Appendix I: Surface Water, Groundwater & Water Framework Directive

Appendix G Table 1: Additional information on the non-WFD surface water bodies from the RTS Ecological Monitoring Project (EA, 2016).

Appendix G Table 2: Additional information on the WFD lake water bodies.

Appendix G Table 3: Additional information on the WFD river water bodies.

Appendix G Table 4: Additional information on the WFD groundwater bodies.

Appendix G Table 5: Additional information on the WFD transitional water bodies.

Appendix G Table 6: Summary of groundwater - lake level interaction based on RTS Ecological Surveys Monitoring Project (EA, 2016).

Appendix Table 1: Additional information on the non-WFD surface water bodies from the RTS Ecological Monitoring Project (EA, 2016).

Non-WFD water body	Mean Hard Bed Depth (m)	Water level (mAOD)				WFD classification elements determined using the results of the Ecological Monitoring Project					
		Min	Max	Range	Period of monitoring	Total Phosphorus	Dissolved oxygen concentrations	Phytoplankton	Phytobenthos	Macrophytes	Benthic macroinverte-brates
Datchet 2	3.67	15.12	15.78	0.67	Aug 13 – Nov 13 Aug 14 – Jun 15	Moderate	High	Moderate	Good	Poor	Moderate
Datchet 3 (N)	3.22	15.07	15.74	0.68	Aug 13 – Nov 13 Aug 14 – Jun 15	Good	High	Good	Good	Moderate	Good
Datchet 3 (S)	2.69										
Sunnymeads 1		15.98	16.64	0.67	Mar 13 – Jun 14 Aug 14 – Jun 15	Good	High	High	Good	Moderate	Moderate
Sunnymeads 2	1.60	15.95	16.60	0.64	Mar 13 – Jun 14 Aug 14 – Jun 15	High	High	High	Moderate	Poor	Good
Kingsmead Island Lakes	4.71	16.16	16.70	0.54	Oct 14 – Jun 15	Moderate	High	Good	Good	Moderate	Moderate
Sunnymeads 3	3.46	15.76	16.12	0.37	Jun 14 – Aug 14 Oct 14 – Jun 15	High	High	High	Good	Moderate	Good
Horton 2	6.04	-	-	-	-	-	-	-	-	-	-
Kingsmead 1 (S)	5.41	-	-	-	-	-	-	-	-	-	-
Douglas Lane	-	-	-	-	-	-	-	-	-	-	-
Lower Hythe Gravel Pit 1	2.61	-	-	-	-	-	-	-	-	-	-
Lower Hythe Gravel Pit 2	3.57	-	-	-	-	-	-	-	-	-	-
Lower Hythe Gravel Pit 3	2.41	-	-	-	-	-	-	-	-	-	-
Egham Hythe Pond	2.69	-	-	-	-	-	-	-	-	-	-
Lake South of Green Lane	3.33	-	-	-	-	-	-	-	-	-	-
Lake South of Northlands Lane 1	2.50	-	-	-	-	-	-	-	-	-	-
Abbey 1	5.06	9.60	10.92	1.32	May 13 – Aug 13 Sep 14 – Jun 15	Moderate	High	Good	Good	Moderate	Good
Abbey 2	5.22	9.19	10.23	1.04	May 13 – Aug 13 Sep 14 – Jun 15	Good	High	Good	Good	Bad	Moderate
Abbey River	-	11.25	11.53	0.28	April 15 - Jun 15	-	-	-	-	-	-
Littleton North	5.97	11.01	12.70	1.70	Nov 13 – Jan 14 Aug 14 – Jun 15	Moderate	High	Moderate	Good	Poor	Good
Littleton South	6.00	10.05	12.72	2.67	Nov 13 – Jan 14 Sep 14 – Jun 15	Good	High	Moderate	Good	Moderate	Good
Littleton East	6.78	9.64	10.51	0.87	Feb 13 – May 13 Sep 14 – Jun 15	Good	High	Good	Good	Moderate	Good
Sheepwalk West 1	3.74	9.76	10.40	0.64	Nov 12 – Feb 13 Aug 14 – Jun 15	-	-	-	-	-	-
Sheepwalk West 2	4.07					Good	High	Good	Good	Poor	Moderate
Sheepwalk West 3	3.64					-	-	-	-	-	-
Sheepwalk East	4.34	9.52	10.25	0.73	Nov 12 – Feb 13 Aug 14 – Jun 15	Good	High	Good	Good	Moderate	Good
Ferry Lane	5.27	8.40	9.28	0.88	Feb 13 – May 13 Aug 14 – Jun 15	Poor	High	Moderate	Good	Moderate	Moderate

Appendix Table 1: Additional information on the WFD lake water bodies.

