



rdWRMP24
Appendix B:
Strategic Environmental
Assessment Report

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Abbreviations

AA	(Habitats Regulations) Appropriate Assessment
ACWB	All Companies Working Group
AONB	Area of Outstanding Natural Beauty
AQMA	Air Quality Management Area
ASR	Aquifer storage and recovery
BAP	Biodiversity Action Plan
BESP	Best Environmental and Societal Plan
BNG	Biodiversity Net Gain
CEMP	Construction Environmental Management Plan
CFMP	Catchment Flood Management Plan
CPRE	Campaign to Protect Rural England
CROW	Countryside and Rights of Way
CO₂	Carbon Dioxide
CTMP	Construction Traffic Management Plan
DCO	Development Consent Order
Defra	Department for Environment, Food and Rural Affairs
DMS	Demand Management Strategy
ENG	Environmental Net Gain
ET	Environmental Targets
EU	European Union
GHG	Greenhouse Gas
GIS	Geographic Information System
ha	Hectares
HER	Historic Environment Record
HRA	Habitats Regulations Assessment
IMD	Index of Multiple Deprivation
INNS	Invasive Non-Native Species
JNCC	Joint Nature Conservation Committee

ktCO ₂	Kilo Tonnes of Carbon Dioxide
LCP	Least Cost Plan
LDP	Local Development Plan
LNR	Local Nature Reserve
LSOA	Lower Super Output Area
LWS	Local Wildlife Sites
LULUCF	Land Use, Land-use Change, and Forestry
MCZ	Marine Conservation Zone
MPA	Marine Protected Area
NCA	Natural Capital Assessment(s)
NERC	Natural Environment and Rural Communities
NEUB	Non-essential Use Bans
NFM	Natural Flood Management
NNR	National Nature Reserve
NO ₂	Nitrogen Dioxide
NPPF	National Planning Policy Framework
PM	Particulate Matter
PS	Pumping Station
RBD	River Basin District
RBMP	River Basin Management Plan
SAC	Special Area of Conservation
SEA	Strategic Environmental Assessment
SPA	Special Protection Area
SR	Service Reservoir
SRO	Strategic Resource Option
SSSI	Site of Special Scientific Interest
SuDS	Sustainable Urban Drainage Systems
ToLS	Test of Likely Significance
TUB	Temporary Use Ban
UK	United Kingdom
UKCP18	UK Climate Projections 2018
UN	United Nations
WFD	Water Framework Directive
WRE	Water Resources East
WRMP	Water Resources Management Plan
WRPG	Water Resources Planning Guideline
WRSE	Water Resources South East
WRZ	Water Resource Zone
WTW	Water Treatment Works
ZoI	Zone of Influence

Non-Technical Summary

Water Resource Management Plan

Thames Water is the UK's largest water and wastewater services company, it supplies 2.6 billion litres of drinking water per day and treats 4.7 billion litres of wastewater per day. It is responsible for the public water supply and wastewater treatment for most of Greater London, Luton, the Thames Valley, Surrey, Gloucestershire, north Wiltshire, and far west Kent. The area covered by Thames Water has a population of 15 million; this comprises 27% of the UK population.

Water companies have a statutory obligation to produce a Water Resources Management Plan (WRMP). The WRMP sets out how a company intends to achieve a secure supply of water for customers while protecting and enhancing the environment over a minimum 25-year period. The plans must be prepared every five years and reviewed annually. Thames Water's WRMP 2024 (WRMP24) renews the previous WRMP published in 2019.

The WRMP also informs the Thames Water business plan and forms a major part of the price review process undertaken by the water industry regulator, Ofwat. Price Review 2024 (PR19) is the eighth price review since the water industry was privatised in 1989. Engagement with regulators, licensed water suppliers, other water companies, customers and stakeholders is key to the WRMP development process, and extensive consultation on the development of the WRMP24 has been undertaken with these interested parties.

In the development of a WRMP, companies in England and Wales must follow the Environment Agency Water Resources Planning Guideline and consider broader government policy objectives. The guideline highlights that where required companies must carry out a Strategic Environmental Assessment (SEA) for their WRMP.

The SEA process was undertaken alongside the development of the Thames WRMP24 to inform the decision-making process and integrate environmental considerations. The SEA for the draft WRMP24 (dWRMP24) was presented in an Environmental Report which was issued for consultation from November 2022 to March 2023. Comments received from the consultation process were reviewed and have been addressed where appropriate within this Environmental Report. The draft WRMP24 has been updated to the revised draft WRMP24 (rdWRMP24) reflecting additional modelling work undertaken to optimise the plan as well as consultation feedback. This report is the SEA Environmental Report for the Thames rdWRMP24 and forms part of the Thames rdWRMP24 documentation.

Further information on Thames Water's rdWRMP24 is presented in Section 1 and 2 of the Strategic Environmental Assessment - Environmental Report.

Environmental Assessment of the rdWRMP24

Thames Water, as a responsible authority under the UK Environmental Assessment of Plans and Programmes Regulations 2004, determined that its WRMP24 falls within the scope of the SEA Regulations. Thames Water must also ensure the rdWRMP24 meets the requirements of the Habitats Regulations Assessment (HRA) and Water Framework Directive (WFD) and related national regulations before adoption.

This SEA Environmental Report is therefore supported by the findings of the HRA and WFD assessments carried out on the rdWRMP24. The detailed findings of these assessments are provided in accompanying HRA and WFD assessment reports.

In the context of water resources planning, SEA identifies the likely significant environmental effects of the various measures, both individually and in-combination, required to provide a reliable and resilient water supply service to Thames Water's customers. These effects can then be used to help define the preferred programme of schemes to meet this objective, and which together form the rdWRMP24. Biodiversity Net Gain (BNG) and Natural Capital Assessments (NCAs) have also been undertaken.

The SEA process was used by Thames Water to help inform a final decision on the most appropriate programme of measures to include in the rdWRMP24.

A summary of this is outlined in Section 5, 6 and 7 of the Strategic Environmental Assessment - Environmental Report.

SEA Objectives

The key issues identified in the area were brought together to form a suite of SEA objectives under each of the SEA topics. A set of indicator questions was also developed for each objective to ensure that the assessments were comprehensive and consistent. The Water Resources South East (WRSE) SEA Scoping Report sought views on the proposed SEA objectives for the regional plan, with the intention that this would be adopted by the water companies within the region. The WRSE SEA Scoping Report outlined how these objectives would be used to assess the environmental effects of the WRMP. The final SEA objectives have formed the basis for the assessment. It was not considered appropriate to scope any topics out of the SEA.

An assessment framework was developed and consulted upon as part of the SEA Scoping Report consultation. This included the proposed approach to the measurement of effect significance which assigns assessed effects according to a seven-point scale (from major beneficial to major adverse including a negligible effect category) which was considered to provide an appropriate level of distinction between effects, according to combinations of impact magnitude and receptor sensitivity. The assessment considered both adverse and beneficial effects, with the assessment findings for each kept separate throughout the SEA process in line with best practice to avoid adverse and beneficial effects being 'mixed' together. This approach provides a general indication of the significance of environmental and social effects of the rdWRMP24.

Comments received on the Scoping Report consultation were used to refine and finalise the SEA objectives and assessment approach. Responses to consultation on the SEA Scoping Report are included as Annex B to this report.

The SEA assessment method is presented in detail in Section 4 of the Strategic Environmental Assessment - Environmental Report.

Environmental baseline

Determining which SEA topics are relevant to the Thames rdWRMP24 and which should be scoped out (if any) is a key stage in the SEA process.

The key present and future baseline environmental information is presented in Annex D of the Environmental Report. Topics were scoped in taking into account the baseline situation and the potential impact of the Thames Water WRMP on them. This was assessed by reviewing baseline conditions, current environmental issues for the Thames and wider WRSE region and an assessment of the likelihood of potential impacts occurring.

Assessment Process

The SEA has been undertaken in stages to feed into the development of the rdWRMP24 and influence the decision-making process:

- Option level SEA – the feasible list of options for the rdWRMP24 was assessed. These included supply side option, demand management options, drought options and catchment management options. For options with major adverse effects, such as a pipeline route or tunnel shafts within designated sites or nationally significant heritage assets, the option design was reviewed and amended where possible. The option was then re-assessed to ensure no significant residual effects remain where possible.. For options where minor effects were identified, mitigation measures were identified for future option development.
- WRMP Investment modelling – the results of the SEA were translated into numerical values (environmental metrics) using professional judgement, for the purposes of the investment modelling. Section 4.3 describes how this translation was done. The environmental metrics were used as one of the BVP Framework criteria to select the BVP and BESP (see Section 4.4).
- Programme Appraisal – a cumulative effects assessment was undertaken for the BVP, LCP and BESP to consider the potential cumulative effects of each plan as a whole. The cumulative effects assessment was undertaken for Situations 1, 4 and 8 of the BVP, as these represent the preferred pathway and highest and lowest demand pathways, and for Situation 4 (i.e. the preferred pathway) for the LCP and BESP.
- Links with other plans, programmes and projects – the BVP was considered in combination with other plans and projects including neighbouring water company WRMPs, Hybrid Bills, Local Authority Local Development Plans, Development Consent Orders (DCOs) and major planning applications.

Full details of the SEA process and assessment methodology are presented in Section 4 of the Strategic Environmental Assessment – Environmental Report.

SEA of constrained list option elements

The final conceptual designs for each option element were then assessed through the SEA, HRA, WFD, Invasive and Non-Native Species (INNS), BNG and NCA processes based on their residual effects after application of the mitigation measures. The SEA findings were set out in assessment tables as presented in this Strategic Environmental Assessment - Environmental Report.

