



Thames Water Utilities Ltd

SEA Post Adoption Statement

Final Water Resources Management Plan

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Contents

1	Introduction	1
1.1	Background to the Water Resources Management Plan	1
1.2	The SEA Process to Date.....	2
1.3	Purpose of the SEA Statement.....	2
2	How Environmental Considerations Have Been Integrated into the Final Water Resources Management Plan.....	3
3	How the Environmental Report Influenced the Water Resources Management Plan	5
4	Consultation on the SEA	11
4.1	Introduction.....	11
4.2	Consultation on the Draft WRMP Environmental Report and HRA	13
4.3	Further Clarifications Sought Prior to Publication of the Final WRMP	13
5	Rationale for Selection of Schemes for the Final Water Resources Management Plan	15
5.1	Scheme Level Alternatives	15
5.2	Programme Level Alternatives	15
6	Monitoring of the Water Resources Management Plan	17
7	Availability of Documents	19
	Appendix 1 – HRA and SEA Related Comments at Draft WRMP Stage	21
	Appendix 2 - Post Adoption Procedures	47
	Appendix 3 - Further Information in Support of the Statement of Response ...	49

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1 INTRODUCTION

1.1 BACKGROUND TO THE WATER RESOURCES MANAGEMENT PLAN

Every five years water companies in England and Wales are required to produce a Water Resources Management Plan (WRMP). The WRMP sets out how water companies aim to balance the supply and demand for water over the next 25 years in a cost-effective manner, managing future demand for water and ensuring resilient and sustainable water supplies. It consists of several elements, including:

- A 25-year demand forecast describing how much water customers will need in the future, considering factors such as changing behaviours and population growth;
- A 25-year supply forecast describing how much water is available for use now and how this may change in the future, considering the impacts of climate change and potential sustainability reductions;
- An assessment of the options to manage the demand for water, including installing water meters at customers' properties, helping customers to be more water-efficient, and reducing leakage;
- An assessment of the options for providing additional reliable supplies of water, including water abstraction, water transfers and water re-use schemes.

The draft Water Resources Management Plan (dWRMP) was published for public consultation in May 2013, accompanied by an Environmental Report to document the Strategic Environmental Assessment (SEA) of the dWRMP. Stakeholder representations relating to the Environmental Report and the SEA process, and the subsequent actions taken by Thames Water, were recorded in the Statement of Response published in October 2013. A revised draft WRMP (rdWRMP) was published in December 2013, taking account of stakeholder representations and new information. The Environmental Report was also updated to align with the rdWRMP. Following advice from the Environment Agency, the Secretary of State requested further information on the plan in March 2014, and additional information was provided in April 2014.

The final WRMP was published in August 2014, following receipt of approval from the Secretary of State in July 2014. The Environmental Report was also updated to align with the final WRMP. This SEA Post Adoption Statement refers to the final WRMP.

1.2 THE SEA PROCESS TO DATE

The WRMP has been subject to SEA in compliance with the SEA Directive¹, as transposed in England by the SEA Regulations². This SEA Post Adoption Statement was produced in accordance with the provisions of Regulation 16.

The SEA process for Thames Water's WRMP started early in 2012 and ran in parallel with the development of the WRMP. An Environmental Report was produced with the dWRMP (forming Appendix B to the dWRMP). The assessment stage of the SEA process was repeated for each revision of the WRMP to ensure that the findings of the Environmental Report remained relevant to the plan. This is in accordance with the Government's SEA Guidance³ which states:

'It is important to keep the implications for the Environmental Report under review to ensure that it remains consistent with the plan or programme on which opinions are being sought.'

Accordingly, an updated version of the Environmental Report was produced to accompany the rdWRMP (ultimately adopted as the final WRMP). Habitats Regulations Assessment (HRA) screening of the dWRMP and rdWRMP has also been undertaken. The HRA process helped to inform the SEA process. The final Environmental Report and HRA are documented as Appendix B and C of the final WRMP.

1.3 PURPOSE OF THE SEA STATEMENT

The SEA Statement must describe:

- How environmental considerations have been integrated into the final WRMP (Section 2)
- How the Environmental Report has been taken into account (Section 3)
- How responses to consultation have been taken into account (Section 4)
- Reasons for choosing the final WRMP as adopted, and why other reasonable alternatives were rejected (Section 5)
- The measures that are to be taken to monitor the significant environmental effects of implementation of the final WRMP (Section 6).

1 Directive 2001/42/EC of the European Parliament and of the Council on the Assessment of the Effects of Certain Plans and Programmes on the Environment
2 The Environmental Assessment of Plans and Programmes Regulations, 2004 (2001/42/EC)
3 Office of the Deputy Prime Minister (2005). A Practical Guide to the Strategic Environmental Assessment Directive.

2 HOW ENVIRONMENTAL CONSIDERATIONS HAVE BEEN INTEGRATED INTO THE FINAL WATER RESOURCES MANAGEMENT PLAN

WRMPs are developed to ensure a secure water supply and that the measures proposed to maintain the balance between supply and demand for water provide value for money to Thames Water and its customers, whilst taking account of environmental and social effects.

Environmental considerations were incorporated into the development of Thames Water's WRMP from the outset, and considered at all stages of the planning, from the calculation of available water supply and demand forecasts, including incorporation of climate change scenario predictions, through to the assessment of a wide range of options to maintain a supply-demand balance.

The initial 'Unconstrained' list of options to balance supply and demand went through successive screening stages using a range of criteria including environmental impact (documented in Section 7 of the Plan). This primary screening resulted in a feasible list of approximately 250 options. Further secondary screening was undertaken on the basis of engineering feasibility, outline cost appraisal and outline environmental appraisal to develop the 'Constrained List' of options. The process is explained in Section 7 and Appendix Q of the Plan.

Following this screening process, options in the 'Constrained List' were scoped and subjected to engineering and environmental appraisal to enable derivation of capital and operating costs, an understanding of environmental and social impacts, assessment against the SEA objectives, and incorporation of appropriate mitigation, for example by routing of pipelines to avoid sensitive habitats. Where environmental and social impacts (both negative and positive) could be monetised, values were included in the calculation of the average incremental social cost (AISC) of each scheme. Through optimisation modelling according to the Economics of Balancing Supply and Demand (EBSM) methodology⁴, a 'Least Cost' planning solution was developed for the Water Resource Zones (WRZ) for which a supply-demand deficit had been forecast, incorporating consideration of those environmental and social impacts which had been monetised.

The SEA reviewed all the environmental and social effects of the Least Cost programmes for the London WRZ and the Thames Valley WRZs, taking particular account of those environmental and social effects which had not already been

4 Environment Agency & UKWIR (2002) The Economics of Balancing Supply and Demand (EBSM) Guidelines. Report Ref: No. 02/WR/27/4. UKWIR. London.

monetised and thereby considered through least cost modelling. This provided a check that the Least Cost programme did not include schemes that might cause unacceptable or avoidable environmental and social effects, in line with Stage 13 of the EBSD Guidelines⁵.

The HRA⁶ found that there were unlikely to be any significant effects on European sites from the final WRMP, either alone or in combination with other plans or projects. Natural England and Natural Resources Wales were consulted during preparation of the HRA Screening Report.

5 Environment Agency & UKWIR (2002). The Economics of Balancing Supply and demand (EBSD) Guidelines. Report Ref: No. 02/WR/27/4. UKWIR. London

6 The Conservation of Habitats and Species Regulations 2010 [as amended by the Conservation of Habitats and Species (Amendment) Regulations 2011, and the Conservation of Habitats and Species (Amendment) Regulations 2012]

3 HOW THE ENVIRONMENTAL REPORT INFLUENCED THE WATER RESOURCES MANAGEMENT PLAN

The Environmental Report and the WRMP were developed in parallel so that the SEA process could inform the development of the final WRMP. Table 3.1 identifies the main findings and outputs of the Environmental Report which informed the development of the dWRMP, rdWRMP and subsequently the final WRMP.

Table 3.1 Environmental Report Findings and Consideration in the WRMP

Finding/Output	How integrated into the WRMP
Schemes and Programme Impacts	
<p>Individual scheme assessments were undertaken. Potential cumulative scheme effects and mutually exclusive schemes were also identified. On the basis of these assessments, recommendations were made as to which schemes should be considered for inclusion in programmes or excluded.</p>	<p>Some individual schemes were identified as mutually exclusive, in that it would not be possible or environmentally acceptable to select both schemes in the WRMP. These included schemes that would constitute variations of the same option, schemes that would occupy the same site, and those that would use the same water resource. Cumulative impacts of schemes were also taken into account in the programme appraisal process.</p> <p>SEA outputs were used in programme appraisal, taking care only to consider those effects which had not already been considered as monetised environmental effects.</p> <p>Several alternative programmes were generated. Each programme was examined and assessed based on the environmental effects identified for each of its constituent schemes by the SEA. These assessments informed the selection of the preferred programme.</p> <p>Specific scheme related recommendations for the final WRMP are identified below.</p>
<p>London WRZ</p> <p>The Least Cost programme for this WRZ contained four groundwater schemes, one Aquifer Storage and Recovery (ASR) scheme, one canal transfer scheme and a large reuse scheme (using non-reverse osmosis (NRO) technology) that had the potential for significant adverse effects. The Abbey Mills reuse scheme could cause likely significant effects on a SAC and would discharge waste products to the River Roding with potential adverse effects on water quality.</p> <p>Excluding consideration of NRO technology for</p>	<p>The outputs of the SEA were considered for each of the alternative programmes generated for the final WRMP. For each programme, the overall environmental effects of the component schemes were considered relative to the Least Cost programme.</p> <p>The Preferred solution (Programme 6) to providing the required amount of water over the 25 year period of the final WRMP for London WRZ is not the Least Cost solution (Programme 1). The preferred solution contains more schemes than that identified in the dWRMP (resulting</p>

Finding/Output	How integrated into the WRMP
<p>reuse schemes brought two RO reuse schemes (Deephams and Beckton) into Programme 2. The scale of the two reuse schemes caused this alternative programme to have significant environmental effects overall, similar in terms of overall scale as for the Least Cost programme.</p> <p>Programme 3 saw the reuse schemes replaced by two desalination schemes which would cause permanent loss of BAP habitat and significant effects on cultural heritage. Overall this magnitude of impact was considered to be greater than the Least Cost programme.</p> <p>For Programme 4, the inclusion of two major reservoir schemes would cause impacts and disturbance at a greater scale than those caused by the Least Cost programme, although there could be qualitative benefits.</p> <p>Programme 5 included a large strategic transfer scheme featuring a supporting reservoir at Longdon Marsh with some very significant impacts due to the scale of the scheme and level of disturbance. This programme would lead to greater environmental impacts than the Least Cost programme.</p> <p>The Preferred Programme included a large reuse scheme using RO. Developing a major reuse scheme at one site (Beckton) would cause fewer impacts than transferring treated effluent for treatment at a new site as for the Abbey Mills reuse scheme. Initial concerns over the routing of a pipeline through Epping Forest SAC were discussed with Natural England to identify a solution which would avoid causing likely significant effects on the SAC.</p>	<p>from a change in the supply-demand balance described in Section 6 of the final WRMP).</p> <p>The Preferred Programme has fewer potential environmental and social impacts than the Least Cost Programme modelled for the final WRMP, due to the inclusion of the Beckton Reuse scheme instead of the Abbey Mills Reuse scheme.</p>
<p>Thames Valley WRZs</p> <p>The Least Cost programme for the Thames Valley WRZs comprised schemes with no significant environmental impacts. However, two alternative programmes were considered to improve alignment to government policies and customer priorities.</p> <p>The model was re-run to combine both these aspects: provision for additional water exports to a neighbouring water company as well as restricting options to demand management schemes only. The resulting Preferred Programme included two schemes in addition to demand management: the ASR Guildford scheme in 2039 and a water network constraint removal scheme in 2038.</p>	<p>As for the London WRZ programmes, those developed for the Thames Valley WRZs were considered in terms of their environmental effects relative to the Least Cost programme.</p> <p>The Least Cost programme was developed to better align with government policies and customer priorities. The resultant Preferred Programme provides a sustainable solution with few environmental impacts, as it contains only demand management schemes, a water network constraint removal scheme and the ASR Guildford scheme at the very end of the planning period to enable a water transfer to a neighbouring company, as part of the Water Resources in the South East regional strategy. The programme accords with customer and stakeholder priorities and Government objectives.</p>

