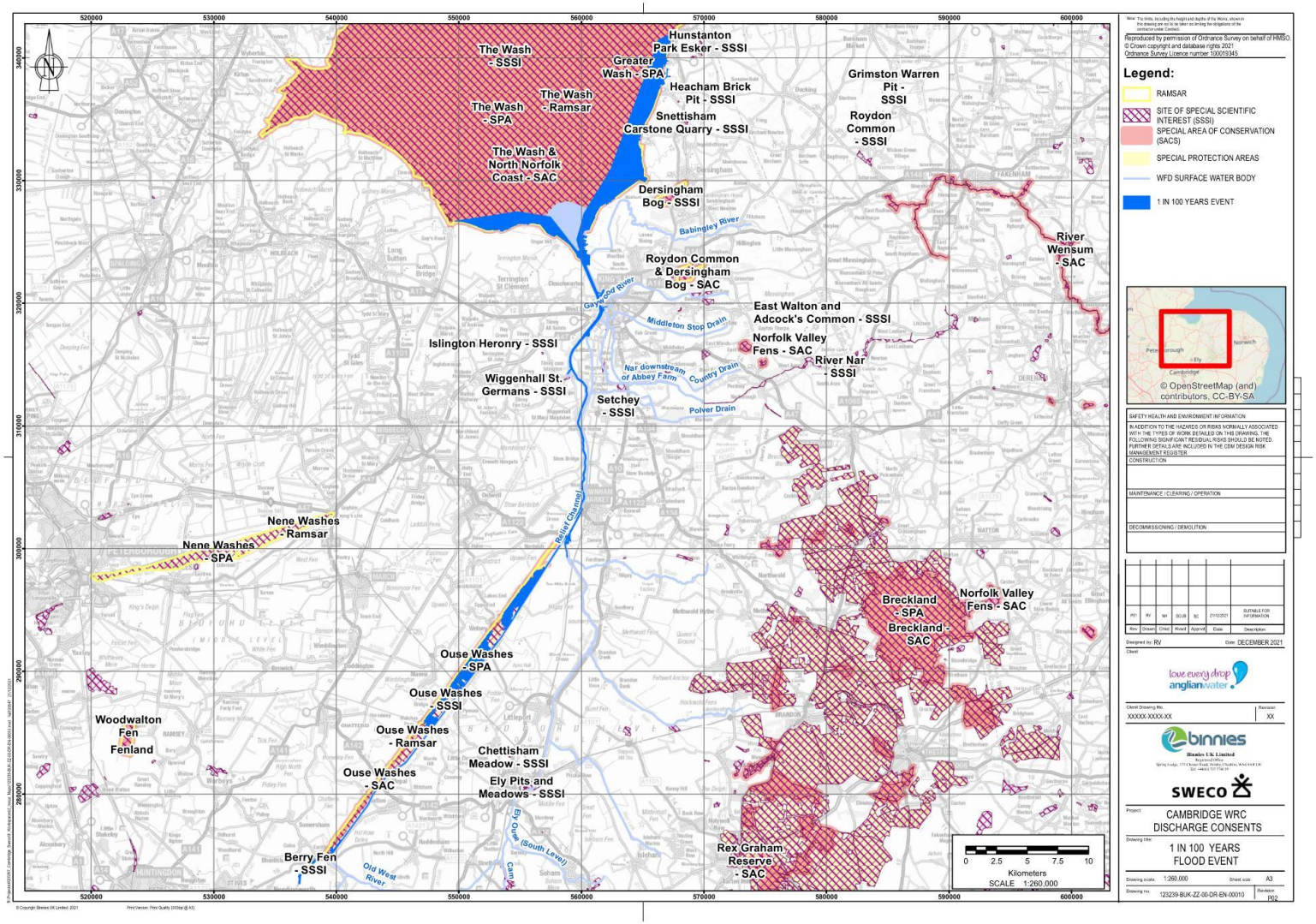
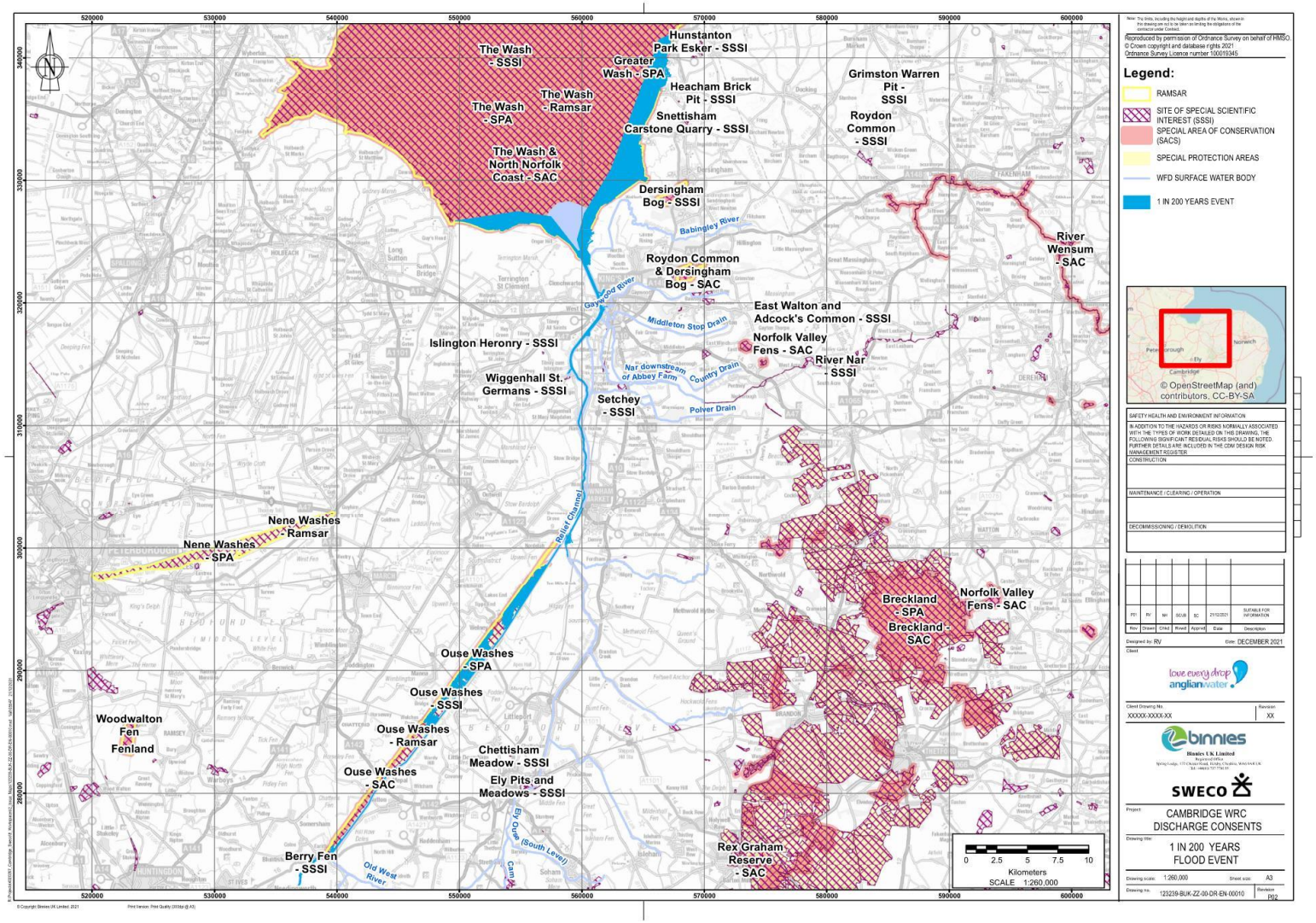


Figure 6: 1 in 200 Flood Event – Tidal Great Ouse



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https://infrastructure.planninginspectorate.gov.uk/projects/eastern/cambridge-waste-water-treatment-plant-relocation/