WFD Lakes		Queen Mother Reservoir - GB30642334 - Artificial	Wraysbury Lake - GB30642430 - Artificial		Wraysbury No 2 - GB30642489 - Artificial		Heron Lake - GB30642538 - Artificial	Wraysbury Reservoir - GB30642417 - Artificial	Queensmead - GB30642569 - Artificial	Thorpe Park Lakes - GB30642753 - Artificial			
			Wraysbury 1 (N)	Wraysbury 1 (S)	Wraysbury 2 (N)	Wraysbury 2 (S)	Wraysbury Hilton			Fleet Lake	Abbey Lake	Manor Lake	St Ann's Lake
Mean Hard Bed Depth (m)		-	4.70	4.16	4.55	6.98	3.88	-	-	5.35	5.79	6.66	4.64
Water level (mAOD)	**Min**	-	14.91		14.91		-	-	-	12.13			12.04
	Max	-	16.18		16.18		-	-	-	13.56			13.47
	Range	-	1.27		1.27		-	-	-	1.43			1.43
	Period of monitoring	-	Sept 14 - Jun 15		Jan 13 - Jun 15		-	-	-	Aug 14 - Jun 15			Jan 13 - Jun 15
WFD 2015 RMBP Status	**Ecological Objective**	Good by 2021	Good by 2027		Good by 2027		Good by 2027	Moderate by 2015	Good by 2027	Good by 2027			
	Chemical Objective	Good by 2015	Good by 2015		Good by 2015		Good by2015	Good by 2015	Good by 2015	Good by 2015			
	Overall Objective	Good by 2021	Good by 2027		Good by 2027		Good by 2027	Moderate by 2015	Good by 2027	Good by 2027			
	Hydromorphological Supporting Conditions												
	Quantity and dynamics of water flow	Not used to classify this water body	Supports Good		Supports Good		Not used to classify this water body	Not used to classify this water body	Not used to classify this water body	Supports Good			
	Residence time												
	Connection to the groundwater body												
	Lake depth variation												
	Quantity, structure and substrate of the lake bed												
	Structure of the lake shore												
	Physico-chemical Supporting Elements												
	Transparency	Not used to classify this water body	Not using to classify this water body		Not used to classify this water body		Not used to classify this water body	Not used to classify this water body	Not used to classify this water body	Not used to classify this water body			
	Thermal conditions									Not used to classify this water body			
	Oxygenation conditions (DO)									High			
	Salinity		High					High		High			
	Acidification status (pH)		Not using to classify this water body					Not used to classify this water body		Not used to classify this water body			
	Nutrient conditions		Good					Bad		Good			
	Specific pollutants		Not using to classify this water body		High (Copper)			High (Copper)		High (Copper)			
	Biological Quality Elements												
	Phytoplankton	Not used to classify this water body	Moderate		Not used to classify this water body		Not used to classify this water body	High	Not used to classify this water body	Good			
	Macrophytes and phytobenthos (combined)		Poor					Not used to classify this water body		Moderate			
	Macrophytes		Poor							Moderate			