Finding/Output	How integrated into the WRMP
	<p>The SEA identified that the ASR Guildford scheme could result in significant effects (subject to investigation) at an early stage of its development. Considering the scheme is not required until 2039, it is anticipated that it will be possible to avoid or mitigate the effects through more detailed design and assessment.</p>
<p>Cumulative effects</p> <p>No adverse cumulative effects were identified as a result of delivery of the preferred programmes included in the final WRMP or with neighbouring water company final WRMPs. The potential for cumulative effects with other land use and development plans identified a number of considerations for the future.</p>	<p>Beneficial effects of demand management schemes with demand-side measures in Thames Water's Drought Plan, and with other company WRMPs and Drought Plans, were identified in terms of reduced environmental burden and associated stresses on habitats.</p> <p>Cumulative effects arising from construction of the Thames Tideway Tunnel between 2015 and 2023 were considered but deemed unlikely due to spatial distance between sites.</p> <p>While no adverse cumulative effects were identified specifically, it was noted that a number of schemes in the London WRZ Preferred Programme would be located within opportunity areas identified for the London Plan, or Areas for Intensification.</p>
<p>Water Framework Directive</p> <p>The SEA and associated Water Framework Directive (WFD) assessment recommended further assessment in order to confirm that the final WRMP will not contravene Article 4.7 of the WFD, noting that four schemes included in the final WRMP could affect WFD waterbody status deterioration.</p>	<p>Depending on the conclusions of investigations, it may be necessary to consider alternatives to the schemes in question. An advantage of the final WRMP is that numerous schemes are maintained for contingency and could be used as alternatives in the event that further WFD assessment suggests one or more scheme should be replaced</p>
<p>Mitigation of the final WRMP</p>	
<p>Effects on water quality and water resources particularly in terms of WFD status</p> <p>Some of the groundwater schemes in the London WRZ preferred programme (GW ELRED, GW Addington, GW Honor Oak and GW Southfleet/Greenhithe) may affect groundwater levels, quantity and WFD waterbody status of the aquifers from which they abstract. The WFD assessments recommend that further assessment, potentially leading to mitigation, would be required to conclude whether these schemes introduce an impediment to achieving Good Groundwater Status.</p> <p>The ASR Darent Valley (Horton Kirby) scheme may affect flows in the River Darent, and local cultural heritage resources, although with reduction of the output from 6Ml/d to 5Ml/d the</p>	<p>The London WRZ Preferred Programme is configured such that it leaves a number of contingency schemes available as alternatives should they be required.</p> <p>If it is not possible to conclude from further investigation and subsequent mitigation that schemes comply with the WFD assessment objectives, alternatives to the schemes would be considered.</p>

Finding/Output	How integrated into the WRMP
<p>scale of any impacts is likely to have reduced. Any effects will be further investigated through operational scale trials during early AMP6. Mitigation of effects will depend on the outcome of these investigations.</p> <p>The Oxford Canal Transfer scheme may also have potential to affect water quality in the River Cherwell.</p>	
<p>Effect on biodiversity</p> <p>The Oxford Canal Transfer scheme would be likely to cause disturbance to approximately 25ha of non-designated habitats during its construction, and loss of less than 1.5ha of non-designated terrestrial habitat once built.</p> <p>The Beckton Reuse scheme is large scale, and could cause other effects on habitats and species through its construction.</p> <p>The pipeline route initially proposed for the Beckton Reuse scheme would have caused likely significant effects on the qualifying features of Epping Forest SAC. The pipeline route was therefore revised in discussion with Natural England for inclusion in the dWRMP, and refined again in for inclusion in the rdWRMP and final WRMP.</p>	<p>Temporary construction effects would be mitigated through best practice methods such as dust suppression, screening of noise disturbance, and reinstatement where appropriate. Habitat loss could be mitigated through provision of compensatory habitats depending on the type of habitat lost.</p> <p>The alternative pipeline route for the Beckton reuse scheme was developed in discussion with Natural England to avoid causing likely significant effects on the Epping Forest SAC, as documented in the HRA of the final WRMP (Appendix C). It features a section traversing Epping Forest SAC approximately along the route of the A406, between the A406/A104 intersection and Highams Park. In order to avoid likely significant effects on the SAC, it is proposed that the pipeline is tunnelled beneath the A406 at a sufficient depth to avoid potential effects on tree roots.</p>
<p>Air quality and climate change effects</p> <p>Air quality and climate change effects of moderate significance were assessed for several schemes: AR Kidbrooke; ASR Darent Valley (Horton Kirby); AR SLARS Merton Abbey; GW Southfleet/Greenhithe; Oxford Canal Transfer. Effects were assessed as of major significance for the Beckton Reuse scheme. Construction of the schemes would involve transport and associated air quality and emissions in Air Quality Management Areas (AQMAs) and the London Low Emissions Zone (LEZ).</p>	<p>Effects due to transport would be mitigated through continual improvement of transport logistics by both Thames Water and its contractors, for example routing vehicles so that transport through an AQMA or the LEZ is minimised, and routing to avoid residential areas where possible.</p> <p>The Beckton Reuse scheme involves reverse osmosis, which is energy intensive. There may be opportunities to mitigate these effects further through increased renewable power generation at the Beckton site using anaerobic digestion and thermal hydrolysis. Over time, an increased proportion of power from the electricity grid network will be derived from renewable sources ("grid-greening"). These options will need to be reviewed in order to mitigate the scheme's impact in terms of climate change.</p>
<p>Effects on archaeology and cultural heritage</p>	

Finding/Output	How integrated into the WRMP
<p>The ASR Darent Valley (Horton Kirby), GW Southfleet/Greenhithe, the Beckton Reuse, the Oxford Canal transfer and GW Addington schemes may present risks to unknown buried heritage assets during construction, and through operation of groundwater schemes due to potential wetting and drying effects of varying groundwater levels.</p>	<p>Construction related effects would be mitigated through investigations, surveys and discussion around potential effects and hotspot areas with English Heritage and other stakeholders prior to construction, and by implementation of a watching brief to minimise damage and disturbance during construction. Effects of varying water levels as a result of scheme operation will also be subject to closer investigation and discussions with English Heritage prior to scheme implementation.</p>
<p>Effects on landscape and visual amenity</p> <p>The ASR Darent Valley (Horton Kirby) scheme would result in a small permanent structure (a new WTW), with potential adverse effects on visual amenity.</p>	<p>The structure would be designed and constructed to be unobtrusive in the context of the surrounding landscape.</p>

4 CONSULTATION ON THE SEA

4.1 INTRODUCTION

The SEA Regulations require consultation at the scoping stage and on the assessments as documented in the Environmental Report. Consultation with the statutory bodies defined by the Regulations is mandatory at both stages. Although consultation with the public is only mandatory at the Environmental Report stage, Thames Water consulted both the statutory bodies and the public at both stages.

The SEA Regulations define the statutory consultation bodies according to the spatial extent of the plan. If a plan will only affect England, the consultation bodies are the Environment Agency, Natural England and English Heritage. If the plan may affect other parts of the UK, the consultation bodies are widened to reflect this. The Scoping Report was issued to the English consultation bodies, and also the Scottish and Welsh bodies. The Scottish consultation bodies (Historic Scotland, Scottish Natural Heritage and the Scottish Environment Protection Agency) were included out of courtesy and to confirm that no schemes were under consideration which would affect Scotland, as were considered for WRMP09. As is documented in Appendix A, the Scottish consultation bodies acknowledged that the spatial extent of the WRMP does not include Scotland, and that it will therefore have no significant effects on the Scottish environment. The Scottish consultation bodies were therefore not subsequently consulted on the Environmental Report.

The Welsh bodies (which at the time were the Countryside Council for Wales, Cadw, Environment Agency Wales and Welsh Government)⁷ were consulted on the SEA Scoping Report because schemes to transfer water from the River Severn were included on the constrained list of schemes, and schemes to transfer water from elsewhere in Wales were also under consideration as part of the feasible list. The Welsh bodies were also consulted on the Environmental Report.

The Environmental Report was published and issued for consultation as an appendix of the dWRMP in May 2013. It provided a useful reference point for consultees to express their views on Thames Water's dWRMP. Comments relating to the Environmental Report and the SEA process and comments on the dWRMP were responded to by Thames Water in its Statement of Response submitted to Defra on 30 October 2013, and sent to all respondees to the consultation. An updated version of the Environmental Report was issued to accompany the rdWRMP. This SEA 'Post Adoption' Statement sets out how the SEA and any views expressed by the consultation bodies or the public have influenced the final WRMP.

⁷ From 1 April 2013, Natural Resources Wales (NRW), a new body formed by the Welsh Government, took over the functions previously carried out by the Environment Agency Wales, the Forestry Commission Wales and the Countryside Council for Wales.

Table 4.1 lists the main documents relating to the WRMP environmental assessments and provides their publication dates.

Table 4.1 Summary of WRMP, SEA and HRA Documentation

Document	Date of publication	Purpose
SEA Scoping Report	May 2012	Issued to public and statutory bodies as vehicle for consultation on scope and approach for SEA
Draft Water Resources Management Plan (dWRMP)	May 2013	Issued for formal consultation to understand the views and priorities of customers and stakeholders
SEA Environmental Report for the dWRMP	May 2013	Issued with the dWRMP to document the environmental assessments supporting the dWRMP
HRA Report for the dWRMP	May 2013	Issued to fulfil Habitats Directive requirements for the dWRMP
Statement of Response (SoR)	October 2013	Responded to the comments received from consultation on the dWRMP, including those relating to SEA and HRA (referred to below and included in Appendix 1)
Revised Draft Water Resources Management Plan (rdWRMP)	December 2013	Amended to take account of the changes made as a result of the public consultation and also new and updated information since the publication of the dWRMP
SEA Environmental Report for the rdWRMP	December 2013	Issued with the rdWRMP to document the environmental assessments supporting the rdWRMP, taking account of the SEA related comments included in the SoR
HRA Report for the rdWRMP	December 2013	Issued to fulfil Habitats Directive requirements for the rdWRMP, taking account of the HRA related comments included in the SoR
Defra letter requesting further information in support of the Statement of Response	17 March 2014	Requested further information, including effects of Kidbrooke schemes on Oxleas Woodlands SSSI, and effects of ASR Horton Kirby on cultural heritage (see below and Appendix 3)
Thames Water response to Defra request for further information	10 April 2014	Provided requested clarifications confirming resolution with Natural England of issue relating to ASR Kidbrooke scheme, and liaison with English Heritage on issue relating to ASR Horton Kirby (subsequently resolved - see below and Appendix 3)
Defra letter of approval for WRMP	23 July 2014	Instruction to publish final WRMP in accordance with Regulation 6 of the Water Resources Management Plan Regulation 2007
Final Water Resources Management Plan (final WRMP)	August 2014	Final WRMP published, incorporating the further information requested by Defra concerning the ASR Kidbrooke scheme and the ASR Horton Kirby scheme
SEA Environmental Report for the final WRMP	August 2014	Issued with the final WRMP to document the environmental assessments supporting the final WRMP
HRA Report for the final WRMP	August 2014	Issued to fulfil Habitats Directive requirements for the final WRMP
SEA Post Adoption Statement	September 2014	Sets out how the SEA and any views expressed by the consultation bodies or the public have influenced the final WRMP

4.2 CONSULTATION ON THE DRAFT WRMP ENVIRONMENTAL REPORT AND HRA

Table A1.1 in Appendix 1 lists the responses to the consultation on the dWRMP which relate to the SEA and HRA. These responses are included in the Statement of Response published on Thames Water's website <http://www.thameswater.co.uk/haveyoursay/17072.htm>. The Environmental Report and HRA Report for the rdWRMP took account of these comments.