The SEA findings of the different types of options considered for inclusion in the rdWRMP24 can be summarised as follows (please note each option has been assessed individually):

- Aquifer storage and recovery – common considerations include abstraction licensing requirements for source water and/or Aquifer Storage and Recovery (ASR) hub. Impact of water level changes on stream-flow and wetlands (HRA and WFD risk). Impact of new intake structures, if required, on the water bodies, and water quality impact of reinjection regime on the aquifer.
- Demand Management Options – generally cause few significant adverse effects. The main adverse effects relate mostly to disruption during the construction/implementation phase (e.g., for water pipe repair, replacement activities or equipment installation). These measures provide benefits by reducing the volume of water that needs to be abstracted, treated, and put into supply. The magnitude of the benefit varies widely and depends on the implementation scale of the measure and consequent volume of water savings delivered.
- Desalination – impacts typically associated with construction of the marine intake and outfall, including temporary disruption to the local habitat and disposal of drilling mud, if used. Discharge of the waste stream which will have a higher density than the surrounding water body has the potential for HRA and WFD impacts. Operational power consumption and related carbon are also typically high, although this may be offset if a low carbon power source becomes available.
- Distribution capacity expansion – typically few negative environmental impacts due to expansion of existing assets, with benefits derived from the additional water resource.
- Drought interventions – similar to other Demand Management Options and generally cause few significant adverse effects. The main adverse effects relate mostly to disruption during the construction/implementation phase (e.g., for water pipe repair, replacement activities or equipment installation). These measures provide benefits by reducing the volume of water that needs to be abstracted, treated, and put into supply. The magnitude of the benefit varies widely and depends on the implementation scale of the measure and consequent volume of water savings delivered.
- Groundwater sources – similar to ASR. Impact of water level changes on streamflow and wetlands (HRA and WFD risk).
- Increase water treatment works (WTW) capacity and efficiency – Typically few negative environmental impacts due to expansion of existing assets, with benefits derived from the additional water resource.
- Water recycling – the schemes have a high energy demand arising from intensive water treatment processes, with adverse effects on carbon emissions. For some of the schemes, construction of the water conveyance pipelines or tunnels may temporarily adversely affect natural, built, or human receptors, with associated HRA and WFD risks.
- Reservoirs – can have significant adverse effects during a prolonged construction period. Both adverse and beneficial effects can arise during operation: from potential adverse effects on visual amenity in the medium to long term before the reservoir landscaping is fully established, to beneficial effects from the recreational resources and compensatory habitat provision.
- Redevelopment of existing resources with increased yields – typically few negative environmental impacts due to use of existing assets, with benefits derived from the additional water resource.
- Transfers – treated water transfers generally have fewer environmental effects, but this is dependent on the precise location of the construction activities relative to natural, built, and human receptors. Effects from water transfers vary considerably according to

the scale of the scheme and the associated transfer and water treatment infrastructure required.

- Trading – involves an agreement with another water company to trade water where there is a surplus. Few environmental effects for these specific options, however, depending on how the water is transferred, the transfer itself may have potential environmental consequences.

Details of the option level assessments are presented in Section 5 of the Strategic Environmental Assessment – Environmental Report.

Programme Appraisal

Thames Water has adopted a planning approach that uses least-cost optimisation as well as broader criteria to develop a Best Value Plan (BVP) (Preferred Plan) which takes account of 'best value' decision making criteria:

- Cost to build and operate the plan
- Adaptability and flexibility of the plan to cope with uncertain future needs
- Alignment to the Water Resources East regional strategy
- Resilience of the plan to severe and extreme drought and other hazards, and the residual risks
- Deliverability of the plan with timescales needed to manage risks
- Alignment to customer preferences
- Environmental and social impacts of the plan, including net environmental benefit

Through the WRSE regional planning process, environmental metrics (translated from the assessment results) were included in the investment modelling to influence the selection of options within the WRSE Draft Regional Plan and correspondingly Thames rdWRMP24. The environmental metrics were used as part of the development of the rdWRMP24 as one of the 'best value' criteria, which was used to generate the list of BVP options.

Demand management is a priority for Thames Water. In developing the rdWRMP24, Thames Water has first considered what risk could be offset from demand management, before seeking to develop supply-side options. The Demand Management Strategy (DMS) is ambitious but must also be deliverable, and therefore carefully targeted investment in supply-side capacity is still required. The supply-side options considered for inclusion in the rdWRMP24 have been developed following industry and regulator guidance.

The Preferred Plan provides the best value for customers in the long term whilst considering environmental and social metrics such as SEA performance, embodied carbon, biodiversity net gain, and others. The strategy:

- Prioritises demand management which aligns with customers' expectations
- Recognises the environmental benefits of demand management, such as offsetting treatment, pumping costs and carbon
- Challenges Thames Water and its customers to push the boundaries of what is achievable, with respect to levels of future consumption
- Maximises the use of existing resources before developing new ones
- Provides future flexibility over the location and type of new resource inputs

- Delivers significant additional resilience across the region both to drought and non-drought events (e.g., freeze-thaw)
- Delivers environmental benefits by reducing abstraction from the environment and ensuring no deterioration in the ecological status of water bodies in the region

Summary of the rdWRMP24 Effects

Environmental and social considerations have strongly influenced the development of the rdWRMP24. The SEA cumulative effects assessment for BVP Situation 4 identified cumulative positive effects for the SEA objectives on biodiversity, water quality and vulnerability to climate risks due to the inclusion in the BVP of a 'High' Environmental Destination, consumption reduction options, changes in levels of service to enhance water available for use (WAFU) (i.e. media campaigns, TUBs, NEUBs) and leakage reduction. The cumulative effects of these options will result in more water being kept within the natural environment. Positive cumulative effects were also identified for the SEA objective on delivering reliable and resilient water supply to customers through delivery of new water supply options, increased capacity and improving transfers across the region.

The SEA cumulative effects assessment for BVP Situation 4 identified cumulative negative effects for SEA objectives on soil due to cumulative loss of agricultural land, carbon due to construction and operational carbon emissions across the plan, and resource use due to the cumulative effects of materials and resource use and waste production across the plan. We will continue work to identify mitigation for these effects as we develop our options through to detailed design and delivery.

The SEA cumulative effects assessment identified several options with the potential for interactions with the same sensitive receptors. This was largely due to construction effects such as disturbance from noise, air and light pollution from different options where the construction periods overlapped. These sensitive receptors included LNRs, SSSI, heritage assets and community assets. However, it was concluded that with implementation of best practice construction techniques and a Construction Transport Management Plan, significant cumulative effects are not anticipated.

In addition to rdWRMP24, Local Plan allocations, other major planning applications and projects along with other water company WRMP options could lead to the potential for in-combination effects to some receptors. The WFD in-combination effects assessment identified 14 water bodies where multiple options and other plans occur. The in-combination effect assessment indicated that only one of these water bodies (GB40601G604100: Chiltern Chalk Scarp) is at risk of further WFD deterioration due to the combination of options and planning projects. Further information on the implications of HS2 phase 1 on the waterbody will be required to quantify the in-combination effects on this water body. The HRA concluded that no in-combination effects on Habitats Sites are likely with other plans and programmes and options within the BVP. The SEA identified potential negative cumulative effects on sensitive receptors relating to construction; in particular for objectives on Biodiversity, Soil, Landscape and Historic environment; all these identified effects can likely be mitigated with best practice construction mitigation and the developments themselves will go through a design and planning process to develop their own mitigation.

The full assessment of the rdWRMP24 is presented in Section 7 of the Strategic Environmental Assessment – Environmental Report.

Alternative Plans

At a WRSE (regional) level a Best Value Plan and two alternative programmes were selected for consideration / assessment through the SEA process, and these programmes have been adopted by Thames Water to form its plan. These programmes are set out below along with a justification for why they were progressed:

- **BVP** – the Guidelines state in Section 9.1 that:
 - *‘The aim of the regional plan and the WRMP is to present a best value plan.’*
 - This programme meets all the legal / regulatory requirements, policy expectations and objectives of the plan. It is therefore a reasonable plan and was progressed for consideration through the SEA process.

- **LCP** – the Guidelines state in Section 10.4 that:
 - *‘You should produce a least cost programme as a benchmark to appraise your other programmes against. The least cost plan should meet your statutory requirements and be informed by your SEA and HRA. The least cost plan should include policy expectations around demand management.’*
 - This programme meets all of the legal / regulatory requirements, policy expectations and objectives of the plan. It is therefore a reasonable alternative and was progressed for consideration through the SEA process.

- **BESP** – the Guidelines state in Section 10.3 that:
 - *‘You should present in your WRMP a programme that represents a ‘Best Environment and Society’ programme in your programme appraisal. The ‘best environment and society’ programme should be one that is formed using this guidance and therefore takes into account the Strategic Environmental Assessment, Habitats Regulations Assessment, Biodiversity Net Gain and Natural Capital where appropriate... You should explain in your plan how you have considered your Best Environment programme, as part of your programme appraisal, and what influence it has had on your preferred programme.’*
 - This programme meets all the legal / regulatory requirements, policy expectations and objectives of the plan. It is therefore a reasonable alternative and was progressed for consideration through the SEA process.

The outcomes of the SEA cumulative effects assessment for the LCP and BESP are very similar to the BVP Situation 4, and to each other due to similar options being selected. However, there are a few nuances within the scoring as outlined below.

Compared to the BESP, the LCP contains New WTW at Kempton - 100MI/d - Construction, Replace New River Head Pump – TWRM and New Reservoir - SESRO 150Mm³ - Construction, whilst the BESP contains New Reservoir - SESRO 75Mm³ – Construction, Beckton Desalination, two Drought Permit option, Henley to SWOX and Kidbrooke groundwater option. The majority of these options have minor residual effects and the differences are not likely to significantly affect scores between the two plans. Both plans contain a version of Abingdon Reservoir. The LCP contains New WTW at Kempton - 100MI/d - Construction which is a new

WTW and the BESP contain Beckton desalination. However, both these options will require large material and energy use and on their own do not change the scoring across the plans.

Compared to the LCP, the BVP contains two additional Drought Permit options, Henley to SWOX transfer and Didcot Power Station Licence Trading, whilst the LCP contains two additional groundwater options, one AR option and Cheam to Merton - London Ring Main. Given the nature of these options and minor residual effects associated with them the differences are not likely to affect scores between the two plans significantly.

Compared to the BESP, the BVP contains New WTW at Kempton - 100Ml/d - Construction, Replace New River Head Pump – TWRM , New Reservoir - SESRO 150Mm3 – Construction and Didcot Power Station Licence Trading, whilst the BESP contains New Reservoir - SESRO 75Mm3 – Construction, Beckton Desalination, two groundwater options, one AR option and Cheam to Merton - London Ring Main. The majority of these options have minor residual effects and the differences are not likely to significantly affect scores between the two plans. The BVP contains New WTW at Kempton - 100Ml/d – Construction which is a new WTW and the BESP contain Beckton desalination. However, both these options will require large material and energy use and on their own do not change the scoring across the plans.

The full assessment of the alternative plans is presented in Section 6 of the Strategic Environmental Assessment – Environmental Report.

Mitigation

Mitigation measures have been suggested as part of the SEA options assessment process. Where possible mitigation measures have been incorporated into the options development process. This has included pipeline re-routing and directional drilling to avoid significant effects on designated sites and heritage assets. Incorporation of these measures at this early strategic stage will help deliver a rdWRMP24 that benefits the environment and reduces the risk of significant negative effects and cost-prohibitive mitigation measures further down the line during detailed design of specific options.