WFD Lakes		Queen Mother Reservoir - GB30642334 - Artificial	Wraysbury Lake - GB30642430 - Artificial		Wraysbury No 2 - GB30642489 - Artificial		Heron Lake - GB30642538 - Artificial	Wraysbury Reservoir - GB30642417 - Artificial	Queensmead - GB30642569 - Artificial	Thorpe Park Lakes - GB30642753 - Artificial			
			Wraysbury 1 (N)	Wraysbury 1 (S)	Wraysbury 2 (N)	Wraysbury 2 (S)	Wraysbury Hilton			Fleet Lake	Abbey Lake	Manor Lake	St Ann's Lake
	Phytobenthos		Not using to classify this water body							Moderate			
	Benthic invertebrate fauna									Not used to classify this water body			
	Fish fauna									Not used to classify this water body			
	Chemical Status												
	Priority hazardous substances	Good	Not used to classify this water body		Not used to classify this water body		Not used to classify this water body	Not used to classify this water body	Not used to classify this water body	Not used to classify this water body			
	Priority substances												
	Other Pollutants												
	Supporting Elements	Moderate	Moderate		Moderate		Moderate	Moderate	Moderate	Good			
	Overall Status (2015)	Moderate	Poor		Moderate		Moderate	Moderate	Moderate	Moderate			
	Designations	Drinking Water Directive	Conservation of Wild Birds Directive		Conservation of Wild Birds Directive		Drinking Water Directive	Conservation of Wild Birds Directive	Drinking Water Directive	Conservation of Wild Birds Directive			
								Drinking Water Directive					
		Urban Waste Water Treatment Directive			Urban Waste Water Treatment Directive			Nitrates Directive	Nitrates Directive	Nitrates Directive			
								Urban Waste Water Treatment Directive					

Appendix Table 2: Additional information on the WFD river water bodies.

WFD Rivers		River Thames (Cookham to Egham) GB106039023231 - HMWB	Datchet Common Brook - GB106039023520 - HMWB	Horton Drain - GB106039023040 - HBWM	River Thames (Egham to Teddington) - GB106039023232 - HMWB	Chertsey Bourne (Virginia Water to Chertsey) - GB106039017070 - HMWB	Chertsey Bourne (Chertsey to River Thames confluence) - GB106039017030 - Not HMWB	The Moat at Egham - GB106039017060 - HMWB	Colne Brook - GB106039023010 - HMWB	Colne (confluence with Chess to River Thames) GB106039023090 - HMWB	Surrey Ash - GB106039023480 - HMWB	Mole (Hersham to River Thames Conf at East Molesey) - GB106039017622 - HMWB	Wey (Shalford to River Thames confluence at Weybridge) - GB106039017630 - HMWB	Addlestone Bourne (Mill / Hale to Chertsey Bourne) - GB106039017020 - Not HMWB
Mean Hard Bed Depth (m)		-	-	-	-	-	-	-	-	-	-	-	-	-
Water level (mAOD)	**Min**	14.48	-	-	-	-	-	-	-	-	-	-	-	-
	Max	15.13	-	-	-	-	-	-	-	-	-	-	-	-
	Range	0.65	-	-	-	-	-	-	-	-	-	-	-	-
	Period of monitoring	Feb 2015 - Jun 2015	-	-	-	-	-	-	-	-	-	-	-	-
WFD 2015 RMBP Status	**Ecological Objective**	**Moderate by 2015**	**Good by 2027**	**Good by 2027**	**Poor by 2015**	**Good by 2027**	**Poor by 2015**	**Good by 2027**	**Moderate by 2015**	**Moderate by 2015**	**Moderate by 2015**	**Moderate by 2015**	**Moderate by 2015**	**Good by 2027**
	Chemical Objective	**Good by 2015**	**Good by 2015**	**Good by 2015**	**Good by 2015**	**Good by 2015**	**Good by 2015**	**Good by 2015**	**Good by 2015**	**Good by 2015**	**Good by 2015**	**Good by 2015**	**Good by 2015**	**Good by 2015**
	Overall Objective	**Moderate by 2015**	**Good by 2027**	**Good by 2027**	**Poor by 2015**	**Good by 2027**	**Poor by 2015**	**Good by 2027**	**Moderate by 2015**	**Moderate by 2015**	**Moderate by 2015**	**Moderate by 2015**	**Moderate by 2015**	**Good by 2027**
	Hydromorphological Supporting Conditions													
	Quantity and dynamics of water flow	Not used to classify this water body	Supports Good	Supports Good	Not used to classify this water body	Supports Good	Supports Good	Does not support good	Supports Good	Does not support good	Supports Good	Supports Good	Supports Good	Supports Good
	Connection to groundwater bodies													
	River continuity													
	River depth and width variation													
	Structure and substrate of the river bed													
	Structure of the riparian zone													
	Physico-chemical Supporting Elements													
	Thermal conditions	High	High	High	High	High	High	High	High	High	High	High	High	High
	Oxygenation conditions (DO)	High	Moderate	Good	High	Good	Moderate	Bad	High	High	Good	High	High	Good
	BOD	High	Not used to classify this water body	Not used to classify this water body	High	Not used to classify WFD status	Not used to classify WFD status	Not used to classify WFD status	Not used to classify WFD status	High	Not used to classify WFD status	Good	High	Not used to classify WFD status
	Acidification status (pH)	High	High	High	High	High	High	High	High	High	High	High	High	High
	Acid Neutralising Capacity	Not used to classify this water body	Not used to classify this water body	Not used to classify this water body	Not used to classify this water body	Not used to classify this water body	Not used to classify this water body	Not used to classify this water body	High	High	Not used to classify WFD status	High	High	Not used to classify WFD status
	Ammonia	High	High	High	High	High	Good	Good	High	High	High	Moderate	High	High
	Nutrient conditions	Moderate	Moderate	Moderate	Moderate	Good	Poor	Moderate	Poor	Poor	Moderate	Poor	Moderate	Moderate
	Specific pollutants	High (Arsenic, Copper, Iron, Zinc & Manganese)	Not used to classify this water body	Not used to classify this water body	High (Arsenic, Copper, Iron, Permethrin, Zinc, Manganese)	High (Iron & Triclosan)	High (Iron & Triclosan)	Not used to classify this water body	High (Copper, Zinc, Triclosan)	High (Arsenic, Copper, Iron, Permethrin, Zinc, Triclosan, Manganese)	High (Iron, Triclosan)	High (Arsenic, Copper, Iron, Permethrin, Zinc, Manganese)	Not used to classify this water body	Not used to classify this water body
	Biological Quality Elements													