4.3 FURTHER CLARIFICATIONS SOUGHT PRIOR TO PUBLICATION OF THE FINAL WRMP

In a letter to Thames Water, dated 17 March 2014, Defra requested further information in support of the Statement of Response (SoR) to Thames Water's consultation on its draft Water Resources Management Plan (dWRMP). The further information related to effects assessed for two schemes: AR SLARS (Kidbrooke) and ASR Horton Kirby. Appendix 3 documents Thames Water's response in full.

4.3.1 AR SLARS (Kidbrooke) (GW-AR-09)

Defra's letter stated:

Your SoR does not fully address the representations made in relation to protection of the Oxleas SSSI from the proposed pipeline to connect your new option of the London Aquifer Recharge Scheme to supply the London Resource Zone. Whilst this pipeline is not needed until 2026 you should discuss with Natural England the proposed route and the mitigation measures that will be required and provide us with that further information.

Thames Water's response clarified the following:

- AR SLARS (Kidbrooke) (GW-AR-09) was considered as a feasible option in the revised draft Water Resource Management Plan (rdWRMP), but was not included in the Preferred Programme for the rdWRMP (now final WRMP).
- AR Kidbrooke (GW-AR-02), a distinct scheme from that above, was included in the Preferred Programme (at 2021). This scheme will cause no effects on Oxleas Woodlands SSSI, being approximately 2km distant.

The clarification was accepted by Natural England in an email dated 1st April 2014, which stated: *Having reviewed this report Natural England can confirm that the information it contains reflects our current understanding of the proposals and includes clarification of the boundary issues. The information presented addresses Natural England's concerns about the potential impacts on Oxleas Woodlands*

SSSI, which were raised in our response to the draft Water Resources Management Plan (dWRMP) on 22 July 2013.'

4.3.2 ASR Horton Kirby

Defra's letter stated:

'...your SoR does not fully address the representations made by English Heritage in relation to the impacts of your options on the historic environment and the mitigations proposed. Whilst your SoR states that only one option (Beckton) has a significant adverse impact on the historic environment, the SEA highlights that Horton Kirby may also have a significant adverse effect as a result of wetting/drying of buried assets. You should discuss with English Heritage any potential impacts around this scheme and provide further information on Horton Kirby and the mitigations that will be required.'

Thames Water corresponded with English Heritage to clarify the ASR process and its potential impacts on buried archaeological resources. English Heritage suggested that the effects of natural and induced groundwater level variation in the Chalk and Lower Greensand aquifers, on shallow groundwater in the superficial deposits and on soil moisture, should be modelled. The discussions between Thames Water and English Heritage have culminated in an agreement to monitor effects of operational scale trials of the scheme on water levels in the Chalk aquifer and in the superficial deposits, where any buried archaeological resources would be held. According to this agreement, should monitoring determine any significant potential effects on levels in the superficial deposits, Thames Water, subject to advice from English Heritage and Kent County Council, would undertake assessment of the condition and significance of deposits in the potentially affected areas.

English Heritage confirmed on 17 June 2014 agreement with the proposed approach: *'Your explanation of your assessment of the groundwater effects at Horton Kirby was clear and helpful. Your proposed approach seems like a sensible one that addresses our concerns in a proportionate way. We agree that it is likely to be useful to first understand the possible effect of ground water changes on the superficial deposits at the abstraction site at Horton Kirby to assess in general whether there might be potentially harmful effects on the deposits in which archaeological remains are found. On the basis of the results of this initial monitoring we can then together consider whether any further assessment would be appropriate.'*

5 RATIONALE FOR SELECTION OF SCHEMES FOR THE FINAL WATER RESOURCES MANAGEMENT PLAN

5.1 SCHEME LEVEL ALTERNATIVES

All constrained list schemes, including both demand and supply options, were subject to assessment through the SEA. In this way, viable alternatives were assessed at the scheme level. In turn, this informed the assessment of alternative programmes, and the assessment of potential cumulative effects between schemes within programmes.

5.2 PROGRAMME LEVEL ALTERNATIVES

Programme appraisal commenced with the generation of a Least Cost Programme for both the London WRZ and the Thames Valley WRZs using an optimisation model. The costs considered by the model were capital costs (capex) and operating costs (opex). In addition, certain environmental and social effects were monetised according to methods set out in the Environment Agency's Benefits Assessment Guidance (BAG)⁸, and these were included in the costs input to the model.

The Least Cost Programme was then re-modelled and refined according to environmental and social impacts as identified by the SEA, as well as optimisation against other factors including government priorities, customer preferences, risk and reliability. For example, for the London WRZ Programme 2, the model was prevented from selecting non-reverse osmosis (NRO) reuse schemes on the basis of recommendations from the Independent Expert Review Panel on Reuse commissioned by Thames Water to review the appropriateness of treatment technology for wastewater reuse.

For the London WRZ, the final Preferred Programme was not the Least Cost Programme. The Preferred Programme incorporates practicability and delivery improvements. It retains a number of small groundwater schemes, and includes the Beckton Reuse (using reverse osmosis) scheme for development during the period 2025-30. The Oxford Canal Transfer scheme is also included. The reuse scheme was initially designed with a pipeline traversing Epping Forest SAC; however through the HRA screening process, the pipeline was re-configured to avoid likely significant effects on the SAC. In terms of environmental performance, the Preferred Programme is an improvement on the Least Cost Programme as the

⁸ Some types of impacts can be costed through trading values (e.g. carbon) and others using studies on people's willingness to pay to avoid them occurring.

selected Beckton Reuse scheme causes fewer potential impacts than the Abbey Mills Reuse scheme (which formed part of the Least Cost Programme).

The Least Cost Programme for the Thames Valley WRZs presented no significant environmental effects. However, it was refined to better align to government policies and customer priorities. The final Preferred Programme includes demand management schemes with very few significant environmental effects but with beneficial effects in terms of sustainability and water resources. It also features an ASR scheme and a water network constraint removal scheme towards the end of the programme planning horizon to enable water exports to a neighbouring water company, aligned with the Water Resources for the South East (WRSE) regional strategy. The inclusion of the ASR scheme does incur some potential environmental impacts, particularly as the scheme could encroach on a local nature reserve. However as there is time for further development of the scheme before its planned implementation in 2039, it is likely that effects can be mitigated, if not avoided, through detailed design.

The programme appraisal process undertaken for the London and Thames Valley WRZs is explained in full in Section 8 of the final WRMP.

6 MONITORING OF THE WATER RESOURCES MANAGEMENT PLAN

The SEA Regulations require the responsible authority to:

'monitor the significant environmental effects of the implementation of each plan or programme with the purpose of identifying unforeseen adverse effects at an early stage and being able to undertake appropriate remedial action.'

Key monitoring parameters are those relating to the abstraction of water and the effects this may have on waterbodies, their WFD waterbody status, and their functions as habitats. Changes to groundwater levels can also affect buried archaeological assets. The WRMP may also cause more direct potential impacts on people living in urban areas, due for example to construction works and associated disturbance, or operational activities associated with demand management schemes.

The effectiveness of the WRMP will be monitored and reported to the Environment Agency through the annual review process. The SEA focussed on impacts of individual schemes and the cumulative effects of programmes of schemes, as well as cumulative impacts of the WRMP with other plans. Most scheme level impacts will be assessed in more detail through the statutory planning and permitting processes, as applicable. This may include Environmental Impact Assessment (EIA) where required. The statutory processes will inform development of targeted Environmental Management Plans (EMP).

Higher level potential effects, such as those on water resources, groundwater and river levels, are monitored and reported routinely by the Environment Agency and/or Thames Water. Many company level effects, such as carbon dioxide emissions, are monitored and reported annually by Thames Water.

Table 6.1 identifies indicators for potentially significant effects which the WRMP could have on different receptors.

Table 6.1 Monitoring Parameters for the final WRMP

Impacted Receptor	Indicator
Water resources, water quality, biodiversity	Proportion of surface waters and groundwater waterbodies at 'Good' WFD status; species and habitats surveys; condition of SSSIs in Thames Water ownership according to Natural England condition assessment process; progress against the Thames Water BAP as reported in the company's Corporate Responsibility Report
Climate Factors	Net greenhouse gas emissions per Ml (million litres) of treated water (kg CO ₂ equivalent emissions per Ml)
Transport	Transport fleet fuel consumption, emissions and business mileage, as monitored routinely by Thames Water
Nuisance/ Community/ Local Economy	Scheme level community disruption of capital works would be monitored through EIA (where required) led Environmental Management Plan (EMP) or through EMPs linked to other statutory approvals and permitting processes. Complaints logged with Thames Water Customer Centre and Local Authority EHOs. Responses gauged through customer satisfaction surveys and reported in the Thames Water Annual Performance Report. Community investment, employee volunteering and match funding as reported in the Thames Water Annual Performance Report.
Air Quality	Scheme related issues of capital works would be monitored through EIA led Environmental Management Plan (if required). Changes in air quality are monitored by the Automatic Urban and Rural Network ⁹ , and these data would be available if required to inform a baseline. Ricardo-AEA ¹⁰ maintains the Defra air quality monitoring network in order to assess the Government's legal compliance through detailed ambient air quality modelling, these data could also inform the baseline.
Cultural Heritage	Condition of buried archaeology would be monitored during construction, e.g. through the EIA led Environmental Management Plan or through a Watching Brief. Consultation with relevant stakeholders to ensure impacts are minimised, e.g. to water level dependent assets, as a result of scheme operation. For certain schemes, the effects of scheme operation on groundwater levels may be monitored (for example ASR Horton Kirby, see section 4.3.2). English Heritage monitor parameters relating to all heritage assets such as Listed Buildings and Scheduled Monuments, Conservation Areas, Registered Battlefields, Registered Parks and Gardens, in order to maintain a 'Heritage at risk' register.

The SEA Regulations state that monitoring must enable appropriate remedial action. For the monitoring programme to be effective there must therefore be a mechanism in place to detect trends and to ensure that action is taken where trends are progressively adverse. At the scheme level, EIA-led EMPs (or similar EMPs relating to other statutory permissions and approvals) will facilitate monitoring and trigger mitigation if required, particularly during and immediately after capital works. At a more regional level, monitoring of environmental parameters such as groundwater levels and emissions will inform development of the next WRMP, both directly and through the SEA process.

Five yearly assessment of the environmental baseline will be undertaken in preparation for the SEA of the subsequent WRMP. This will incorporate consideration of the parameters identified in Table 6.1.

⁹ Automatic Urban and Rural Network (AURN)
¹⁰ <http://www.ricardo-aea.com/cms/>

7 AVAILABILITY OF DOCUMENTS

The adopted final WRMP and accompanying SEA Environmental Report is available on Thames Water's website at:

www.thameswater.co.uk/wrmp

The documents are also available for inspection at Clearwater Court, Reading by appointment. To arrange an appointment please contact us by:

- Email to: consultations@thameswater.co.uk or
- Writing to: Lesley Tait, Thames Water, Clearwater Court, Vastern Road, Reading, RG1 8DB

If you would like to request copies of the WRMP or associated documentation, please email consultations@thameswater.co.uk.