Thames Water is committed to delivering the mitigation measures identified by the SEA, HRA, WFD, INNS, Natural Capital and BNG assessments at the strategic level. The outcomes of these environmental assessments will help inform the option-level assessments and mitigation required during later design stages (e.g. Environmental Impact Assessment).

The SEA also identified numerous enhancement measures across the option assessments; these include:

- Enhance PRow networks
- Incorporate education and information resources in option design to enhance operational benefits
- Enhance the reservoirs through incorporating recreational activities into the design process
- Development of tourism and recreational assets on site – this also has potential to add economic value to the area.
- Opportunities to create new habitats alongside the reservoir
- Opportunities to improve existing habitats during post-construction remediation: options are suitable for planting high value habitats

- Opportunities to use sustainable materials and implement sustainable design measures

Further mitigation and enhancement measures have been collated and presented in Section 8 of the Strategic Environmental Assessment – Environmental Report.

Monitoring

Monitoring the negative effects of implementing the rdWRMP24 is an essential ongoing element of the SEA process. Monitoring helps ensure that the identified SEA objectives are being achieved and allows for early identification of unforeseen adverse effects so that appropriate remedial action can be taken. Monitoring will be an important requirement to measure performance and ensure the rdWRMP24 is being successfully implemented.

The SEA Regulations expect that monitoring should focus on the significant negative effects identified through the assessment. The UK Water Industry Research (UKWIR) guidance recommends that existing arrangements for monitoring should be used where possible to avoid duplication of effort.

Monitoring proposals are set out in Section 8 of the Strategic Environmental Assessment – Environmental Report.

Influence of the SEA on the rdWRMP24 Development

The SEA has been undertaken as an iterative process with the development of the rdWRMP24. It has influenced the rdWRMP24 option design and decision-making as follows:

- The outcomes of the assessments of the feasible options were used to refine option designs, for example, where major adverse effects were identified for sensitive receptors such as ecological sites or heritage assets, the option design was refined, including re-routing pipelines away from receptors.
- Alongside the HRA and WFD, the SEA led to the rejection of some options on environmental grounds where effects could not be adequately mitigated.
- The SEA fed directly into the selection of options through use of the environmental metrics in the investment model. Environmental metrics were included within of the BVP criteria for the selection of options.
- The programme appraisal identified potential cumulative effects and mitigation to ensure the rdWRMP24 minimises environmental impacts and maximising benefits.
- Further mitigation measures, enhancement opportunities and monitoring have been recommended through the SEA to protect the environment, whilst maximising benefits.

Next Steps

The Thames rdWRMP24 and its options have been assessed at a high strategic level. The options that form the rdWRMP24 (the BVP) will be subject to the formal planning process when implemented and may require an Environmental Impact Assessment under the Town and Country Planning (Environmental Impact Assessment) Regulations 2017 (as amended) Or the Infrastructure Planning (Environmental Impact Assessment) Regulations 2017, if it is an Nationally Significant Infrastructure Project (NSIP). Requirements for environmental impact assessment will be determined on an option-by-option basis. As part of this process more detailed option-specific mitigation measures will be developed.

The large supply options proposed under the adaptive strategy (e.g., new reservoirs and desalination plants) may be classified as 'Nationally Significant Infrastructure' and would therefore be required to go through the Development Consent Order planning route. As mentioned previously, the strategy has been identified to enable 'pre-planning' activities for these options so that they are available for delivery if they are selected in rdWRMP24.

1 Introduction

1.1 Background and Context

Thames Water is the UK's largest water and wastewater services company, and it supplies 2.6 billion litres of drinking water per day and treats 4.7 billion litres of wastewater per day. It is responsible for the public water supply and wastewater treatment for most of Greater London, Luton, the Thames Valley, Surrey, Gloucestershire, north Wiltshire, and far west Kent. The area covered by Thames Water has a population of 15 million; this comprises 27% of the UK population.

Water companies have a statutory obligation to produce a Water Resources Management Plan (WRMP). The WRMP sets out how a company intends to achieve a secure supply of water for customers while protecting and enhancing the environment over a minimum 25-year period. The plans must be prepared every five years and reviewed annually. Thames Water's WRMP 2024 (WRMP24) renews the previous WRMP published in 2019.

In the development of a WRMP, companies in England and Wales must follow the Environment Agency Water Resources Planning Guideline and consider broader government policy objectives. The guideline highlights that where required companies must carry out a Strategic Environmental Assessment (SEA) for their WRMP.

The objective of a SEA, in accordance with Article I of the SEA Directive (European Directive 2001/42/EC)¹ from which the 2004 SEA Regulations are derived, is *'to provide for a high level of protection of the environment and to contribute to the integration of environmental considerations into the preparation and adoption of plans and programmes with a view to promoting sustainable development...'*.

To achieve this, The Environmental Assessment of Plans and Programmes Regulations 2004 requires the preparation of an environmental report, in which the likely significant effects on the environment of implementing the plan, and reasonable alternatives taking into account the objectives and geographical scope of the plan, are identified, described and evaluated. The environmental report should include:

- a) An outline of the contents, main objectives of the, and relationship with other relevant plans and programmes)
- b) The relevant aspects of the current state of the environment and the likely evolution thereof without implementation of the plan or programme.
- c) The environmental characteristics of areas likely to be significantly affected.
- d) Any existing environmental problems which are relevant to the plan or programme, including, in particular, those relating to any areas of particular environmental importance, such as designated areas.
- e) The environmental protection objectives, established at international community or national level, which are relevant to the plan or programme and the way those objectives and any environmental considerations have been taken into account during its preparation.

¹ The European Parliament and the Council of the European Union (2001). Directive 2001/42/EC of the European Parliament and of the Council of 27 June 2001 on the assessment of the effects of certain plans and programmes on the environment. *Official Journal of the European Communities*. Available at: [EUR-Lex - 32001L0042 - EN - EUR-Lex \(europa.eu\)](#).

- f) The likely significant effects on the environment, including on issues such as biodiversity, population, human health, fauna, flora, soil, water, air, climatic factors, material assets, cultural heritage including architectural and archaeological heritage, landscape and the interrelationship between the above factors. These effects should include secondary, cumulative, synergistic, short, medium and long-term permanent and temporary, positive and negative effects).
- g) The measures envisaged to prevent, reduce and as fully as possible offset any significant adverse effects on the environment of implementing the plan or programme.
- h) An outline of the reasons for selecting the alternatives dealt with, and a description of how the assessment was undertaken including any difficulties (such as technical deficiencies or lack of know-how) encountered in compiling the required information.
- i) A description of measures envisaged concerning monitoring in accordance with Article 10
- j) A non-technical summary of the information provided under the above headings.

The report must include the information that may reasonably be required taking into account current knowledge and methods of assessment, the contents and level of detail in the plan or programme, its stage in the decision-making process, and the extent to which certain matters are more appropriately assessed at different levels in that process to avoid duplication of the assessment. Appropriate consultation should be undertaken with authorities with environmental responsibility.

The SEA process was undertaken alongside the development of the Thames WRMP24 to inform the decision-making process and integrate environmental considerations. The SEA for the draft WRMP24 (dWRMP24) was presented in an Environmental Report which was issued for consultation from November 2022 to March 2023. Comments received from the consultation process were reviewed and have been addressed where appropriate within this Environmental Report. The draft WRMP24 has been updated to the revised draft WRMP24 (rdWRMP24) reflecting additional modelling work undertaken to optimise the plan as well as consultation feedback. This report is the SEA Environmental Report for the Thames rdWRMP24 and forms part of the Thames rdWRMP24 documentation.

1.2 Purpose and Structure of the Environmental Report

The purpose of this Environmental Report is to present the results of the SEA process for the Thames rdWRMP24 including the potential effects (positive and negative) of the plan and its alternatives, mitigation and enhancement measures, and monitoring proposals.

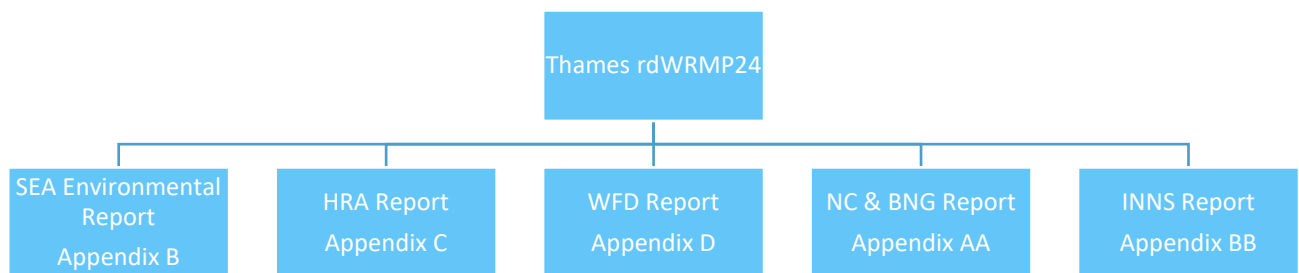
The structure of this Environmental Report is as follows:

- Non-Technical Summary
- Section 1 – Introduction to the WRMP and SEA process and requirements
- Section 2 – Description and context of the rdWRMP24
- Section 3 – Scoping summary
- Section 4 – Assessment methodology
- Section 5 - Assessment of the feasible options
- Section 6 – Assessment of alternative programmes and rdWRMP24 decision making
- Section 7 –Best value plan (rdWRMP24)
- Section 8 – Mitigation measures and enhancement opportunities
- Section 9 – Monitoring proposals
- Section 10 – Consultation and next steps

- Annex A. SEA Process Tasks
- Annex B. Consultation Logs – Scoping and Environmental Report
- Annex C. Policies, Plans and Programmes Review
- Annex D. Baseline Review
- Annex E. SEA Scoring Criteria
- Annex F. SEA Options Assessments

As discussed in Section 1.1 a number of environmental assessments have been undertaken to support the development of the Thames rdWRMP24. Each assessment is presented in a standalone report and forms part of the rdWRMP24 documentation (see Figure 1-1).

Figure 1-1: Reports submitted in support of the Thames Water draft rdWRMP24



1.3 Water Resources Planning Guideline

The Water Resources Planning Guideline (WRPG) sets out the framework and requirements for developing a WRMP with the objective *'to efficiently deliver resilient, sustainable water resources for your customers and the environment, both now and in the long term'*.