WFD Rivers	River Thames (Cookham to Egham) GB106039023231 - HMWB	Datchet Common Brook - GB106039023520 - HMWB	Horton Drain - GB106039023040 - HBWM	River Thames (Egham to Teddington) - GB106039023232 - HMWB	Chertsey Bourne (Virginia Water to Chertsey) - GB106039017070 - HMWB	Chertsey Bourne (Chertsey to River Thames confluence) - GB106039017030 - Not HMWB	The Moat at Egham - GB106039017060 - HMWB	Colne Brook - GB106039023010 - HMWB	Colne (confluence with Chess to River Thames) GB106039023090 - HMWB	Surrey Ash - GB106039023480 - HMWB	Mole (Hersham to River Thames Conf at East Molesey) - GB106039017622 - HMWB	Wey (Shalford to River Thames confluence at Weybridge) - GB106039017630 - HMWB	Addlestone Bourne (Mill / Hale to Chertsey Bourne) - GB106039017020 - Not HMWB
Phytoplankton	Not used to classify this water body	Not used to classify this water body	Not used to classify this water body	Not used to classify this water body	Not used to classify this water body	Not used to classify this water body	Not used to classify this water body	Not used to classify this water body	Not used to classify this water body	Not used to classify this water body	Not used to classify this water body	Not used to classify this water body	Not used to classify this water body
Macrophytes and phytobenthos	High	Moderate	Moderate	Poor	Not used to classify this water body	Not used to classify this water body	Moderate		Good			Moderate	Moderate
Benthic invertebrate fauna	Good	Good	Good	Good	Good	High	Poor		High	Good	Good	High	Not used to classify this water body
Fish fauna	Not used to classify this water body	Not used to classify this water body	Not used to classify this water body	Not used to classify this water body	Bad	Good	Not used to classify this water body	Bad	Moderate	Good	Good	Moderate	Good
Chemical Status													
Priority hazardous substances	Good	Not used to classify this water body	Good	Good	Not used to classify this water body	Not used to classify this water body	Not used to classify this water body	Good	Good	Good	Good	Not used to classify this water body	Not used to classify this water body
Priority substances	Good		Good	Good				Good	Good	Not used to classify this water body	Good		
Other Pollutants	Good		Not used to classify this water body	Good				Not used to classify this water body	Good		Good		
Overall Status (2015)	**Moderate**	**Moderate**	**Moderate**	**Poor**	**Moderate**	**Poor**	**Poor**	**Moderate**	**Moderate**	**Moderate**	**Moderate**	**Moderate**	**Moderate**
Designations	Conservation of Wild Birds Directive Drinking Water Directive Nitrates Directive Urban Waste Water Treatment Directive	Conservation of Wild Birds Directive		Conservation of Wild Birds Directive Drinking Water Directive Nitrates Directive Urban Waste Water Treatment Directive	Conservation of Wild Birds Directive Habitats Directive Nitrates Directive	Nitrates Directive	Conservation of Wild Birds Directive Nitrates Directive	Conservation of Wild Birds Directive Nitrates Directive	Conservation of Wild Birds Directive Nitrates Directive	Conservation of Wild Birds Directive Nitrates Directive	Nitrates Directive	Drinking Water Directive Nitrates Directive	Nitrates Directive