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APPENDIX 1 – HRA AND SEA RELATED COMMENTS AT DRAFT WRMP STAGE

Table A1.1 Summary of SEA/HRA Related Comments on dWRMP and Responses

Consultee	Key concerns	Summary responses
Natural England	<p>Overall the potential effects of option types have been correctly identified and most assumptions made in the methodology are reasonable. The assumption within the HRA that physical damage is only likely to be significant where the boundary of the scheme extends within or is directly adjacent to the European site is not however correct. Natural processes can be affected resulting in physical damage from schemes many kilometres upstream or along a coast. Since none of the preferred options are likely to cause this type of damage to any European site this assumption has not materially affected the outcome of the HRA screening of the preferred options set.</p>	<p>Noted. The HRA has been completed with this in mind, with the potential for impacts considered for up to 10km from a site and those in hydrological connectivity to a proposed scheme. Where a European site is in hydrological connectivity with a proposed scheme, the potential for physical damage has been considered.</p> <p>The relevant text was updated to reflect this approach as shown below: <i>'Physical damage is likely to be significant where the boundary of the scheme extends within or is directly adjacent to the boundary of the European site, is within/adjacent to an offsite area of known foraging, roosting, breeding habitat (that supports species for which a European site is designated, or where natural processes link the scheme to the site, such as through hydrological connectivity downstream of a scheme).'</i></p>
Natural England	<p>The plan level screen for Beckton effluent reuse suggests that the concentrated wastes into the Thames Estuary and Marshes Special Protection Area (SPA) and Ramsar sites will only produce localised water quality reduction and that the reduction in flows do not at the plan level appear likely to be of significance. These potential impacts (water quality and flows) should be looked at in more detail at the project scale assessment, though only to ensure confirmation of the conclusion of no likely significant effects.</p>	<p>Noted. The following text was added: <i>"The results of the screening process in Table 4 show that the Preferred Programme for the dWRMP is not likely to have a significant effect on any European sites. However, it is recommended that impacts are considered at the project level to ensure the findings of this assessment remain accurate."</i></p> <p>The following text was also added: <i>"It is therefore concluded that Thames</i></p>

Consultee	Key concerns	Summary responses
		<i>Water's dWRMP will have no likely significant effects on European sites and therefore no Appropriate Assessment of the plan is required. However, it is recommended that impacts are considered at the project level to ensure the findings of this assessment remain accurate."</i>
Natural England	The Severn Thames Transfer (STT) options have not been selected for the preferred (best value) plan but are to be progressed in parallel with effluent reuse and reservoir options for further investigation, consultation and decision by 2020. Following the public inquiry on dWRMP09 an HRA of STT options has been completed to assess the impact of abstraction on the flows of the River Severn European sites. The European sites in the Severn Estuary were shown to have sufficient flow for a conclusion of no adverse effect upon integrity of the Severn Estuary sites or on the upstream migration of fish. Assessment on the downstream recipient site ecology and water quality are to be expanded in 2013/2014. Natural England looks forward to receipt of this assessment.	Noted. TW will engage NE and other interested stakeholders as it progresses this work.
Natural England	A high level screen of other water company dWRMPs should be undertaken to check if there is any potential for in combination effects of these plans. This should be noted in the HRA of the final dWRMP.	Neighbouring water company draft WRMPs were assessed for potential in-combination effects. The revised Environmental Report, SEA Post Adoption Statement and HRA were updated with relevant information.
Natural England	Note there are some errors in the identified European site names listed in Table C1 where names of SSSIs and European sites have been confused or are incorrect. Natural England will write separately to Thames Water detailing these errors to enable correction before final plan publication. These errors do not appear to have affected the accuracy of the HRA or the SEA of the preferred options" potential impacts.	Additional information was requested from Natural England and included in the HRA and SEA.
Natural England	The intention to extend the cumulative assessment of effects in the SEA to include other companies' dWRMPs is welcome. It would be helpful to attempt a quantitative in combination/cumulative assessment of preferred plans in terms of loss of semi natural habitat. The detailed options dossiers (Appendix R) contain information which would allow worst case scenario figures to be estimated.	There is very limited amount of permanently lost semi-natural habitat associated with the Thames Water dWRMP. This being almost exclusively related to the 1.5ha of potential habitat loss associated with the Addington groundwater scheme (which would take place within the existing Thames Water

Consultee	Key concerns	Summary responses
		<p>site boundary). In addition, none of the schemes in the preferred programme come in close proximity with the boundary of other water company supply areas, therefore the risk of any cumulative effects associated with overlapping or proximal habitat loss is considered negligible and for these reasons this assessment was not undertaken.</p>
<p>Natural England</p>	<p>Although the SEA objectives reflect the statutory duties, the indicator questions focus on the protection elements of these duties and do not reflect duties with regard to potential for enhancement. For example a good biological indicator question would have been “does the programme contribute to the achievement of favourable condition of designated sites?”. In addition to the consultation documents, Thames Water has provided Natural England with a draft report that screens the preferred options for the first five years against SSSI favourable condition tables. This document also focuses on the potential for avoiding impact and does not identify if there are any opportunities to contribute to favourable condition. Natural England recommends that the SSSI assessment document (once finalised) is appended to the SEA for the final report to provide clarity to other stakeholders.</p>	<p>The SEA Framework addresses the potential for enhancement in the indicator question:</p> <p><i>3. Will it protect and enhance aquatic, transitional and terrestrial species and habitats?</i></p> <p>The SEA framework, objectives and indicator questions were consulted on with Natural England and other statutory consultees both informally prior to issue of the scoping report and subsequently agreed at the scoping stage.</p> <p>In response to previous comments, Thames Water produced the draft report 'Screening of effects on SSSIs' that screened the preferred options for the first five years against SSSI favourable condition tables. Opportunities for enhancement were reviewed when producing the final 'Screening of effects on SSSIs' report which was appended to the relevant SEA documentation.</p>
<p>Natural England</p>	<p>In addition to the monitoring indicators currently chosen, the SEA should be amended to include the condition of SSSIs in Thames Water's ownership and those influenced by their water resource assets as a monitoring indicator for the biodiversity objective. The Water Framework Directive (WFD) water body status indicators on flow or water quality currently chosen may be significantly less stringent than those required to meet favourable condition for</p>	<p>The monitoring indicators were updated to include the use of and reference to Natural England's condition assessment of relevant SSSIs. This was included in the revised Environmental Report (Appendix</p>

Consultee	Key concerns	Summary responses
	a SSSI. The inclusion of SSSI condition as a monitoring indicator will provide an indication of how Thames Water is performing against its S28G body duty described above.	B).
Natural England	Oxleas Woodlands SSSI is a semi-natural woodland on London clay. One of the pipelines for the South London Aquifer Recharge Scheme (SLARS) Kidbrooke (GW-AR-09) is likely to cut across the Oxleas Woodlands SSSI. It will be exceptionally challenging to route a pipeline through this woodland without resulting in damage to the semi natural habitats. The rooting zone of woodland (considered to be 50m from the edge of the woodland) is vulnerable to disturbance and damage from earth movement works such as pipeline construction. The rooting zone is more vulnerable in urban situations where woodlands are often under other environmental stress factors. The SEA identifies “careful pipeline routing” as sufficient mitigation to reduce these impacts to low. The pipeline must be routed so as to avoid the SSSI and the rooting zone to result in a residual magnitude of low. Given the extremely constrained corridor for this pipeline (the SSSI is surrounded by housing) the mitigation may not be possible. If this option is brought forward as a preferred option in the final WRMP, Natural England would need to be assured the pipeline will not result in loss or damage of woodland and therefore not undermine the favourable condition of the SSSI. Currently the preferred option Kidbrooke artificial recharge (GWAR-02) does not require a new pipeline through the SSSI as it is a subset of the wider SLARS scheme.	The proposed works relate to an existing Thames Water asset (Oxleas Wood service reservoir) which is located in Oxleas Woodlands. The service reservoir is located 300m north of Rochester Way (main road). The pipe would be laid between the road and the service reservoir. This part of the SSSI is grassland rather than woodland (and also forms part of a local nature reserve). When undertaking the assessment it was anticipated that, due to the presence of the service reservoir, there would also be access roads along which the pipe line could be routed. However, on further investigation this is not the case and therefore the scheme would require the inclusion of mitigation measures with respect to traversing the 300m of grassland. The boundary of the woodland habitat of Oxleas Woodlands SSSI is more than 50m from the probable pipeline route. Considering the urban location, the risk of disturbance to the rooting zone of the woodland trees associated with the woodland would need to be taken in to account should this option ever need to be taken forward. As noted in the comment from Natural England this option does not form part of the preferred programme.
Natural England	Reservoir and Transfer Options - though not selected as a preferred options (best value) the reservoir option suite and the STT are being taken forward for further investigation, consultation and decision by 2020. The Chinnor Reservoir options are in the Chilterns AONB and have the potential to have significant impacts on the special features of this protected landscape. Natural England would have serious concerns if one of these schemes were taken	Noted. This was already identified in the relevant SEA tables, as below for Chinnor Reservoir (75 (LON) (RS-RRR-CHI-03)).

Consultee	Key concerns	Summary responses
	<p>forward. It is likely that such a development would constitute a “major development” in planning terms and this would be a significant risk to delivery.</p>	<p>"The scheme is located within the Chilterns AONB, and some sections of pipeline construction will be within the Upper Thames Tributaries ESA. During construction there will be obvious widespread disruption to local visual amenity at 655ha site for 5 years (short term with respect to pipeline construction). The local area scores highly with respect to the tranquillity map for England. In operation the scheme would be a major new prominent landscape feature and change the visual context. Sympathetic design and landscaping (e.g. embankment profiling) would mitigate against some of the adverse effects of the new landscape feature. These could add value to the anticipated beneficial effects to landscape and visual amenity (and tranquillity of the local area) associated with a new surface water feature. Over the long term the reservoir would become more integrated into the landscape and the surface water feature will provide a tranquil area for recreation and amenity."</p> <p>The schemes are all assigned High Magnitude of impact, and the Residual Effect Significance implies there would be Major Adverse effects as well as beneficial effects (which are reliant on mitigation effectiveness).</p>
<p>Natural England</p>	<p>The Abingdon and Longworth Reservoir options do not directly impact protected landscapes but would significantly and permanently alter the landscape in which they were built. There are opportunities for landscape improvements with these latter two reservoirs but careful design would be essential to ensure local landscape character is protected and enhanced.</p>	<p>Noted. This was already identified in the relevant SEA tables, as below for Abingdon Reservoir (30 (London) (RS-RRR-ABI-01)).</p> <p>"The scheme is not within a designated landscape area. During construction there</p>

Consultee	Key concerns	Summary responses
		<p>will be obvious widespread disruption to local visual amenity at 210ha site for 5 years. The local area scores relatively highly with respect to the tranquillity map for England. In operation the scheme would be a major new prominent landscape feature and change the visual context. The 210ha site is not designated for landscape. However there is potential for the site to be visible from other areas with visual amenity importance.</p> <p>Sympathetic design and landscaping (e.g. embankment profiling) would mitigate against some of the adverse effects of the new landscape feature. These could add value to the anticipated beneficial effects to landscape and visual amenity (and tranquillity of the local area) associated with a new surface water feature. Over the long term the reservoir would become more integrated into the landscape and the surface water feature would provide a tranquil area for recreation and amenity".</p> <p>The schemes are all assigned High Magnitude of impact, and the Residual Effect Significance implies there would be Major Adverse effects as well as beneficial effects (which are reliant on mitigation effectiveness).</p>
Natural England	<p>Some of the supported STT options have a reservoir and pipeline within or in the context and setting of protected landscapes. The unsupported options also have potential negative landscape impacts due to the scale of the options and transfer infrastructure (pipeline or canal). Most of the impacts from the options fall within the Cotswolds AONB but the Deerhurst supported STT option has potential for impacts on the Malvern Hills AONB in addition to those on the Cotswolds AONB. STT options with a supporting reservoir within the AONB are likely to constitute a "major development" in planning terms and Natural England would have concerns regarding the potential impacts on the special features of the protected landscapes.</p>	<p>Noted. This was already identified in the relevant SEA tables, as below for the Supported Severn Thames Transfer using the Deerhurst pipeline (STT Deerhurst 50 Mm3 (Lon) (RWT-STT-SD-02)).</p> <p>"The construction of the scheme would result in widespread disruption to visual amenity over a large area, including areas</p>