The WRPG highlights the following key environmental considerations:

- Reflect the government's 25-year Environment Plan including:
 - Setting out ambitions for environmental sustainability and resilience
 - Supporting nature recovery
 - Using natural capital in decision-making
 - Using a catchment approach
 - Delivering net gain for the environment
- Considering the impact of climate change regarding river flows and groundwater recharge, and any future supply options
- Considering the risk of the spread of invasive non-native species (INNS) and proposed measures to mitigate that risk
- Enhancing the natural resilience of catchments by effective catchment management planning, to increase the amount and/or quality of water available for abstraction without putting unacceptable pressures on the environment
- Considering whether abstractions are truly sustainable, looking across a catchment
- Considering the requirement to demonstrate Biodiversity Net Gain (BNG) for options and the plan
- A stronger focus and detailed guidance on natural capital including the five minimum ecosystem services to be considered and natural capital metrics

- Improved guidance on approaches to integrate environmental outputs into options decision-making and programme appraisal

The supplementary guidance note ‘Environment and society in decision-making’² provides additional detail on how to integrate environmental and social considerations into decision-making in the WRMP process through SEA, BNG and Natural Capital Assessment (NCA).

The Guideline states that there is a need to comply with environmental legislation, SEA, and Habitats Regulations Assessment (HRA). The results of the SEA and other environmental assessments aid decision-making on mitigation requirements, options development, and selection of preferred options for the WRMP, with the aim of developing a WRMP that meets legislative environmental requirements and provides Environmental Net Gain (ENG).

1.4 WRMP and the Regional Planning process

Thames Water is part of the Water Resources South East (WRSE) regional group. WRSE is made up of an alliance of the six water companies that cover the south east region of England:

- Affinity Water
- Portsmouth Water
- SES Water (Sutton and East Surrey)
- Southern Water
- South East Water
- Thames Water

WRSE’s aim is to secure the water supply for future generations through a collaborative, regional approach to managing water resources. To meet this aim, WRSE has produced a multi-sector, regional resilience plan in order to secure reliable and resilient water supplies for the south east of England. The WRSE regional plan takes a long-term view to 2075 and also provides a consistent framework for the development of the member water companies’ WRMP 2024.

The main objectives, as presented in the WRSE regional plan, are to:

- Ensure there is enough water for a growing population and to support economic growth
- Improve the environment by leaving more water in the region’s rivers, streams, and underground sources
- Increase the region’s resilience to severe drought and other extreme shocks and stresses
- Address the impacts of climate change on demand for water and on how much is available

The ambition is that water companies in the region collaborate with others and agree a long-term water resource strategy which will then be used to guide the development of the draft 2024 company WRMPs. WRSE’s overall aim is to deliver a reliable, sustainable, and affordable system of water supply to meet multi-sector requirements (including the environment) across the South East of England for the next 50 years and beyond.

In support of the National Framework, WRSE has developed the Regional Plan in parallel to the water company WRMP24 development process.

² ‘Environment and society in decision-making’ available from: water-company-plan@environment-agency.gov.uk

The WRSE regional plan suggests that the environmental assessments, including the SEA, can be used as a framework for the WRSE member water companies such as Thames Water when undertaking their WRMP24 statutory environmental assessments.

To support the development of the regional plan, an environmental assessment process has been undertaken that included:

- Strategic Environmental Assessment
- Habitats Regulations Assessment
- Water Framework Directive Assessment
- Biodiversity Net Gain Assessment
- Natural Capital Assessment
- Invasive Non-Native Species Risk Assessment

SEA option assessments carried out for the regional plan were used for the rdWRMP24 SEA assessment. The regional SEA results were reviewed and where relevant local information was included in the assessments as part of WRMP24. The regional SEA results also flagged where mitigation was needed, which helped inform further options development by Thames Water for the rdWRMP24.

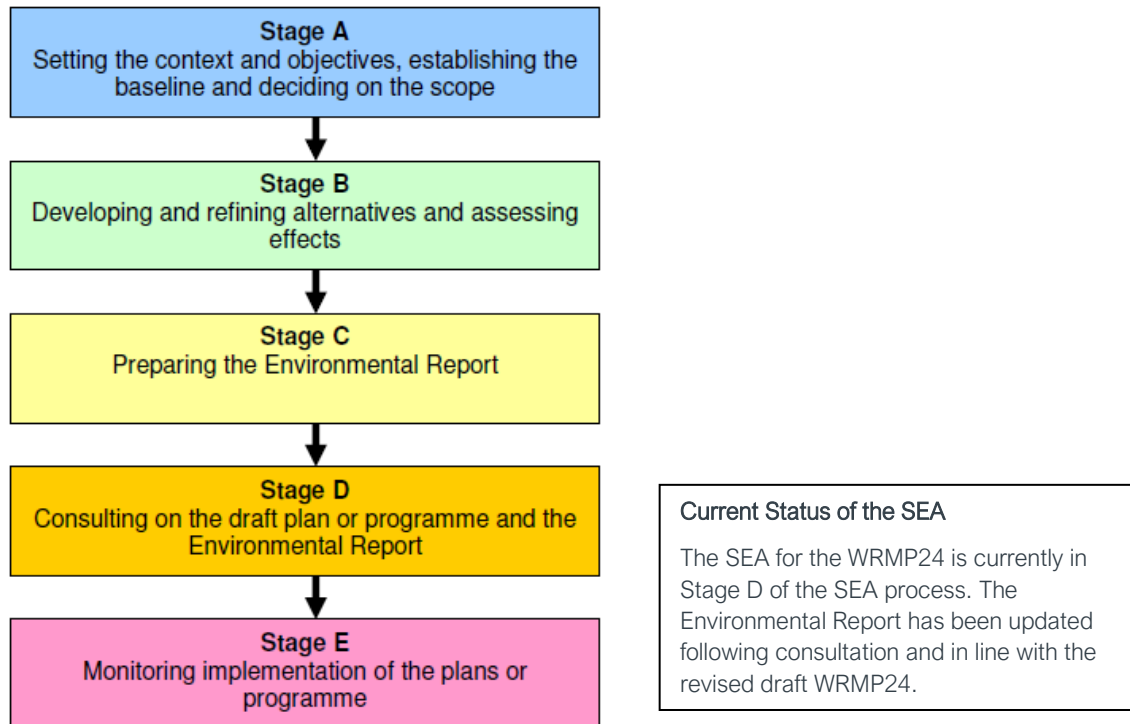
The regional plan has undergone in-combination effects assessment. To meet legislative requirements, an in-combination effects assessment specific to Thames Water's rdWRMP24 has also been undertaken, the results of which are included in this report. The Thames Water rdWRMP24 in-combination effects assessment has considered options which are outside the Thames Water area or in close proximity to the plan boundary with potential pathways affecting receptors outside the plan area.

1.5 The SEA Process

SEA is required for the Thames Water rdWRMP24 under the European Directive 2001/42/EC, more commonly known as the SEA directive. The Directive was transposed into United Kingdom (UK) law via the Environmental Assessment of Plans and Programmes Regulations 2004, which require an assessment of the effects of certain plans and programmes on the environment. While Directive 2001/42/EC originated from the European Union (EU), it continues to apply after the EU (Withdrawal) Act 2018 as retained EU law. Article 3 of the Directive requires that SEA shall be carried out for plans and programmes which are prepared for water management, set the framework for future development consents, and are likely to have significant environmental effects.

The SEA also works to inform the plan-making process through the identification and assessment of effects a plan or programme may have on the environment, including cumulative and in-combination effects. The SEA process is conducted at a strategic level and enables consultation on the potential effects of a plan with a wide range of stakeholders. Figure 1-2 presents the different stages in the SEA process.

Figure 1-1 : Stages in the SEA process



Source: Adapted by Mott MacDonald from the DLUHC SEA Guidance 'A Practical Guide to the Strategic Environmental Assessment Directive'.

The Thames Water rdWRMP24 SEA was carried out in accordance with the following guidance:

- Environment Agency, Natural Resources Wales, Ofwat (March 2023) Water Resources Planning Guideline (WRPG)
- Environment Agency (2023) Water resources planning guideline supplementary guidance – Environment and society in decision-making
- UK Water Industry Research (UKWIR) (2012) Strategic Environmental Assessment and Habitats Regulations Assessment – Guidance for Water Resources Management Plans and Drought Plans (ref. 12/WR/02/7)
- UKWIR (2021) Environmental Assessment Guidance for Water Resources Management Plans and Drought Plans (ref. 21/WR/02/15)
- Office of the Deputy Prime Minister (ODPM) (now the Department for Levelling Up, Housing and Communities (DLUHC)) (2005) A Practical Guide to the Strategic Environmental Assessment Directive
- Defra (2018) A Green Future: Our 25 Year Plan to Improve the Environment
- Environment Agency (2011) Strategic environmental assessment and climate change: guidance for practitioners
- Historic England (2016) Sustainability Appraisal and Strategic Environmental Assessment – Historic England Advice Note 8
- All Company Working Group (2020) Strategic Environmental Assessment: Core Objective Identification

The Department for Environment, Food and Rural Affairs (Defra) consulted on draft Environmental Targets (ETs) in March 2022. The consultation period opened on 16 March 2022

and closed on the 27 June 2022. Legally binding ETs are a key commitment in the Environment Act 2021 and will help deliver the government’s vision of leaving the environment in a better state than it was found and will drive forward ambitious environmental improvements by successive governments that protect and enhance our natural world.

The 2021 Environment Act requires the government to set at least one long-term target in each of the following areas: air quality; water; biodiversity; and resource efficiency and waste reduction. It also requires targets to be set for fine particulate matter (PM2.5) and species abundance (i.e., six categories of ET in total). Defra is proposing targets in these six categories that will deliver environmental outcomes in the areas where there are some of the greatest problems. This is why the ETs go beyond the legal minimum that Defra is required to set, with requirements to:

- Halt the decline in species populations by 2030, and then increase populations by at least 10% to exceed current levels by 2042.
- Restore water bodies to their natural state by bringing harmful pollution from sewers and abandoned mines and improving water usage in households.
- Delivering net zero ambitions and boost nature recovery by increasing tree and woodland cover to 16.5% of total land area in England by 2050.
- Halve the waste per person that is sent to residual treatment by 2042.
- Cut exposure to the most harmful air pollutant to human health – PM2.5.
- Restore 70% of designated features in our Marine Protected Areas to a favourable condition by 2042, with the rest in a recovering condition.

In addition, there are targets to restore and create 500,000ha of wildlife rich habitat by 2030 and reduce phosphorus pollution from wastewater treatment plants by 80% by 2038³.