Appendix Table 3: Additional information on the WFD groundwater bodies.

WFD Groundwater Bodies		Lower Thames Gravels - GB40603G000300	Chobham Bagshot Beds - GB40602G601400
WFD 2015 RMBP Status	**Quantitative Objective**	**Good by 2015**	**Good by 2015**
	Chemical Objective	**Good by 2015**	**Good by 2015**
	Overall Objective	**Good by 2015**	**Good by 2015**
	Quantitative Elements		
	Saline or other intrusions	Good	Good
	Surface water	Good	Good
	Groundwater Dependent Terrestrial Ecosystems (GWDTE's)	Good	Good
	Water balance	Good	Good
	Physico-chemical Supporting Elements		
	Saline or other intrusion	Good	Good
	Surface water	Good	Good
	GWDTE's	Good	Good
	Drinking Water Protected Areas (DrWPAs)	Good	Good
	General chemical quality assessment	Good	Good
	Overall Status (2015)	**Good**	**Good**
	Designations	Drinking Water Directive	Drinking Water Directive

Appendix Table 4: Additional information on the WFD transitional water bodies.

WFD transitional water bodies		Upper Thames - GB530603911403
Mean Hard Bed Depth (m)		-
Water level (mAOD)	**Min**	-
	Max	-
	Range	-
	Period of monitoring	-
WFD 2015 RMBP Status	**Quantitative Objective**	**Good by 2027**
	Chemical Objective	**Good by 2015**
	Overall Objective	**Good by 2027**
	Hydromorphological Supporting Conditions	
	Depth variation	Supports good
	Quantity, structure and substrate of the bed	
	Structure of the intertidal zone	
	Tidal regime - freshwater flow	
	Wave exposure	
	Physico-chemical Supporting Elements	
	Transparency	Not used to classify this water body
	Thermal conditions	

WFD transitional water bodies		Upper Thames - GB530603911403
	Oxygenation conditions	
	Salinity	
	Nutrient conditions	
	Specific pollutants	High (Arsenic, Copper, Iron & Zinc)
	Biological Quality Elements	
	Angiosperms, macroalgae and phytobenthos (Aquatic flora)	High (Phytoplankton blooms)
	Benthic invertebrate fauna	Not used to classify this water body
	Fish fauna	Good
	Chemical Status	
	Priority hazardous substances	Good (Cadmium & its compounds, Mercury & its compounds and Nonylphenol)
	Priority substances	Good (Lead & its compounds, Nickel & its compounds and Trichloromethane)
	Other Pollutants	Not used to classify this water body
	Overall Status (2015)	**Moderate**
	Designations	Nitrates Directive

Appendix Table 5: Summary of groundwater – lake level interaction based on RTS Ecological Surveys Monitoring Project (EA, 2016)

Lakes	Interaction
Datchet 2	The data show that the lakes have a good connection with groundwater and are predominantly groundwater fed, the Queen Mother Reservoir to the north east will provide a barrier to flow and reduce the groundwater inflows to the lakes from the north east, otherwise there are no landfills present that might impede groundwater flow through the gravels aquifer in this area. The water levels recorded at the River Thames, at Datchet, indicate a degree of hydraulic separation between the lake and the river.
Datchet 3	Water has the potential to flow out of the River Thames into the gravels aquifer (head difference > 1m). Data shows that the lake has a degree of hydraulic connection with groundwater. The water levels recorded at the River Thames, at Datchet, indicate a degree of hydraulic separation between