Consultee	Key concerns	Summary responses
		<p>within the Cotswolds AONB and disturbance to the access and enjoyment of this designated site and other valued landscape areas with high tranquility over the medium term (5 years). In operation the scheme would be a major new landscape feature which would change the visual context. The ~420ha site, is not designated for landscape, but has a rural character and high tranquility. The reservoir development would be visible from the Malvern Hills AONB. Other permanent above ground infrastructure associated with this scheme (e.g. pumping stations) may be located within the Cotswolds AONB. Sympathetic design and landscaping (e.g. embankment profiling) would mitigate against some of the adverse effects of the new landscape feature. These could add value to the anticipated beneficial effects to landscape and visual amenity (and tranquility of the local area) associated with a new surface water feature. Over the long term the reservoir would become more integrated into the landscape and the surface water feature will provide a tranquil area for recreation and amenity."</p> <p>The schemes are all assigned High Magnitude of impact, and the Residual Effect Significance is Major Adverse (note the STT Cotswold Canal schemes have been assigned a Mixed Residual Effect Significance).</p>
Natural England	Potential impacts on wider biodiversity are relatively limited in the preferred programme due to the welcome focus on demand management. Alternative schemes have both more potential for biodiversity enhancement and significantly more potential impacts on biodiversity than the	NE's principle of proactively identifying opportunities for biodiversity enhancement and reference to the BAP



Consultee	Key concerns	Summary responses
	<p>preferred programme. The SEA identifies the potential impacts on biodiversity but there is little reference to the opportunities for biodiversity enhancement. It is disappointing that within the relevant plans and programmes the dWRMP has not identified Thames Water's own corporate Biodiversity Action Plan (BAP). A refresh of the Thames Water BAP could be used to identify the enhancement opportunities linked to the preferred programme which are currently missing from the SEA and preferred plan. For example the Addington groundwater scheme is a small scheme in close proximity to the Thames Estuary and Marshes Nature Improvement Area (NIA). In the development of the scheme opportunities to contribute to the objectives of the NIA should be assessed, though they are likely to be limited in extent.</p>	<p>was acknowledged. There are few opportunities for enhancement with respect to the preferred programme with the short term focus on demand management as noted by NE. Furthermore, Addington groundwater scheme, Kidbrooke artificial recharge scheme and the ELRED groundwater scheme involve minor works within existing water resource sites (where there are no associated Thames Water managed SSSIs) that are all located in urban environments with little if any surrounding habitat. GW Addington is more than 6.5km from Thames Estuary and Marshes Nature Improvement Area. Thames Estuary South Desalination 50 Ml/d scheme is located within or in very close proximity to Thames Estuary and Marshes Nature Improvement Area and the related SEA table suggests that mitigation and enhancement opportunities that would support the objectives of the NIA should be investigated. The plans and programmes review were updated to include the Thames Water BAP and check whether those schemes selected for the final WRMP preferred programme could enhance any BAP habitats/species.</p>
<p>Natural England</p>	<p>In general the assessment of potential impacts of options on biodiversity is good. However increased flows (from effluent transfers) have been assumed to have a beneficial impact in the SEA. Where these are reducing the impacts of abstractions at low flows then a beneficial impact can be assumed. However treated effluent could artificially raise flows above their naturalised levels this would be an impact rather than a benefit to the ecology and could potentially undermine the favourable condition of a river SSSI for example. As well as the potential artificial elevation of flows in the receiving water, effluent reuse could potentially</p>	<p>The comments from NE were noted. There are some relatively complex situations regarding some of the wastewater reuse schemes (for example those associated with the River Lee). The SEA process involved scheme level assessment (and associated WFD assessment) at an</p>

Consultee	Key concerns	Summary responses
	<p>impact water chemistry (quality, pH etc.) of aquatic habitats. However the receiving waters of the preferred effluent scheme are not particularly sensitive to pH in the way a chalk stream (for example) would be and the receiving waters of this scheme have regulated flows.</p>	<p>appropriate level of detail. As identified in the SEA, which was informed by the WFD assessment undertaken, most wastewater reuse schemes result in reductions in flow in associated watercourses. Where increased flows are identified (e.g. the Abbey Mills URO schemes that discharge to the River Roding), a balanced view on the overall potential benefits and adverse effects was provided (noting that there are no SSSIs associated with the scheme).</p>
<p>Natural England</p>	<p>2.4 Water Framework Directive (WFD) The Water Framework Directive sets specific objectives for the protection of the water environment which include for surface water bodies the prevention of deterioration and achievement of good ecological status/potential. For groundwater bodies the objectives are to prevent deterioration and achieve good chemical and quantitative status. Natural England welcomes the risk based high-level assessment of the potential impacts on Environmental Flow Indicators (EFI) of licences with the largest average unused licence volume. Natural England welcomes the commitment to undertake further investigations into the potential impact of options on WFD status, in particular on water quality. The more scheme specific high level assessments against WFD objectives are also welcome. The commitment to pursue alternative options if effects on WFD status of preferred programme options cannot be mitigated is also welcome.</p>	<p>This was noted.</p>
<p>Natural England</p>	<p>Natural England welcomes the explicit reference to connectivity of habitats and natural ecosystems in the consideration of climate change adaptation (p.34 SEA). Unfortunately the network connectivity reference is not continued through to Figure 5-1 and is not reflected in the indicator questions. It is also not clear how the plan (if at all) helps to contribute to biodiversity's ability to adapt to climate change.</p>	<p>The SEA objective: <i>To adapt and improve resilience to the threats of climate change</i>, included the key question which was considered to encompass the effects associated with network connectivity: <i>Will it reduce vulnerability to risks associated with climate change effects (e.g. reduce the adverse effects of droughts and floods)?</i> Additionally, the SEA also included the objective: <i>To protect and enhance biodiversity, ecological functions,</i></p>

Consultee	Key concerns	Summary responses
		<p><i>capacity, and habitat connectivity, with the associated key question: Will it avoid causing habitat fragmentation and/or provide opportunities for new habitat creation or restoration and link existing habitats, including for fish passage?</i></p> <p>To avoid disproportionate weighting of effects, there was a need to avoid assessing similar effects of a scheme twice. Where it was identified that a scheme had a definite effect on climate change, through for example network connectivity, it was noted in the commentary. For example, reservoir schemes that would result in regulation releases to rivers during times of high demand and therefore when river flows in associated rivers would likely be low were noted as reducing vulnerability to the risks associated with climate change.</p>
<p>Natural Resources Wales</p>	<p>I7. Strategic Environmental Assessment (SEA) – Monitoring and mitigation: We recommend the company provides more detailed information on monitoring and mitigation it will undertake to ensure that the environment is adequately monitored and protected. The company should undertake an assessment of the cumulative impacts of its plan in combination with its neighbours preferred plans. The company should provide the non-monetised impacts for each option, preferably within the scheme dossiers for easy reference.</p>	<p>1. Monitoring and Mitigation - This SEA Post Adoption Statement includes confirmation of the identified monitoring and mitigation requirements for the final plan, updated in line with the guidance provided on undertaking SEA of WRMPs in the Practical Guide and the UKWIR Guidance, to ensure they are appropriate and sufficiently detailed to be effective at this strategic level.</p> <p>2. Cumulative in combination impacts - Neighbouring water company draft WRMPs were assessed for potential in-combination effects. 3. Non monetised impacts - the draft Plan Part C Appendix B (Environmental Report) includes</p>

Consultee	Key concerns	Summary responses
Natural Resources Wales	Cumulative effects with other water company plans - The Severn Trent Water draft WRMP, Dwr Cymru draft WRMP and United Utilities draft WRMP and Severn Trent Water draft drought plan are all currently out for consultation. We would, therefore, suggest that potential cumulative effects of the Thames Water plan with these water resources plans should be considered.	information on non-monetised impacts. Screening for, and where relevant, assessment of potential cumulative impacts effects was undertaken using information on neighbouring water company dWRMPs and updated drought plans that became publicly available following issue of the Thames Water draft WRMP and SEA Environmental Report.
Natural Resources Wales	Annex 1: Thames Water Utilities Ltd. Draft Water Resources Management Plan 2014- Strategic Environmental Assessment- Environmental Report. Non-technical summary. 1.5: See separate comments on the Habitats Regulations Assessment process for this draft WRMP 1.7: From April 1st 2013, Natural Resources Wales brings together the work of the Countryside Council for Wales, Environment Agency Wales and Forestry Commission Wales, as well as some functions of the Welsh Government. References to CCW and/or EAW should be amended accordingly. 2.2: We welcome the consideration of environmental effects around all source areas, including those outside Thames Water's supply area and Region. 2.3.2: See our separate comments on the appropriate assessment of the Severn Thames transfer options. Table 3.1: The Severn Trent Water draft WRMP, Dwr Cymru draft WRMP and United Utilities draft WRMP and Severn Trent Water draft drought plan are all currently out for consultation and should be taken into consideration.	1.7 Noted. References amended. 2.2 Noted. 2.3.2 Noted Table 3.1 Screening for, and where relevant, assessment of potential cumulative impacts effects was undertaken using information on neighbouring water company dWRMPs and updated drought plans that became publicly available following issue of the Thames Water draft WRMP and SEA Environmental Report.
Natural Resources Wales	Severn-Thames transfer options We note that Thames Water has concluded that the draft water resources management plan will have no likely significant effects from the preferred set of options and, therefore, no appropriate assessment of the plan is required. However, the HRA does refer to preliminary appropriate assessments carried out on the Severn Thames transfer options. We are disappointed that Thames Water did not consult the Countryside Council for Wales when undertaking and consulting on these assessments. We believe it is premature to conclude no likely significant effects from these options and the relevant Tables in Appendix A of the HRA should be updated to reflect this.	NRW was consulted as part of the scoping stage of the Appropriate Assessment. Consultation was undertaken with regulators via two Scoping Workshops; the first of these on 25 January 2011, and was attended by Alison Brown of CCW but CCW were unable to attend the second on 16 March 2011. The appropriate assessment concluded that, for all scenarios and capacity options

Consultee	Key concerns	Summary responses
		<p>for the Severn-Thames Transfer scheme, the WFD83 criteria for freshwater flows to estuaries would not be compromised. Therefore, the proposed scheme would not have an adverse impact on the Severn Estuary/Môr Hafren European and Ramsar site with respect to habitat features, sessile communities and birds dependent on these habitats. The report also concluded that through examination of the effects of changes in flow regime in the lower River Severn, there would be no significant adverse impacts on migratory fish through the direct abstraction options or the supported pipeline option. However, further investigation would be needed to demonstrate an absence of impact through the supported canal transfer option. With no effects predicted on salmonids, impacts on freshwater pearl mussel populations have been ruled out.</p> <p>NRW were issued the draft report (26 June 2013) and prompted for comments (19 July 2013). NRW provided comments on 4 October 2013. The comments made by NRW were used to update the HRA tables in Appendix A of the HRA to reflect NRW's views.</p>
Natural Resources Wales	For any revisions to these assessments or if any new options are to be brought onto the preferred list, including the Severn Thames transfer constrained options, Thames Water must consult Natural Resources for Wales as the relevant nature conservation body for the Habitats Directive and HRA process in Wales. Natural Resources Wales will participate fully with the revised SEA and HRA processes.	Noted.
Natural Resources Wales	Annex 1: Thames Water Utilities Ltd Draft Water Resources Plan 2014 Habitats Regulations Assessment- Screening.	1.1 Noted and amendments made. 1.2 Noted. Further text was added to