These statutory targets have been in effect since January 2023 and therefore have not directly influenced the selection of SEA objectives, however it is considered that the objectives selected are robust enough to ensure the rdWRMP24 will contribute to achievement of these statutory targets.

The SEA involved a fully integrated environmental assessment approach, with outcomes from the other environmental assessments such as HRA, WFD and INNS feeding into SEA objectives on biodiversity and water.

1.6 Compliance with the SEA Directive

The Environmental Report has been prepared in accordance with the requirements of the SEA Directive. Table 1-1 indicates where the specific requirements in the SEA Directive relating to the Environmental Report (SEA Directive Annex I) can be found within this report.

Table 1-1: SEA Directive Requirement Signposting Table

SEA Directive Environmental Report Requirements	Section of Environmental Report where Requirement is Found
An outline of the contents, main objectives of the plan or programme and relationship with other relevant plans and programmes.	Section 1 sets out the purpose and objectives of the regional plan and WRMP. Section 3.3 and Annex C outline the relationship of the SEA with other policies, plans and programmes.

³ New Legally Binding Environment Targets Set Out, DEFRA, 2022. Available at: [New legally binding environment targets set out - GOV.UK \(www.gov.uk\)](https://www.gov.uk/government/news/new-legally-binding-environment-targets-set-out)

SEA Directive Environmental Report Requirements	Section of Environmental Report where Requirement is Found
The relevant aspects of the current state of the environment and the likely evolution thereof without implementation of the plan or programme.	Annex D sets out both the existing environmental baseline and future baseline.
The environmental characteristics of areas likely to be significantly affected.	Annex D sets out the existing environmental baseline. Sections 4 and 5 explain how options were developed and present the method and findings of the environmental assessment.
Any existing environmental problems which are relevant to the plan or programme including, in particular, those relating to any areas of particular environmental importance, such as areas designated pursuant to Directives 79/409/EEC and 92/43/EEC.	Section 3.5 presents the key issues and opportunities.
The environmental protection objectives, established at International, Community or Member State level, which are relevant to the plan or programme and the way those objectives and any environmental considerations have been taken into account during its preparation.	Section 3.3 and Annex C outlines the relationship of the SEA with other policies, plans and programmes.
The likely significant effects on the environment, including on issues such as biodiversity, population, human health, fauna, flora, soil, water, air, climatic factors, material assets, historic environment, landscape and the interrelationship between the above factors.	Sections 4 and 5 explain how options were developed and present the method and findings of the environmental assessment. Section 6 sets out the programme appraisal stage, including the identification of reasonable alternative programmes, and the findings of the environmental assessment, including the cumulative effects assessment. Section 7 sets out the rdWRMP24 BVP, including findings of the cumulative effects assessment.
The measures envisaged to prevent, reduce and as fully as possible offset any significant adverse effects on the environment of implementing the plan or programme.	Section 8 sets out the mitigation identified for the rdWRMP24 BVP, including opportunities for enhancements and areas for further investigation.
An outline of the reasons for selecting the alternatives dealt with, and a description of how the assessment was undertaken, including any difficulties (such as technical deficiencies or lack of know-how) encountered in compiling the required information.	Sections 4 and 6 explain the programme appraisal stage, identify reasonable alternative programmes, set out the findings of the environmental assessment, and outline reasons for the selection of the preferred programme and adaptive futures. Section 7 sets out the rdWRMP24 BVP, including findings of the cumulative effects assessment.
A description of the measures envisaged concerning monitoring in accordance with Article 10.	Section 8 sets out proposals for monitoring.

SEA Directive Environmental Report Requirements	Section of Environmental Report where Requirement is Found
A non-technical summary of the information provided under the above headings.	The Non-Technical Summary has been provided at the beginning of this document.

2 Description and Context of the Thames rdWRMP24

2.1 Background and purpose

As outlined within Chapter 1, water companies have a statutory obligation to produce a WRMP, which sets out how a company intends to maintain the balance between supply and demand for water over a minimum 25-year period. New WRMPs are prepared every five years and Thames Water is due to publish its next WRMP (WRMP24), which is the subject of this Environmental Report.

2.2 Thames Water rdWRMP24

Thames Water has adopted a planning approach that uses least-cost optimisation as well as broader criteria to develop a BVP (Preferred Plan) which takes account of 'best value' decision-making criteria including:

- Environmental and social impacts of the plan, including net environmental benefit
- Cost to build and operate the plan
- Adaptability and flexibility of the plan to cope with uncertain future needs
- Alignment to the Water Resources South East regional strategy
- Resilience of the plan to severe and extreme drought, other hazards, and their residual risks
- Deliverability of the plan with timescales needed to manage risks
- Alignment to customer preferences

The SEA and other environmental studies undertaken were used as part of the decision-making criteria on the environmental and social impacts of the plan to develop the Preferred Plan.

Demand management is a priority for Thames Water. In developing the rdWRMP24, Thames Water has first considered what risk could be offset from demand management, before seeking to develop supply-side options. The Demand Management Strategy (DMS) is ambitious, but it must also be deliverable, and therefore carefully targeted investment in supply-side capacity would still be required. The supply-side options considered for inclusion in the rdWRMP24 have been developed following industry and regulator guidance.

The Preferred Plan provides the best value for customers in the long-term whilst considering environmental and social metrics such as SEA performance, embodied carbon, BNG, and others. The plan:

- Prioritises demand management, which aligns with customers' expectations
- Recognises the environmental benefits of demand management, such as offsetting treatment and pumping costs and carbon
- Challenges Thames Water and its customers to push the boundaries of what is achievable with respect to levels of future consumption
- Maximises the use of existing resources before developing new ones
- Provides future flexibility over the location and type of new resource inputs
- Delivers significant additional resilience across the region both to drought and non-drought events (e.g., freeze-thaw)
- Delivers environmental benefits by reducing abstraction from the environment and ensuring no deterioration in the ecological status of water bodies in the region

The rdWRMP24 includes an adaptive strategy to deal with uncertainties and future scenarios that will mean further investment is required (e.g., further future sustainability reductions). In some cases, there may not be a long lead time to implement schemes and therefore Thames Water needs to develop a plan which identifies thresholds beyond which it needs to take further action. The potential options identified as part of the adaptive strategy have been assessed as part of the SEA. It should be noted that at this stage these are strategic supply-side options that may be required in the future. They do not form a definitive list of options.

Alongside the BVP (rdWRMP24), two alternative plans (a Least Cost Plan (LCP) and Best Environment and Societal Plan (BESP)) were developed in line with the WRPG. The SEA assessed the Thames Water feasible options list and the cumulative effects of the BVP and the two alternative plans (see Chapters 5, 6 and 7).

The dWRMP24 was published for consultation in November 2022, allowing interested stakeholders and customers to review and comment upon the proposals. The feedback received from the consultation process has played a significant role in shaping the rdWRMP24.

3 Scoping Summary

3.1 Introduction

The scoping stage of the SEA process (Stage A in Figure 1.2) sets the context and scope for the SEA and Environmental Report. During scoping, key plans and programmes are reviewed, baseline conditions, and key issues and opportunities are identified, and the SEA Framework is developed. This section summarises the outcomes of the scoping stage. Further detail on the relationship with other policies, plans, and programmes, as well as the scoping baseline review and future baseline are provided in Annex C and D, respectively.

3.2 Scoping Consultation

Thames Water utilised the WRSE SEA Scoping Report, which was issued for formal consultation for a six-week period between 18th September and 30th October 2020 to the Statutory Consultees: Natural England, Environment Agency, and Historic England. Prior to the formal consultation, the Scoping Report was issued for informal consultation to stakeholders to gain early feedback and agreement on key elements of the process. During the formal and informal consultation period stakeholders were able to comment on the proposed scope and approach for the SEA.

Following the Scoping Report consultation period, all consultation responses were reviewed and considered, as appropriate. Comments were received and encompassed agreement with aspects of the proposed approach, methodological questions and clarifications, along with suggested modifications and enhancements to the proposed approach and SEA Framework.

Where changes to the approach were suggested, these were considered in detail by the WRMP24 project team. Recommendations were incorporated based on factors such as:

- The extent to which they were already addressed by the SEA Framework
- Their specific applicability and relevance (including level of detail) to the purpose and scope of the WRMP
- The feasibility of carrying out realistic and informative assessments
- Proportionality in the context of the existing SEA Framework for water resources planning
- The significance of the expected effects on assessment results

The full SEA Framework, with changes from the Scoping Report consultation incorporated, is shown in Table 3-1. Note that the purpose of the assessment questions is to prompt consideration of specific issues when assessing effects related to each SEA topic and objective, however the SEA does consider the whole plan and not just the supply options.

Table 3-1: Post-consultation SEA Methodology Assessment Framework

SEA Topic	SEA Objective(s)	Assessment Questions / Sub-Themes
Biodiversity, flora, and fauna	1. Protect and enhance biodiversity, priority species, vulnerable habitats and habitat connectivity (no loss and improve	• Is the option likely to affect the conservation status of any Special Protection Areas (SPAs), Special Areas of Conservation (SACs), Ramsar sites, and Marine Conservation Zones (MCZs), undermine or prevent

SEA Topic	SEA Objective(s)	Assessment Questions / Sub-Themes
	connectivity where possible).	<p>restoration of Sites of Special Scientific Interest (SSSIs) condition or affect the condition of locally designated sites?</p> <ul style="list-style-type: none"> • Will the option protect and enhance aquatic habitats and species, including freshwater fisheries and chalk rivers? • Will the option affect the marine environment, habitats, and species (including MCZs and Marine Protected Areas (MPAs))? • Is the option likely to affect ancient woodland, Section 41 of the NERC (The Natural Environment and Rural Communities) act habitats and species of principal importance for the purpose of conserving biodiversity? • Will the option affect any habitats that support legally protected species or species of conservation concern? • Is there potential for contribution to achieving 'favourable' conservation status or for creation of new Section 41 of the NERC act habitats? • Is the option likely to have an impact on a current or future Nature Recovery Network? • Are there any opportunities for habitat creation or restoration? • Will the option contribute to the loss or gain in habitat connectivity? • Is there a possibility for INNS to be spread/introduced or for algal blooms to occur? • Is there an opportunity to improve biodiversity value through removal of INNS? • Will the option affect the capacity for priority habitats and species to move or adapt in response to climate change?
Soil	2. Protect and enhance the functionality and quality of soils, including the protection of high-grade agricultural land, and geodiversity.	<ul style="list-style-type: none"> • Will the option affect high grade agricultural land? • Will the option promote the efficient use of land? • Will the option prevent soil erosion and retain soil stocks as a natural resource? • Will the option promote soil health? • Will the option involve use of brownfield or greenfield land? • Will the option prevent mineral sterilisation? • Will the option affect soil contamination or involve remediation? • Is the option likely to affect geodiversity, including SSSIs of geological importance?
Water	3. Increase resilience and reduce flood risk. 4. Protect and enhance the quality of the water environment and water resources.	<ul style="list-style-type: none"> • Is the option vulnerable to flood risk? • Will the option contribute to or reduce the risk of flooding? • Will the option affect surface water quality or quantity? • Will the option affect groundwater quality or quantity? • Is the option likely to contribute to or conflict with the achievement of Water Framework Directive (WFD) objectives?