Lakes	Interaction
	the lake and the river.
Sunnymeads 1	There is a low hydraulic gradient in the gravels aquifer in this area. Groundwater levels recorded adjacent to the lake do not follow a similar pattern to the lake over the three years, indicating a degree of hydraulic separation. Lake level patterns are similar to those observed at Kingsmead Island Lake, indicating some connection.
Sunnymeads 2	
Kingsmead Island Lake	There is a low hydraulic gradient in the gravels aquifer in this area. Groundwater levels recorded adjacent to the lake do not follow a similar pattern to the lake over the three years, indicating a degree of hydraulic separation. Lake level patterns are similar to those observed at the Sunnymeads 1 and 2 lakes, indicating some connection.
Sunnymeads 3	Data shows a degree of hydraulic connection with groundwater.
Wraysbury 1 (same as Sunnymeads)	The data show that the lake has a good connection with groundwater and is predominantly groundwater fed.
Wraysbury 2 (N)	The lake has a good connection with groundwater and is expected to be predominantly groundwater fed, with groundwater generally expected to flow south west towards the River Thames. The Wraysbury Reservoir to the north east will provide a barrier to flow and reduce the groundwater inflows to the lakes from the north east. The landfill present to the south is expected to impede groundwater flow through the gravels aquifer in this area. Groundwater flow in the gravels aquifer is expected to be generally from east to west, discharging at the River Thames. The Colne Brook has much higher water levels than the gravels aquifer/lake which implies that the Colne Brook does not act as a discharge point and there is a degree of hydraulic separation.
Wraysbury 2 (S)	
Manor	The lake is considered to be in good hydraulic contact with the gravels aquifer in an upward gradient, as indicated by the long term trends which closely match those in the gravels aquifer. The regional groundwater flow direction is to the south east. The hydraulic gradient is high due to the municipal water abstraction from the gravels at Chertsey.
Fleet	
Abbey	
St Ann's	The lake is considered to be in good hydraulic contact with the gravels aquifer in an upward gradient, as indicated by the long term trends which closely match those in the gravels aquifer. The regional groundwater flow direction is to the south east. The hydraulic gradient is high due to the municipal water abstraction from the gravels at Chertsey. Water levels recorded in the Chertsey Bourne indicate an element of hydraulic connection.
Abbey 1	Similar water level patterns over the three years of monitoring indicate a degree of hydraulic connection to groundwater to the northwest. However,

Lakes	Interaction
Abbey 2	the records suggest some hydraulic separation from groundwater to the east and southeast where groundwater is influenced by abstraction from the Chertsey Public Water Supply. Limited data for the Abbey River indicates the river is hydraulically separated from the lakes.
Littleton North	Monitoring data suggest there is a degree of hydraulic separation from groundwater to the north, with groundwater to the northwest influenced by abstraction from the Chertsey Public Water Supply. Groundwater in the area did not respond to the lake pumping (undertaken in November and December 2014 by Bretts Aggregates), where there was a marked reduction in lake levels. The Littleton North and South lakes have higher water levels than the surrounding gravels aquifer and also the adjacent River Thames, so there is potential for water to leak into groundwater from them.
Littleton South	
Littleton East	The lake appears to be in good hydraulic connection with the gravels aquifer. There are large areas of landfill to the west which would reduce groundwater inflows from this direction. There may be some groundwater inflow from the north feeding the lake. The River Thames at Chertsey Lock shows a similar pattern over the three years of monitoring to the groundwater, suggesting a degree of hydraulic connection between the river, groundwater and lake.
Sheepwalk West 2	Based on a short period of data the lake appears to be in good hydraulic connection with the gravels aquifer. There are large areas of landfill to the south which would reduce groundwater inflows from this direction. The regional gradient is to the south east.
Sheepwalk East	
Ferry Lane	The lake appears to be in good hydraulic connection with the gravels aquifer. There are large areas of landfill to the north and west which would reduce groundwater inflows from this direction.