Consultee	Key concerns	Summary responses
	<p>1.1: Reference should be made to Regulation 102 of the Conservation of Habitats and Species Regulations 2010 (as amended).</p> <p>1.2: Clarification would be welcomed regarding any sequential approach in this HRA process regarding unconstrained options, constrained options, feasible options and preferred options. As written, it is unclear until the very end of this Report whether the HRA screening process is being applied to ‘constrained options’ or to preferred options’.</p> <p>2.2: The potential for significant effects on European Sites is not necessarily determined by spatial proximity but on causal pathways and the sensitivity of the receiving environment and features of interest on any given Site.</p>	<p>Section 1 to clarify that the assessment within the main document relates to the preferred programme, and that the screening of the entire constrained list was provided in Appendix A.</p> <p>2.2 Noted. The potential for the presence of causal pathways was considered, and the spatial proximity determined. Furthermore, due to the potential for impact on sites hydrologically connected to a proposed scheme, consideration was given to sites that are hydrologically dependent on receiving watercourses associated with proposed schemes.</p>
English Heritage	<p>Table 3.1 – Key Policy Messages derived from the Review of Plans and Programmes: The messages summarised in the table in relation to Archaeology and Cultural Heritage is not complete or accurate. For example all development as proposed by the dWRMP can have implications upon the significance of all types of heritage assets, whether directly or in relation to their settings. This includes features of archaeological interest whether known or yet to be discovered and not just built fabric. In addition a key message from existing plans and programmes is that heritage assets are an irreplaceable resource and that proposals should seek to sustain and enhance their significance. These are important messages which should be recognised and acted upon in the SEA and dWRMP.</p>	<p>The SEA Framework for PR14, including the SEA objectives and indicator questions relating to cultural heritage, was consulted on with English Heritage and agreed at the scoping stage. In response to comments made by English Heritage at the scoping stage, the SEA process incorporated consideration of undiscovered and non-designated resources and setting, and clarified considerations as required by the National Planning Policy Framework. The resultant objectives and indicators prompted consideration of all historic resources (designated and non-designated) as well as their setting. The assessments also made provision for unknown resources, incorporating consideration of information supplied by English Heritage on wetland heritage. This source of information is referred to in Appendix C of the Environmental Report.</p> <p>As noted in the Scoping Consultation</p>

Consultee	Key concerns	Summary responses
		record (Appendix A of the Environmental Report), SEA objectives agreed with EH for PR09 were used as a starting point for developing objectives for PR14. Following a meeting on August 2, 2011 a note (Revised Methodology For Assessing Cultural Heritage') was issued to and acknowledged by Jenny Frew at English Heritage on 1 November 2011.
English Heritage	<p>Figure 5.1 – Derivation of SEA Objectives and Indicator Questions: In general we are supportive of the detail and framework proposed for the Archaeological and Cultural Heritage, subject to the following minor changes:</p> <ul style="list-style-type: none"> · Amendment of the PPP Key messages in line with our comments above. · Include a reference to 'the setting of heritage assets' within the Indicator Question 40. 	<p>The SEA Framework was consulted on and agreed at the scoping stage, and as indicated above, took into consideration discussions during development of the PR09 plan.</p> <p>In addition it should be noted that the indicator questions were devised as a guide (avoiding a more criteria led approach). The wording of the objective is considered to adequately cover the point made in the response regarding heritage assets and their setting.</p>
English Heritage	<p>5.2 Interactions between Objectives It is noted that the conclusions made in figure 5.2 on the interaction between the heritage SEA objective and other objectives is limited. We would suggest that the number of 'no direct interaction' identified is inaccurate. For example to adapt and improve resilience to the threats of climate change could have a direct impact upon the historic environment. There are many cases where measures taken for the purpose of addressing climate change issues have had an adverse impact upon the significance of heritage assets. A similar relationship could exist with regards to the SEA objective on protecting and enhancing the soils and land management. For example land management issues can impact upon known or yet to be discovered archaeological interest. We would therefore advise that further consideration is given to the relationship of the Heritage SEA with all of the other objectives identified.</p>	<p>Noted. However, Figure 5.2 identified several interactions between the heritage SEA objective and other objectives. The interactions need to have some connection to the effects of the plan. Therefore while the interactions highlighted in the response certainly exist, they are not determined by actions identified in the plan.</p>
English Heritage	<p>6. Assessment of Schemes It is noted that the schemes discussed do make some reference to their potential impact upon cultural heritage issues. However it would be useful to clearly recognise that subject to the details of the schemes discussed, these impacts could occur during both the construction phase and in the final operation of the infrastructure. These impacts</p>	<p>The completed SEA tables (which were reported in Part C, Appendix B, and then Appendix D of the SEA Environmental Report) considered all issues highlighted</p>



Consultee	Key concerns	Summary responses
	<p>could also have a direct, indirect or cumulative impact upon a wide range of heritage assets including unknown archaeology. Where above ground infrastructure and other capital works are being proposed, English Heritage would seek to ensure that the potential impacts on the significance of heritage assets including their settings are assessed in accordance with the National Planning Policy Framework (NPPF) for conserving and enhancing the historic environment and delivering sustainable development. With this point in mind the proposals for works at Abingdon Reservoir could, subject to further detailed analysis and understanding of the heritage interest in the area, have an impact upon the setting of existing designated heritage assets such as listed buildings and conservation areas, archaeological remains and the wider historic landscape character.</p>	<p>in the comment (impacts of schemes during construction operation including unknown archaeology) where appropriate. An example is provided below with respect to the Abingdon reservoir schemes (in this case Abingdon 30 (London) (RS-RRR-ABI-01)). "There are no designated assets within the construction area of the scheme. There are a number of designated assets in proximity (2.5km) of the scheme including the Scheduled Monuments Settlement Site (north of Cow Lane); Drayton Cursus; Sutton Wick and Noah's Ark SM. A number of listed buildings and Conservation areas are in proximity to the pipeline routes. The access, value and enjoyment of these assets may be temporarily disrupted during construction over the medium term. There is large number of undesignated buried archaeological assets in the proposed reservoir, forming an important archaeological landscape. Some of these assets may be of national importance. The large construction area associated with the scheme and requirement for excavation (including the site itself, the flood compensation area and ancillary works (e.g. pipelines) presents a high risk to other as yet unknown buried assets. In addition the significant aggregate use associated with the scheme would place further pressure on the buried archaeological remains present in local deposits of minerals (especially of sand and gravel). During operation the scheme is not anticipated to have any effect on hydrological setting of</p>

Consultee	Key concerns	Summary responses
		<p>water dependent assets. During operation the scheme would have the potential for some influence on the visual setting of assets (e.g. listed buildings and conservation areas) over a considerable distance. The scheme is considered to have a significant adverse effect on the historic landscape character of the area. However, the scheme is also anticipated to improve access and visitor numbers to the local area which may include visits to heritage assets and therefore improve access, value and enjoyment of the heritage assets."</p>
<p>English Heritage</p>	<p>Unfortunately this level of detail is not clearly expressed in the current SEA. It is noted that the summary provided in relation to ground water abstraction, artificial recharge and aquifer storage recovery, does not consider the potential impact these approaches could have upon the Cultural Heritage SEA objective. In particular we would advise that unless carefully regulated and undertaken from a basis of understanding the effects of abstraction of water resources could have a negative impact on buried, waterlogged archaeological and palaeo-environmental remains of significant interest and fragility. With this in mind we would seek clarification that these types of schemes have been fully assessed against their impact upon the historic environment. It is noted that Figures (7.1-7.6) set out potential impacts, but the level of detail provided is often limited. For example, in some cases the matrix indicates adverse effects (minor to major) upon the heritage SEA objective; however the commentary provided does not detail what this effect entails. Further clarity should be provided.</p>	<p>The full assessment tables (Appendix D of the SEA) demonstrated that consideration of the potential for schemes that interact with groundwater to affect buried, waterlogged archaeological and palaeo-environmental remains was made. This aspect of the assessment was linked to the high level hydrogeological assessment that was undertaken for such schemes.</p> <p>The SEA framework included the following key questions with respect to the objective 'To conserve and enhance the historic environment, the heritage assets therein and their setting':</p> <ol style="list-style-type: none"> 1. Will it maintain and enhance the historic environment, including palaeoenvironmental deposits? 2. Will abstraction alter the hydrological setting of water-dependent assets? <p>These were developed in consultation with English Heritage.</p>

Consultee	Key concerns	Summary responses
		<p>An example is provided below for the Addington aquifer storage recovery scheme (ASR – South East London (Addington) (GW-ASR-01)).</p> <p>"The scheme is not located in proximity to any designated assets. Excavation associated with construction of the boreholes and 1.1km of pipe would predominantly be on previously developed land and is considered to present a very small risk of effects on unknown buried resources. A watching brief, surveys and investigation would minimise risk of harm to unknown assets. During operation, any unknown, water dependent assets within the zone of influence of groundwater drawdown associated with the abstraction from the Chalk aquifer may be affected through operation of the scheme and any potential for drying effects. However, this is considered a limited risk considering abstraction would take place in the winter and spring. As recharge and reabstraction would be from the confined Lower Greensand Aquifer, and it is anticipated that there is little (if any) hydraulic link with surface water features, no potential effects on the hydrological setting of water dependent features are anticipated."</p>
English Heritage	<p>10. Mitigation and Enhancement of Significant Effect</p> <p>English Heritage would seek further clarity on the following: where individual schemes are likely to have an impact on the historic environment; the nature of the mitigation measures proposed and their appropriateness to the level of impact identified; and justification that harm cannot be avoided.</p> <p>It is not clear from the information provided whether the SEA has explored mitigation measures that can help address any potential harm that may be caused to the historic</p>	<p>The SEA Directive requires the Environmental Report to include measures to prevent, reduce or offset any significant adverse effects on the environment of implementing the plan or programme.</p> <p>Beckton STW Reuse (RO) - 150 Ml/d is</p>

Consultee	Key concerns	Summary responses
	environment. The current details appear to focus on biodiversity, air quality and climate change issues.	the only scheme in the preferred programme identified as having the potential to result in significant adverse effects to the historic environment. These relate to potential construction effects only. Mitigation of the environmental impacts of the plan were revised in the ER and also addressed in this Post Adoption Statement. This includes mitigation measures relating to the Beckton STW Reuse (RO) - 150 Ml/d scheme.
English Heritage	11. Monitoring Proposals Table 11.1 – SEA Monitoring Parameters The monitoring parameters proposed for Cultural Heritage should be amended so that the condition of all heritage assets affected by the plans proposals are monitored. In the case of buried archaeology we would suggest that monitoring should be undertaken during construction and operational phases, especially where the works proposed relate to activities that can have an impact upon the hydrology and water levels below ground. In addition English Heritage’s Heritage at Risk Register highlights all designated heritage assets that are at risk. This includes Conservation Areas, Registered Battlefields, and Registered Parks and Gardens, as well as Listed Buildings and Scheduled Monuments.	The wording of the monitoring indicators were updated to provide greater detail on what will be monitored as well as correctly referencing asset types included in the Heritage at Risk Register. It is noted that monitoring during construction and operation phases will form part of the monitoring at the project level rather than at the plan level associated with the SEA.
English Heritage	dWRMP On considering the details of the dWRMP it should be noted that many of the points raised in response to the SEA are pertinent to the draft Plan. It should also be noted that the dWRMP is not very detailed on the nature of the programme of schemes proposed, in terms of their location, extent and level/types of physical works. This is extremely important to address as it is difficult to provide with clarity advice and guidance on what harm could potentially be caused to the historic environment or what measures could be undertaken to help mitigate unavoidable harm. In addition due to a lack of details it is not possible to establish whether alternative approaches, especially in terms of site specifics could be explored, which in heritage terms could be potentially less damaging. These points are particular relevant when discussing schemes that involve ground infrastructure, capital works including water transfers, ground water abstraction, artificial recharge and aquifer storage recovery.	The WRMP is a strategic plan setting out proposals to ensure a secure supply of water for Thames Water’s customers over a 25 year period. As part of the development of the draft Plan, over 200 potential schemes were reviewed and detailed dossiers prepared for each individual scheme which were published in Part C Appendix R. Additional detailed information on the schemes, including relevant maps of locations and schematics, were made available to regulatory agencies including English Heritage. However, this