SEA Topic	SEA Objective(s)	Assessment Questions / Sub-Themes
	5. Deliver reliable and resilient water supplies.	<ul style="list-style-type: none"> • Will the option affect bathing waters? • Will the option affect protected waters for shellfish? • Will the option affect chalk rivers and streams? • Will the option affect raw water quality? • Will the option reduce the flashy nature of surface waters? • Will the option slow the flow in upper catchments and reduce soil losses to river systems? • Does the option provide a reliable and sustainable water supply which meets changing demand? • Will the option protect and enhance the environmental resilience of the water environment to climate change, flood risk and drought?
Air	6. Reduce and minimise air emissions during construction and operation.	<ul style="list-style-type: none"> • Is the option in an air quality management area (AQMA)? • Will the option affect local air quality?
Climatic Factors	7. Minimise/reduce embodied and operational carbon emissions. 8. Reduce vulnerability to climate change risks and hazards.	<ul style="list-style-type: none"> • Will the option affect carbon or other greenhouse gas (GHG) emissions? • Is there potential for the option to incorporate climate mitigation measures to reduce its carbon footprint, such as lower embodied carbon or incorporating renewable energy? • Will the option affect carbon sequestration? • Is the option vulnerable to climate change effects? • Does the option include climate resilience measures? • Will the option create catchment resilience to drought? • Does the option enable or reduce the potential of water dependent/terrestrial wildlife to adapt to climate change?
Landscape	9. Conserve, protect and enhance landscape and townscape character and visual amenity.	<ul style="list-style-type: none"> • Will the option have an effect on the character of the landscape or townscape including tranquillity and views? • Will the option improve access to the countryside? • Will the option create or improve green infrastructure which contributes to access to the landscape? • Will the option protect and enhance designated landscapes and features?
Historic Environment	10. Conserve, protect and enhance the historic environment and heritage assets, including archaeological remains.	<ul style="list-style-type: none"> • Will the option affect designated or non-designated heritage assets, sites and features? • Will the option affect the setting and/or significance of a heritage asset? • Will the option affect archaeological remains (including unknown archaeological remains)? • Will the option affect heritage assets at risk? • Will the option affect conservation areas or historic landscape/townscape areas?
Population and Human Health	11. Maintain and enhance the health and wellbeing of the local community,	<ul style="list-style-type: none"> • Does the option promote water efficiency and encourage a reduction in water consumption?

SEA Topic	SEA Objective(s)	Assessment Questions / Sub-Themes
	including economic and social wellbeing. 12. Maintain and enhance tourism and recreation.	<ul style="list-style-type: none"> • Will the option secure resilient water supplies for the health and wellbeing of customers? • Will the option allow for economic development? • Will the option allow for economic diversity? • Will the option have an effect on active lifestyles, such as impacts on active travel through disruption to pedestrian and cycle routes? • Will the option affect PRowS? • Will the option affect road or rail infrastructure? • Will the option minimise disturbance from noise, light, visual, and transport? • Will the local communities have been actively engaged to foster an inclusive environment and participate in decision making? • Will the option maintain or enhance tourism? • Does the option improve access to the natural environment for recreation, including those living within deprived areas? • Will the option have an effect on freshwater fisheries for recreational purposes? • Will the option have an effect on marine fisheries for recreational purposes?
Material Assets	13. Minimise resource use and waste production. 14. Avoid negative effects on built assets and infrastructure.	<ul style="list-style-type: none"> • Will the option reuse existing infrastructure? • Will the option minimise the use of resources? • Will the option reduce the production of waste? • Will the option affect built assets and infrastructure, including transport infrastructure? • Will the option avoid negative effects on existing green infrastructure? • Will the option create opportunities for enhancing existing green infrastructure?

3.3 Plans and Programme Review

A plans and programmes review was undertaken as part of the WRSE Regional Plan which covered a large majority of plans and programme relevant for Thames Water. As part of the Thames Water SEA the following additional plans and programmes were reviewed:

- Floods Directive (2007/60/EC)
- Planning Act 2008
- National Parks and Access to the Countryside Act 1949
- WISER guidance
- The Environment Agency's National Framework and supporting Guiding Principles for Environmental Destination
- Consider EA Strategic and Local Outcome Plans
- River restoration plans for SSSI Rivers (where relevant)
- Natural capital improvement plans by Local Nature Partnerships (where relevant)
- AONB Management Plans:

- Cannock Chase AONB Management Plan
- Cotswolds AONB Management Plan
- Kent Downs AONB Management Plan
- The North Wessex Downs AONB Management Plan
- Surrey Hills AONB Management Plan
- Chiltern Hills AONB Management Plan
- Malvern Hills Area of Outstanding Natural Beauty Management Plan
- Shropshire Hills Area of Outstanding Natural Beauty Management Plan
- Snowdonia National Park Management Plan
- Environment Agency Water Resources Strategy – A Regional Action Plan for Thames Region
- Environment Agency Area Drought Plans (various)
- RBMP:
 - Thames River Basin District River Basin Management Plan 2022
 - Severn River Basin District River Basin Management Plan 2022
 - Humber River Basin District: River Basin Management Plan 2022
- Severn River Basin District: Flood Risk Management Plan
- Catchment Flood Management Plans:
 - Humber River Basin District Flood Risk Management Plan
 - Thames River Basin District Flood Risk Management Plan
- Thames Region Water Industry National Environment Programme (WINEP)
- South East Biodiversity Strategy
- River Thames Alliance: Thames Waterway Plan
- Water for the Future - Managing Water in the South East of England
- Thames Regional Fisheries Strategy: A Bright Future for Our Fish
- Enjoying Water - Strategic Priorities for Water Related Recreation in London and South East England
- South Downs National Park Partnership Management Plan
- South East Marine Plan
- Thames Waterways Plan
- Thames Salmon Action Plan
- Thames Water Biodiversity Action Plan
- Thames Landscape Strategy, 2012, Our Guidance Document: The Thames Landscape Strategy Review 2012
- The Port of London Act 1968
- London Infrastructure Plan 2050
- London Biodiversity Action Plan
- Mayor of London Plans – London Plan, London Environment Strategy

The main themes, messages and objectives from the policies, plans and programmes review that are considered relevant to the Thames SEA are presented below. These are as follows:

- Conserve flora and fauna and their habitats
- Conservation and wise use of wetlands and their resources
- Protection of wild birds and their habitats
- Halt overall biodiversity loss
- Creation of green infrastructure
- Protection of landscape character and quality

- Improve water quality so all waters achieve ‘good status’ as set out in the Water Framework Directive
- Prevent or limit inputs of pollutants into groundwater
- Monitor and provide information to consumers on drinking water quality
- Promote efficient use of water
- Reduce and manage the risks of flooding
- Reduce greenhouse gas emissions
- Adapt to the impacts of climate change
- Increase resource efficiency and reduce natural resource use and waste
- Create a green economy and promote sustainable growth
- Promote sustainable and healthy communities
- Promote social inclusion and community participation
- Protect cultural heritage assets including archaeology and built heritage
- Protect best quality soils and agricultural land
- Support the Lawton recommendation for statutory undertakers planning the management of water resources to:
 - Make space for water and wildlife along rivers and around wetlands
 - Restore natural processes in river catchments, including in ways that support climate change adaptation and mitigation
 - Accelerate the programme to reduce nutrient overload, particularly from diffuse pollution.
- Support the UK Government’s 25 Year Plan to Improve the Environment:
 - Using and managing land sustainably – including embedding an “environmental net gain” principle into development (as supported by the draft Environment Bill 2020).
 - Recovering nature and enhancing the beauty of landscapes
 - Connecting people to the environment to improve health and wellbeing
 - Increase resource efficiency and reducing pollution
 - Securing clean, healthy and productive and biologically diverse seas and oceans
 - Protecting and improving the global environment

The themes, messages and objectives identified from the policies, plans, and programmes review provided input into the process of identifying key issues and opportunities and developing the SEA Framework.

3.4 Scoping Baseline

The baseline provides a review of conditions within the region. It is based on the WRSE Regional Plan SEA Scoping Report with the addition of Thames specific baseline information to inform the SEA. A GIS database was developed with environmental and social baseline layers to undertake the option-specific assessments and was used as part of the wider consideration of the plan. This has been used as an evidence base to assess environmental issues and opportunities for the SEA, which has in turn fed into the decision-making. Please see the Environmental Baseline provided for scoping in Annex D.

3.5 Key Issues and Opportunities and Scoping of Environmental Topics

Determining which SEA topics are relevant to the plan and which should be scoped out (if any) was a key stage in the Scoping process. The SEA topics and the scoping determination for each are presented in Table 3-2. The key issues and opportunities relevant to each topic, which were identified during the Scoping process, are also presented in the table. Topics were scoped

in based on the baseline situation and the potential impact of the plan on them. This was assessed by reviewing baseline conditions, current environmental issues for the Thames Water area and an assessment of the likelihood of potential impacts occurring.

Table 2-2: Issues and Opportunities

SEA topic	Scoped in	Implications	Opportunities
Biodiversity, Flora and Fauna	Yes	<p>Thames Water’s supply area is rich in habitats and species diversity, and includes national and internationally designated sites including SSSIs, SPAs, SACs, Ramsar sites.</p> <p>Development of new water infrastructure can directly or indirectly affect designated and non-designated sites, habitats and species through loss of land, disturbance and damage.</p> <p>There is potential for the options within the rdWRMP24 to result in surface and/or groundwater pollution which could have an impact on wildlife in the absence of option screening and appropriate mitigation.</p> <p>Wetland and marsh habitat rely on water; the rdWRMP24 should ensure that it does not affect these areas through over-abstraction and should look for opportunities to reduce abstraction pressure where cost effective and possible.</p>	<p>The rdWRMP24 should ensure that there is no net loss of biodiversity and should seek to enhance biodiversity and achieve environmental net gain. There are opportunities to include options which result in improvements to the natural environment and biodiversity net gain through habitat creation or enhancement, support for Nature Recovery Networks and Strategies, connect ecological networks to increase species resilience and in the introduce vegetation to slow run-off and reduce flood risk, amongst others.</p> <ul style="list-style-type: none"> • Protect, conserve and enhance biodiversity linking to Thames nature reserves and other habitat areas around proposed option sites • Slow/halt biodiversity losses/declines • Integrate biodiversity into new infrastructure • Support species adaptation to climate change
Water	Yes	<p>Phosphate and physical modifications are the most common pressures affecting the achievement of ‘Good’ status in the Thames river basin area. The significant water management issues which are most common in affecting the achievement of ‘Good’ are pollution from wastewater, physical modifications and pollution from town, cities or rural areas. There is potential for the options within the rdWRMP24 to have a negative impact on water quality in the absence of option screening and appropriate mitigation..</p> <p>Areas of the Thames region are at high risk of flooding from surface water, rivers. There is potential that</p>	<p>The rdWRMP24 should avoid options which have a negative impact on water quality or ecology. Options which reduce pressures on the water environment should be explored. WFD will be key consideration during the optioneering process to contribute to the selection of options which could lead to WFD improvements and ensure that options avoid WFD deterioration. The rdWRMP24 has the opportunity to improve the environment by leaving more water in the region’s rivers, streams and underground sources.</p>

SEA topic	Scoped in	Implications	Opportunities
		the options within the rdWRMP24 could be affected by, or contribute to, an increased risk of flooding in the absence of option screening and appropriate mitigation..	<p>The options within the rdWRMP24 should avoid areas at high risk of flooding and, where appropriate, implement measures to reduce flood risk.</p> <ul style="list-style-type: none"> • Ensure the protection, improvement and sustainable use of water bodies • Avoid, control or reduce water pollution • Leave more water in the natural environment • Reduce or mitigate flood risk
Soil	Yes	<p>Agricultural land of Grade 2 and 3 is the most common across the region in the more rural areas in the absence of option screening and appropriate mitigation.</p> <p>The options within the rdWRMP24 have the potential to result in a loss of agricultural land.. There is also potential for soil contamination from the construction phase.</p>	<p>Soil is an important natural resource and as such the rdWRMP24 should consider the impact of options on the soil stocks and avoid options which have significant negative effects. The options within the rdWRMP24 should avoid impacts on agricultural land of Grade 1 and 2, if possible, and mitigation should be included where impacts are unavoidable. There are opportunities for the options to positively affect agriculture, for example options to increase raw water storage and supply.</p> <ul style="list-style-type: none"> • Protect and retain soil stocks and high value agricultural land • Ensure soils are protected from contamination • Protect and enhance soil health • Use land efficiently
Air	Yes	<p>Air quality in the region is varied, with some areas designated as AQMAs, especially in and around London. Air pollution sources include transport and industry.</p> <p>The options within the rdWRMP24 have the potential to impact air quality in the absence of option screening and appropriate mitigation.. This could include the generation of air pollutants from treatment plants and there are also likely to be effects from the construction phase in the absence of appropriate mitigation..</p>	<p>There is potential for the rdWRMP24 to mitigate any increases in air pollutants as a result of the options and improve air quality in the region.</p> <ul style="list-style-type: none"> • Improve air quality

SEA topic	Scoped in	Implications	Opportunities
Climatic Factors	Yes	<p>Thames Water’s supply area is projected to experience hotter and drier summers, wetter and warmer winters and more frequent extreme weather events as a result of climate change. There is potential that this could affect water availability through increased periods of drought.</p> <p>There is potential for options within the rdWRMP24 to result in carbon emissions during the construction and operation phases which will further contribute to climate change in the absence of option screening and appropriate mitigation..</p>	<p>Thames Water has the opportunity to consider the impact of climate change within the option selection process. Measures to increase the resilience of an option to a changing climate should also be considered. The options should also consider the impact on climate change through the optioneering and design processes. In light of the Water Industry’s Public Interest Commitment to net zero 2030 the rdWRMP24 has the opportunity to address the impacts of climate change on demand for water and how much is available, and to increase the region’s resilience to severe drought and other extreme events and stresses.</p> <ul style="list-style-type: none"> ● Increase resilience to climate change, including the resilience of resources, infrastructure and the environment ● Reduce contribution to climate change from plan options ● Support species adaptation to climate change
Population, Communities and Human Health	Yes	<p>Thames Water’s supply area includes large population centres such as London. The population in this area is expected to grow, which will likely place additional pressure on the water environment within the Thames Water area. Economic growth and climate change will also add to this pressure.</p> <p>The options within the rdWRMP24 have the potential to result in temporary disturbance effects during the construction phase. There is also potential for impacts on the water or natural environment which could affect recreation and wellbeing in the absence of appropriate mitigation..</p>	<p>The rdWRMP24 could seek to maximise opportunities for recreation through enhancing access to, and the condition of, the water environment, greenspaces or areas of the natural environment, thus improving the inclusivity of, and connection to, the local natural environment.</p> <p>The rdWRMP24 also has the opportunity to ensure a resilient and reliable water supply for customers now and in the future, ensuring there is enough water for a growing population and to support economic growth.</p> <ul style="list-style-type: none"> ● Prevent disturbance effects for the local community ● Enhance the natural environment for recreation purposes

SEA topic	Scoped in	Implications	Opportunities
			<ul style="list-style-type: none"> • Improve access to the natural environment for all members of the community • Provide a resilient and reliable water supply for customers
Historic Environment	Yes	<p>Thames Water's supply area is rich in heritage and contains many listed buildings, conservation areas, scheduled monuments, and registered parks and gardens, amongst others.</p> <p>The options within the rdWRMP24 have the potential to directly or indirectly impact the historic environment through affecting an asset's fabric or setting and archaeological remains in the absence of option screening and appropriate mitigation. Changes in water levels can also affect heritage assets and archaeological remains.</p>	<p>The options within the rdWRMP24 should consider the historic environment and minimise adverse effects.</p> <ul style="list-style-type: none"> • Protect archaeological remains • Carefully consider the siting of options to reduce effects on heritage assets and their setting • Encourage public awareness through promoting heritage sites as part of option design • Promote public benefits opportunities
Landscape	Yes	<p>The Thames region's landscape is diverse and there are important landscapes within the region.</p> <p>There is potential for the options within the rdWRMP24 to have an impact on the landscape. This could include temporary construction effects and permanent effects associated with infrastructure which could affect visual amenity or the character of the area in the absence of option screening and appropriate mitigation.</p>	<p>Impact on the landscape should be considered as part of the option development. There is potential for the rdWRMP24 to enhance the landscape. This may involve selecting certain materials or colours for an option or through planting or habitat creation.</p> <ul style="list-style-type: none"> • Ensure the protection or enhancement of landscape character as part of option development and design
Material Assets	Yes	<p>Thames Water's supply area contains important transport links which could be affected during construction works. There is also significant water and wastewater treatment infrastructure present across the region. The region produces and manages a significant amount of waste and there are numerous historic and authorised landfill sites.</p> <p>The rdWRMP24 has the potential to increase the use of resources within the region and result in the generation of waste in the absence of appropriate mitigation.</p>	<p>The rdWRMP24 has the opportunity to consider the use of resources within the option development and reduce the use of energy and materials to prevent waste generation.</p> <ul style="list-style-type: none"> • Reduce resource use • Minimise waste generation • Avoid impacts on the transport network

4 Assessment Methodology

4.1 Assessment Overview

The SEA has been undertaken in stages to feed into the development of the rdWRMP24 and influence the decision-making process:

- Option level SEA – the feasible list of options for the rdWRMP24 was assessed. These included supply side option, demand management options, drought options and catchment management options. For options with major adverse effects, such as a pipeline route or tunnel shafts within designated sites or nationally significant heritage assets, the option design was reviewed and amended where possible. The option was then re-assessed to ensure no significant residual effects remained. For options where minor effects were identified, mitigation measures were identified for future option development.
- WRMP Investment modelling – the results of the SEA were translated into numerical values (environmental metrics) for the purposes of the investment modelling. Section 4.3 describes how this translation was done. The environmental metrics were used as one of the BVP Framework criteria to select the BVP and BESP (see Section 4.4).
- Programme Appraisal – a cumulative effects assessment was undertaken for the BVP, LCP and BESP to consider the potential cumulative effects of each plan as a whole. The cumulative effects assessment was undertaken for Situations 1, 4 and 8 of the BVP, as these represent the preferred pathway and highest and lowest demand pathways, and for Situation 4 (i.e. the preferred pathway) for the LCP and BESP. This considered the intra-plan effects (that is, the effects of each selected plan as a whole), as well as its inter-plan effects (that is, the effects of the plan with other plans and programmes).
- Links with other plans, programmes and projects – the BVP was considered in combination with other plans and projects including neighbouring water company WRMPs, Local Authority Local Development Plans, Development Consent Orders (DCOs) and major planning applications.

4.2 Option Assessment Methodology

Thames Water's detailed options-level assessment approach was aligned with WRSE's Environmental Assessment process for its regional plan. This is aligned with regulator expectations around regional and water company planning.

Each option was assessed using agreed frameworks and methodologies validated by professional judgement, based on a description of the infrastructure required and a GIS map of its location / routing. The construction and operation of each option was assessed using a qualitative scale of minor, moderate, major positive and minor, moderate, major negative, and neutral effects as summarised in Table 3-1. The effects of each option were assessed against the SEA objectives set out in Table using this scale and a narrative justification. This framework was then used to assess the plan including its alternatives and the findings of this are presented within Chapter 6 and 7 of the report. The datasets and scoring definitions for each SEA objective are also presented in Table 4-2.

The significance key used to undertake the SEAs is provided in Table 4-1 alongside associated numerical scores. The significance scores for each SEA objective have been converted to

numerical scores to facilitate the investment model for the regional plan; this is discussed further in Section 4.3.

Table 4-1: SEA Scoring Key and Significance

Qualitative Score	Description	Numerical score	Definition
+++	Major Positive	8	Substantial measurable beneficial change in the baseline. Effects would be one or more of the following: definite, borough/regional/national/European (high value receptor), long-term, permanent, direct or irreversible.
++	Moderate Positive	4	Measurable beneficial change in the baseline. Effects would be one or more of the following: definite, local borough, medium-term, semi-permanent or temporary, direct or indirect or reversible.
+	Minor Positive	1	Slight measurable beneficial change in the baseline. Effects would be one or more of the following: likely community/local, short-term, temporary, direct or indirect.
0	Neutral	0	No measurable effect on the baseline.
-	Minor Negative	-1	Slight measurable adverse change in the baseline. Effects would be one or more of the following: likely community/local, short-term, temporary, direct or indirect.
--	Moderate Negative	-4	Measurable adverse change in the baseline. Effects would be one or more of the following: definite, local borough, medium-term, semi-permanent or temporary, direct or indirect or reversible.
---	Major Negative	-8	Substantial measurable adverse change in the baseline. Effects would be one or more of the following: definite, borough/regional/national/European (high value receptors), long-term, permanent, direct or irreversible.