Consultee	Key concerns	Summary responses
		<p>information was not publically released in accordance with Defra's direction on national security and commercial sensitivity which requires certain information to be redacted (Security and Emergency Measures Direction 1998 and Advice Notes to manage water company sensitive information).</p> <p>Throughout the consultation period, Thames Water offered to meet and discuss specific points with organisations, including English Heritage.</p>
English Heritage	<p>Section 8: Programme Appraisal</p> <p>8.5 Development of the preferred plan for London Table 8-4: Step 2 Consideration of environmental impacts through the SEA. We would seek to ensure that the findings of the SEA, especially in terms of the impacts of proposal upon the historic environment, are explicitly and completely reflected in the dWRMP. This is particularly important when considering the development of the preferred programmes of work. An example where the transfer of information has not been fully carried forward into the dWRMP, is in relation to the Reuse of Abbey Mills as expressed in the Table 8-4. The SEA (figure 7.4) highlights that this scheme could have Major Adverse impacts upon the historic environment which is supported by the commentary. This message is not reflected in the dWRMP, which implies that the heritage issues are not been fully considered or addressed when developing these individual schemes. We would need reassurances that this is not the approach being taken by Thames Water and that detailed discussions on these sensitive proposals are undertaken with English Heritage.</p>	<p>The scheme specific commentary such as that in Table 8.4 was a very brief summary of effects and this was updated to include reference to significant effects on cultural heritage in the revised draft WRMP. Were such a scheme to be selected for the Preferred Programme, Thames Water would liaise with English Heritage in order to ensure appropriate mitigation and impact avoidance measures are put in place to protect archaeology and cultural heritage.</p>
English Heritage	<p>9.2 Preferred plan - London</p> <p>Under the medium to long term (2020-2040) heading, it is noted that the Plan suggests the development of small groundwater schemes and options (e.g. transfers, re-use and storage as identified in paragraph 8.7). We would wish to be assured that when exploring these schemes that English Heritage is actively involved in their development in order to avoid unnecessary harm being caused to the historic environment.</p>	<p>Noted. As and when schemes move on to the project phase, relevant stakeholders will be consulted for example through the EIA process. English Heritage will be consulted with respect to the historic environment.</p>
CPRE	<p>We fully appreciate the regulatory and business imperative to propose a best value plan. That is why the costing , partnership and risk assessment elements noted above are all so important : we would like to see these tested and challenged more than they have been thus far. We take it as given that any particular part of the plan requiring an SEA will have one with appropriate alternatives being considered. Likewise an Appropriate Assessment (AA) will be undertaken if</p>	<p>The UKWIR guidelines on SEA and HRA were developed in consultation with practitioners across the sector and regulators. The approach has been refined in consultation with EA, NE and EH.</p>

Consultee	Key concerns	Summary responses
	<p>required. We would expect this to apply to most if not all of the long term options that emerge from the five year assessment process. However we also note that the assessment of SEA and AA should be a direct application of SEA and AA best practice not mediated or abbreviated by UKWIR guidelines.</p>	<p>Consequently, there is confidence as to the methodology followed, but Thames Water offered further discussions with CPRE on specific matters where they consider the SEA and HRA may not follow best practice.</p>
<p>BBOWT</p>	<p>We welcome, and endorse, the first two of the three main activities set out in the introduction to the draft Water Resource Management Plan (WRMP): Aiming to manage the increased demand for water through reducing leakage from pipes and undertaking initiatives to use water more wisely; and Aiming to gain a much more detailed understanding of where, when and how water is used throughout our region, so as to better manage demand. The third main activity, developing new resources where appropriate, is understandably vague, given the extent of the plan period. Nevertheless, the WRMP highlights a focus on demand reduction over the next 5 years followed by new supply options.</p> <p>There is a danger that reduction targets for the next 5 years may not be met and new supply options will therefore be seen as the main solution to the growing demand. This will be even more challenging as more abstraction licences are amended through the Restoring Sustainable Abstraction Programme and in order to meet RBMP targets.</p>	<p>The points raised by BBOWT were acknowledged; as part of the development of the draft WRMP, the SEA process was followed to ensure that account is taken of the potential environmental and social impacts of individual resource options and measures to reduce demand. The SEA was presented in Part C Appendix B of the draft Plan. The SEA included consideration of ecosystem services relevant to the dWRMP (Section 5.5 and 7.4) and included an outline overview of how the dWRMP could affect the provision of ecosystems services. Over time, as better information becomes available to allow robust valuation of the related environmental effects of the WRMP, the assessment of changes to ecosystem services and impacts on natural capital resulting from options identified in the plan will become more integrated in to the WRMP process.</p> <p>Over the next 5 years, Thames Water's programme is focused on demand management activity, and through this period, the company will monitor the effectiveness of these demand management measures and this information will be considered in the development of the next plan in 2019.</p>



Consultee	Key concerns	Summary responses
<p>Vale of the White Horse</p>	<p>11. We note that cost has been the lead factor in the selection of some options, for example, wastewater reuse is the preferred option because it is currently the lowest cost solution. Though cost is an important factor it should not be the only reason for choosing or dismissing a particular option. Other important considerations such as amenity of local residents, environmental and nature conservation, landscape, transport, flood risk, historic and cultural heritage, loss of agricultural land and CO2 emissions should also be taken in to account. As demonstrated in our representations to the previous Water Resources Management Plan, we consider the impacts of a storage reservoir to be significant in relation to these considerations. This is also acknowledged in the Strategic Environmental Assessment accompanying the draft Water Resources Management Plan 2015-2040</p>	<p>Cost was not the lead factor in determining the preferred programme, with account taken of other factors including the preferences of Thames Water's customers, Government policy objectives and the environmental and social assessment in shaping the programme. This was explained in the draft Plan Part B, Section 8.</p> <p>The SEA was undertaken to identify the likely significant environmental effects of individual schemes and to help define the preferred programme of schemes for each water resources zone (WRZ) within the dWRMP. Certain environmental effects can be monetised and considered alongside other financial parameters. However this is not possible for all environmental impacts, and the SEA allows incorporation of these other environmental concerns into the process. The methodology followed involved the definition of a suite of SEA objectives under each of the SEA topics (as suggested by the Directive). These objectives formed the basis for the assessment. Alongside each objective, a set of indicator questions were developed to ensure the assessments were comprehensive and consistent. These were prepared in consultation with regulators and interested stakeholders. The SEA covered a wide range of topics including biodiversity, access, and flood risk. The SEA and Habitats Regulation Assessment were presented in Part C, Appendix B and Appendix C of the</p>

Consultee	Key concerns	Summary responses
		<p>dWRMP respectively. A description of each option was presented in Part C Appendix R information is included on the design and initial environmental appraisals for each scheme</p>
<p>Wokingham BC</p>	<p>The DWRMP would ideally have a greater level of information of works planned to go ahead in the Wokingham Borough as this would inform the Council as to any potential impacts regarding the need to phase developments or sites, in addition to new infrastructure. A greater level of information should be included about the potential impacts of water transfers between the areas supplied by Thames Water and South East Water on such things as biodiversity, green infrastructure, heritage assets and archaeology.</p>	<p>The WRMP sets out the plan for provision of future water supply at a company and water resource zone level. Plans at Council and Borough level related to developments are covered through the planning process and liaison with Boroughs and councils takes place as necessary to deliver planned developments.</p> <p>Part C, Appendix B presented the Environmental Report of the draft Plan. Within this document, detailed information was published on the environmental assessment of each of the options in the dWRMP on amongst other things, biodiversity and heritage, according to an assessment framework that was agreed with the regulators and is in accordance with the legal framework for SEA.</p>
<p>Individual conultee ID 76</p>	<p>2. The social impact of compulsory metering hardly appears, at least in the summary version of the plan.....A significant change is intended in the way we pay for water, so that charges become less related to property value and more to total household consumption. This change affects sewerage costs that will be rising very steeply to pay for the Tideway Tunnel and further WFD requirements. The WRMP (encouraged perhaps by national guidance) looks at this change solely from the point of view of what helps to improve the water supply/demand balance. It purports to examine the social impact of metering, but the examination is incomplete and defective. No issues on the social impact of the expansion of compulsory metering are flagged, and no data is provided to support public examination and debate.the absence of data on social impact has the effect of distorting the economic analysis</p>	<p>The comments raised with regard to the nature and scope of the economic assessment and specifically the view that the social impact of metering has not been properly evaluated was noted. The assessment of the social impacts of metering were considered to be appropriate for a strategic plan and to justify their implementation. In developing its Business Plan and WRMP, Thames Water undertook considerable</p>

Consultee	Key concerns	Summary responses
		<p>research with customers; a clear priority expressed by household customers as part of the engagement and research programme was that they did not want to see significant increases in bills. This feedback was taken into account in defining Thames Water's 5 year investment programme and also in the development of the 25-year preferred water resources programme with customers identified as one of the five criteria used to measure the performance of the plan. The impact on water bills is used as one of the measures for this criteria.</p>
<p>Individual consultee ID 76</p>	<p>The social or customer scoring is particularly unconvincing. Under the heading “population and human health” there are assessments whether a particular scheme is high cost, measured in terms of the cost of water produced or saved: its AISC (£ per m³/l). The AISC of compulsory metering is “to be confirmed” although the analysis concludes that “The scheme is unlikely to cause a disproportionate effect on customer bills as it provides water at reasonable cost.” Table D125 Annex to SEA Environmental Report. The implication is that metering has no impact of any kind on customer well-being.</p>	<p>The SEA is based on assessment against an objective, based on consideration of a number of indicator questions. The objectives and indicator questions were defined and consulted on at the Scoping stage in the SEA process. In this case, assessment against the objective 'To improve human health and wellbeing of the area, improve access to recreation and the environment, and reduce inequalities,' was supported by the following indicator questions:</p> <ol style="list-style-type: none"> 1. Will it help to ensure access to a secure supply of drinking water that contributes to improving the affordability of water over the long term? 2. Will it avoid negative effects on human health or quality of life, for example through nuisance?

Consultee	Key concerns	Summary responses
		<p>3. Will it reduce negative effects on human health or nuisance as a result of changes to traffic or transport?</p> <p>4. Is it located in an area considered to be significantly more deprived than others in the region?</p> <p>5. Will it improve access to open spaces, the natural and historic environment and provide opportunities for formal and informal recreation to local residents?</p> <p>The assessment of compulsory metering recognised that there may be adverse impacts associated with deployment of meters in relation to traffic, air quality and nuisance, and beneficial effects in terms of improved leakage detection and reduced disruption associated with leakage repairs. Where there is range of adverse and beneficial effects, a 'Mixed' effect is recorded. The commentary is provided to allow appreciation of the effects considered important to each objective. The level of detail in the assessment is considered appropriate to a strategic assessment.</p> <p>Section 7.4.3 of the dWRMP Section B provides more detail around the metering approaches which are being considered by Thames Water. It is recognised and explained in this section of the WRMP</p>

Consultee	Key concerns	Summary responses
		<p>that progressive metering (also known as Selective or Compulsory) is administered on the basis of an approach that is 'fair and reasonable to customers and stakeholders'.</p>
<p>Individual consultee ID 76</p>	<p>It speaks volumes that there is a 140 page report on habitats (including reviews of “in combination effects” and 264 pages plus 295 pages of tables on environmental impacts, but no data or assessment of “in combination effects” of changes in the method of charging for people. The predominance of environmental considerations imports a blind spot when demand management options are summarized:</p> <p>“Demand management schemes cause few significant adverse effects. These are mainly disruption and congestion effects during the construction or installation phase. They provide significant benefits by reducing the volume of water that needs to be abstracted, treated and put into supply.” SEA Environmental Report, page iv</p> <p>Would the conclusion that there are “few significant adverse affects” hold good if a distributional analysis found that the overall effect of metering was regressive – i.e. demanded a higher contribution from poorer areas and households, and generally produced winners in areas where the wealth of households, not to say the overall carbon footprint, is greater?</p>	<p>It was recognised that the progressive metering programme will have a significant impact on customers. Assessment of the impact on customers’ bills and identification of affordability issues is therefore an integral part of the assessment of progressive metering proposals. Thames Water is working hard to ensure that the programme is customer focused, with clear information and support, and charging arrangements designed to help those customers who need help including the introduction of a social tariff (Watersure+) as a further addition to support families that will/may be disadvantaged from being metered. Thames Water will work closely with CCWater and other regulators and will continue to do so as it develops proposals both for metering and tariffs.</p>

APPENDIX 2 - POST ADOPTION PROCEDURES

Part 4 of the Environmental Assessment of Plans and Programmes Regulations 2004 requires Thames Water, 'as soon as is reasonably practicable' after the adoption of the WRMP, to:

1. Make a copy of the final WRMP and Environmental Report (with addenda) available at its principal office for inspection by the public at all reasonable times and free of charge;
2. Notify the public and potentially affected parties of their availability;
3. Inform the statutory consultees and other parties who responded;
4. Issue a statement containing:
 - how environmental considerations have been integrated into the WRMP;
 - how the environmental report has been taken into account;
 - how consultation responses have been taken into account;
 - the reasons for choosing the WRMP as adopted;
 - measures to monitor the significant environmental effects of the WRMP.

Requirements 1 to 3 have been fulfilled by the publication of the WRMP and SEA documents on Thames Water's website, and informing all consultees of the publication.

The publication of this document fulfils Requirement 4.

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APPENDIX 3 - FURTHER INFORMATION IN SUPPORT OF THE STATEMENT OF RESPONSE

In a letter to Lesley Tait of Thames Water, dated March 17, 2014, Defra requested further information in support of the Statement of Response (SoR) to Thames Water's consultation on its draft Water Resources Management Plan (dWRMP). The information related to effects assessed for two schemes: AR SLARS (Kidbrooke) and ASR Horton Kirby. The information provided to Defra is presented below.

SLARS KIDBROOKE AND EFFECTS ON OXLEAS WOODLANDS SITE OF SPECIAL SCIENTIFIC INTEREST (SSSI)

Context

Defra's letter states:

Your SoR does not fully address the representations made in relation to protection of the Oxleas SSSI from the proposed pipeline to connect your new option of the London Aquifer Recharge Scheme to supply the London Resource Zone. Whilst this pipeline is not needed until 2026 you should discuss with Natural England the proposed route and the mitigation measures that will be required and provide us with that further information.

AR SLARS (Kidbrooke) (GW-AR-09) was considered as a feasible option in the revised draft Water Resource Management Plan (rdWRMP), but is not included in the Preferred Programme for the rdWRMP (now final WRMP).

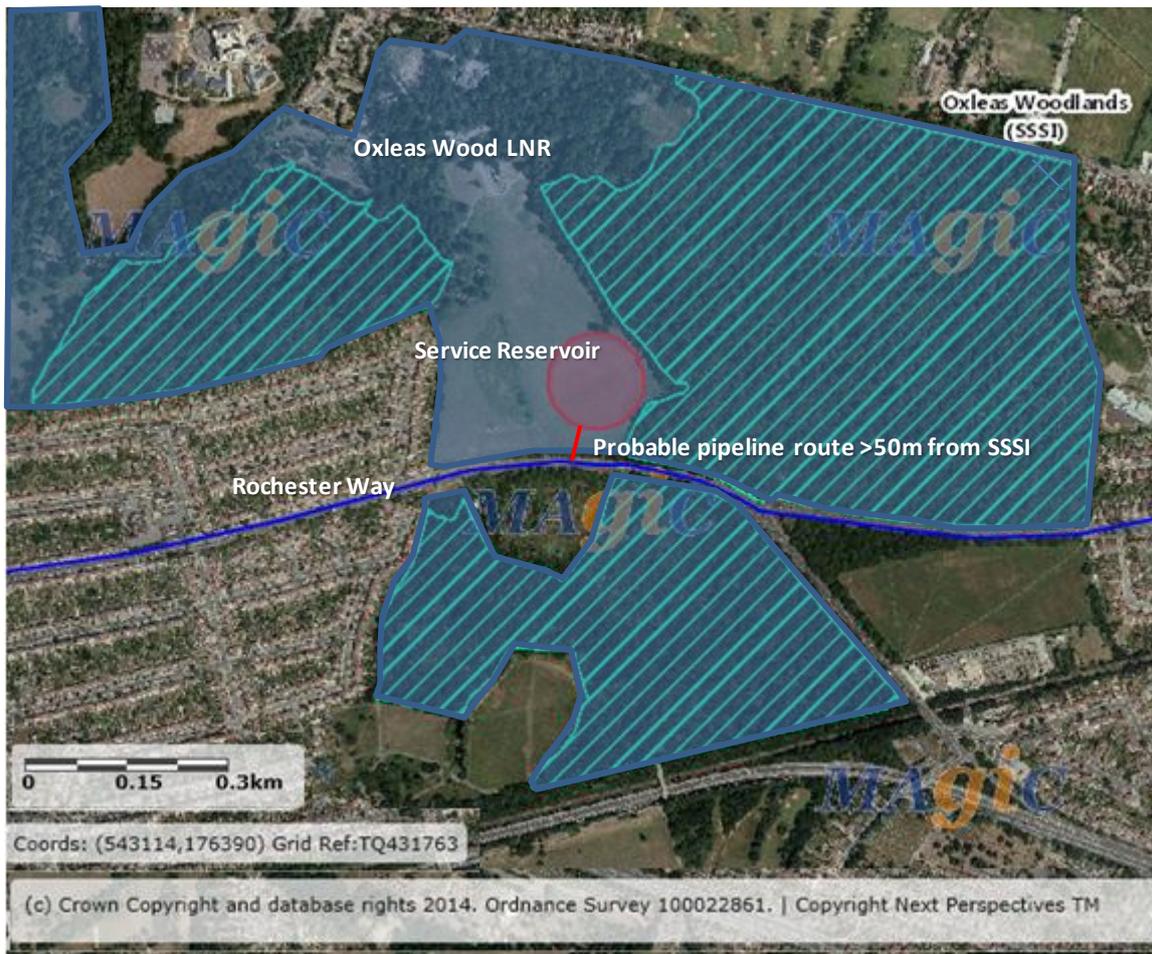
AR Kidbrooke (GW-AR-02), a distinct scheme from that above, is included in the Preferred Programme (at 2021). This scheme will cause no effects on Oxleas Woodlands SSSI, being approximately 2km distant.

Assessment and Rationale

Following review of the AR SLARS (Kidbrooke) scheme details and the boundaries of the Oxleas Woodlands SSSI, it was apparent that potential impacts of the scheme had been overstated in the SEA of the dWRMP. This was due to confusion over a pipeline route and the boundary of the SSSI.

The pipeline passes through an area called Oxleas Wood which is designated as a Local Nature Reserve (LNR) (shaded blue on Figure 1) and, in parts, as a SSSI (hatched green on Figure 1). The proposed works relate to an existing Thames Water asset (Oxleas Wood service reservoir) which is located in a grassed area of Oxleas Woodland LNR as identified by the red circle in Figure 1 below. The service reservoir is located 300m north of Rochester Way (main road), represented by the blue line in Figure 1. The pipe would be laid between the road and the service reservoir, without incursion into the SSSI.

Figure 1 Location of Oxleas Woodlands SSSI relative to one of AR SLARS (Kidbrooke) pipe routes



A final pipeline route has not yet been defined. However, the probable route would in all places be at least 50m from any woodland habitat (designated as SSSI) (shown as red line on Figure 1), such that risk of root zone disturbance of trees within the SSSI is negligible. It is acknowledged that the route does encroach on the LNR. However it traverses a grassland area only, and it is considered that adverse effects of construction of the pipeline across this area can be mitigated in the longer term through deployment of best construction practices and minimum soil disturbance. As the pipeline route does not pass through the SSSI, and considering mitigation of effects on the LNR and its relative sensitivity, the significance of effect was reduced to **Minor Adverse**.

The assessment matrix for the scheme (Appendix D of the Environmental Report for the final WRMP) clarifies this assessment. As stated in the matrix, effects and mitigation would be considered further prior to scheme implementation. As explained earlier, this scheme is not in the Preferred Programme for the final WRMP.

ASR DARENT VALLEY (HORTON KIRBY) AND POTENTIAL EFFECTS ON HISTORIC ENVIRONMENT

Context

Defra's letter states:

...the SEA highlights that Horton Kirby may also have a significant adverse effect as a result of wetting/drying of buried assets. You should discuss with English Heritage any potential impacts around this scheme and provide further information on Horton Kirby and the mitigations that will be required.

ASR Darent Valley (Horton Kirby) is included in the rdWRMP14 Preferred Programme for London WRZ at 2019 (now final WRMP).

Assessment and Rationale

As illustrated in Table 1, the SEA identified a 'major adverse' significant effect against Archaeology and Cultural Heritage for the following reasons:

1. Due to the proximity of the scheme to known heritage assets (30m), and the fact that construction of the scheme would involve ground disturbance (construction of the new WTW, boreholes and pipeline), and
2. Due to the potential for the scheme to cause variations in water levels, with consequent potential effects on drying/wetting of buried resources.

In relation to the first of the above effects, mitigation was identified as likely to include a watching brief during construction and surveys. It is suggested this would also be allied to discussions with English Heritage and other interested parties, including the County Archaeologist. The residual effect was judged to be significant.

In relation to the second of the above effects, the assessment was based on a strategic hydrological assessment and an environmental screening process, documented in the scheme dossier (found in Appendix R of the final WRMP). The strategic hydrological assessment referenced groundwater modelling that indicated the scheme would affect groundwater levels in the Lower Greensand aquifer (variation of 4-7m in the confined zone), with potential effects on baseflows in the River Darent headwaters (noting that there are uncertainties in the modelling which have yet to be clarified). The confined groundwater zone is sufficiently deep (approximately 250m below ground level) and covered by a 70m layer of impermeable Gault Clay, such that these level changes will have no effect on near surface groundwater levels, and there is therefore no mechanism for level changes in the confined aquifer to affect preservation of buried archaeological resources. There is some potential for minor level effects in the upper reaches of the River Darent. However if these do occur, they will be small (up to 1cm), and will have no significant effect on buried archaeology.

It is emphasised that the SEA and its underlying assessments are undertaken at a strategic level, with the intention of identifying potential risks. More detailed assessments would be undertaken prior to scheme construction and deployment, and the scope of these investigations and any necessary mitigation would be discussed with English Heritage at an early stage.

Table A3.1 Information from ASR Horton Kirby SEA Assessment Framework (Appendix D of the Environmental Report)

Topic	Objective	Potential residual effect on sensitive receptors (taking account of mitigation)	Magnitude (scale/certainty/permanence - as applicable)	Residual Effect significance
Archaeology and Cultural Heritage	To conserve and enhance the historic environment, the heritage assets therein and their setting.	<p>The scheme is located within close proximity to a number of heritage assets associated with Franks Hall. During construction there may be some short term adverse effects on the setting of these heritage assets. Mitigation measures such as screening should be employed to minimise these effects. Excavation associated with construction of the new WTW, boreholes and 2km of pipe presents a small risk of effects on unknown buried resources, which may be considered relatively high considering the concentration of assets within proximity to the site. A watching brief, surveys and investigation would minimise risk of harm to unknown assets.</p> <p>During operation, any unknown, water dependent assets within the zone of influence of groundwater drawdown, or reductions in surface water level (e.g. River Darent) associated with the scheme may also be affected through operation of the scheme and any potential for drying effects.</p>	Medium Medium scale, moderate certainty, permanent	Major Adverse

Note: This Table is published as Table D13 in Appendix B of the final WRMP14.