The assessment indicated whether the proposed Option would help meet or prevent achievement of the SEA objectives. If the option contributes to the SEA objectives, its effect was considered to be positive. If the option prevents the SEA objective being met, its effect was considered to be negative. The assessment against the SEA objectives was strategic in nature, being based on the early-stage design of each option; as such, it is not undertaken to the level of detail expected in a project-level Environmental Impact Assessment (EIA).

The assessment was split into construction effects and operational effects. An option may have both positive and negative effects under an SEA objective for both construction and operation, which were reported separately to provide more clarity for decision making on the timing and nature of each of the effects identified.

Other assessments and studies being undertaken as part of the wider WRMP24 were also used to inform the SEA options assessment. The results of the HRA and WFD assessments fed into the SEA objectives on biodiversity and water. The HRA and WFD assessments can be found in Appendix C and Appendix D, respectively. The BNG and NCAs are presented in Appendix AA. An INNS risk screening exercise was undertaken based on options type to identify those options with potential for INNS risks. The results were reported as part of the SEA under the biodiversity objective. The INNS risk assessment is presented in Appendix BB.

A variable zone of influence (Zol) was determined for each topic. Some key receptors and assets were only considered if there was a direct intersection (such as allotments and woodland). Other key receptors and assets, such as scheduled monuments, listed buildings and registered parks and gardens were considered within 500m of the option (works) location in the assessment. The exceptions to this were European and National ecological designated sites, such as SPAs, SACs, Ramsar sites, and SSSIs, which were considered by identification of potential pathways from the option to the receptor, based on qualifying species and habitats. The geographical scope of the SEA covered the Thames Water supply area and was extended to cover options that went beyond the Thames Water area and to cover transboundary effects.

The temporal scale of effects was considered based on whether they would be permanent or temporary and based on the duration of the effect. Permanent changes were considered as those which are irreversible (e.g., land use change from woodland to development) or will last for the near future (e.g., noise from operational road traffic). Temporary effects were considered as those which are reversible and are generally related to construction (e.g., construction traffic). The SEA covers the WRMP24 planning period to 2075 in line with the regional plan, considering options selected up to 2075. Options selected between 2050 and 2075 have a great deal of uncertainty and are likely to be revisited in subsequent planning cycles.

Where potential negative effects were identified, mitigation measures (measures to avoid, reduce or offset negative effects) were identified as part of the assessment process and fed back into iterative option development. Options with major and moderate negative effects were required to include appropriate mitigation to reduce effects or be flagged for rejection if these were deemed insufficient. Enhancement opportunities were also identified where the options could be used for the benefits of people and/or wildlife, e.g., reservoirs potentially provide an opportunity to establish wetland habitats, or can be used for recreation.

The effects of each option were assessed pre-mitigation and post-mitigation (residual effects). In determining the residual effects for the SEA, it was assumed that all options would include standard environmental controls, including:

- No surface water (river) abstractions will be able to reduce the water levels below the minimum flow levels agreed for that river.
- Construction works will be undertaken according to existing good practice to manage impacts on site, such as dust creation, noise and vibration, and disturbance.
- Environment Agency Pollution Prevention Guidance will be followed during construction.

- Good practice construction management includes using construction environmental management plans (CEMPs), construction and logistics plans (including construction traffic management plans (CTMPs), waste management plans, etc.
- Sites would be surveyed for species/habitats prior to construction. Non-native species would be identified, and methods/works put in place to avoid spreading them during construction.
- Construction sites situated in a flood zone will have appropriate plans in place to manage the site in the event of flooding, e.g., management of materials and/or equipment likely to cause pollution.
- Health of construction workers would be managed on site using good practice, such as avoidance or personal protective equipment. Where in-river working is proposed, the potential for the transmission of waterborne infectious diseases (e.g., Leptospirosis, Cyanobacteria, gastro-intestinal illness, and Hepatitis A) during construction of the new infrastructure would be managed appropriately.
- Construction sites will be in adherence to the Considerate Contractors Scheme, including engagement with the local community.
- Construction methods to be used will be sympathetic to and reduce effects on the surrounding landscape, e.g., suitable hoardings.
- Any required consents will be obtained prior to undertaking works, e.g., tree preservation orders, listed building consent.
- Safe access will be available for pedestrians, vehicles, bicycles, horses, etc. during construction. Any roads, footpaths, cycleways, bridleways that are consented to be closed during construction will be re-instated to their original or better condition following completion of the works, or re-routed if the option footprint directly impacts on access route.
- The WFD assessment assumes that standard best practice construction measures and operational procedures are employed when delivering options, meaning that some options are assumed to be compliant with the objectives of the WFD and require no further assessment.
- Where options involve disturbance of land for pipeline laying, the land will be restored to its original or better condition on completion of the works.
- Where options involve works crossing roads or PRowS, appropriate diversions and signage will be implemented, and roads/paths will be restored to their original or better condition following completion of the works.
- Where options involve loss of agricultural land, Thames Water policy on compensation and land requisition will be followed.
- Options that use energy, either during construction and/or operation, will use the energy mix available at the time from the UK energy grid.

Table 4-2: SEA Framework

SEA Objective	Datasets/Key Themes	Effect		Description
Biodiversity, Flora, Fauna: <ul style="list-style-type: none"> Protect and enhance biodiversity, priority species, vulnerable habitats and habitat connectivity (no loss and improve connectivity where possible) 	<ul style="list-style-type: none"> SPAs SACs Ramsar sites SSSIs Marine Protected Areas (MPAs) MCZs National Nature Reserves (NNRs) Local Nature Reserves (LNRs) Priority habitats and species Non-designated sites Terrestrial, aquatic and marine habitats, species and protected sites Green networks and corridors (e.g., foraging areas and commuting routes, migration routes, hibernation areas, etc. at all scales) 	+++	Major Positive	The option would result in a major enhancement of the quality of designated sites/habitats due to changes in flow or groundwater levels, water quality or habitat quality and availability. The option would result in a major increase in the population of a priority species. Effects could be caused by beneficial changes in water flows/water quality, or large amounts of creation or enhancement of habitat, promoting a major increase in ecosystem structure and function. The option would result in a major reduction or management of INNS.
		++	Moderate Positive	The option would result in a moderate enhancement of the quality of designated and/or non-designated sites/habitats due to changes in flow or groundwater levels, water quality or habitat creation and enhancement measures. The option would result in a moderate increase in the population of a priority species. Effects could be caused by beneficial changes in water flows/water quality, or moderate amounts of creation or enhancement of habitat, promoting a moderate increase in ecosystem structure and function. The option would result in a moderate reduction or management of INNS.
		+	Minor Positive	The option would result in a minor enhancement of the quality of designated and/or non-designated sites/habitats due to changes in flow or groundwater levels, water quality or habitat creation and enhancement measures. The option would result in a minor increase in the population of a priority species. Effects could be caused by beneficial changes in water flows/water quality, or small amounts of creation or enhancement of habitat, promoting a minor increase in ecosystem structure and function. The option would result in a minor reduction or management of INNS.
		0	Neutral	The option would not result in any effects on designated or non-designated sites including habitats and/or species. It will not have an effect on INNS.
		-	Minor Negative	The option would result in a minor negative effect on the quality of designated and/or non-designated sites/habitats due to changes in flow or groundwater levels, water quality or habitat loss or degradation. The option would result in a minor decrease in the population of a priority species. Effects could be caused by detrimental changes in flows/water quality, or small losses or degradation of habitat leading to a minor loss of ecosystem structure and function. The option would result in a minor increase or spread of INNS.
		--	Moderate Negative	The option would result in a moderate negative effect on the quality of designated and/or non-designated sites/habitats due to changes in flow or groundwater levels, water quality or habitat loss or degradation.

SEA Objective	Datasets/Key Themes	Effect		Description
				The option would result in a moderate decrease in the population of a priority species. Effects could be caused by detrimental changes in flows/water quality, or moderate loss or degradation of habitat leading to a moderate loss of ecosystem structure and function. The options would result in a moderate increase or spread of INNS.
		---	Major Negative	The option would result in a major negative effect on the quality of designated and/or non-designated sites/habitats due to changes in flow or groundwater levels, water quality or habitat loss or degradation. HRA results indicate potential for Likely Significance Effects. The option would result in a major decrease in the population of a priority species. Effects could be caused by detrimental changes in flows/water quality, or large losses or degradation of habitat leading to a major loss of ecosystem structure and function. The option would result in a major increase or spread of INNS.
Soil: <ul style="list-style-type: none"> Protect and enhance the functionality, quantity and quality of soils 	<ul style="list-style-type: none"> Agricultural Land Classification Landfill sites – authorised and historic 	+++	Major Positive	The option would result in a major enhancement of the quality of soils through the implementation of catchment approaches, remediation or other measures.
		++	Moderate Positive	The option would result in a moderate enhancement of the quality of soils through the implementation of catchment approaches, remediation or other measures.
		+	Minor Positive	The option is located on a brownfield site and has no effect on soils or existing land use. The option results in the remediation of contaminated land.
		0	Neutral	The option would not result in any effects on soils or land use.
		-	Minor Negative	The option is not located on a brownfield site and/or results in a minor loss of best and most versatile agricultural land or is in conflict with existing land use. The option results in land contamination.
		--	Moderate Negative	The option will result in a moderate loss of best and most versatile agricultural land or is in substantial conflict with existing land use. The option is partially overlying mineral resources leading to partial mineral sterilisation.
		---	Major Negative	The option will result in a major loss of best and most versatile agricultural land or is in substantial conflict with existing land use. The option results in land contamination. The option is directly overlying mineral resources leading to mineral sterilisation.
Water:	<ul style="list-style-type: none"> Environment Agency Flood Defences 	+++	Major Positive	The option results in addressing failure of WFD Good Ecological Status / Good Ecological Potential. The option would result in a major improvement to flood risk.

SEA Objective	Datasets/Key Themes	Effect		Description
<ul style="list-style-type: none"> • Increase resilience and reduce flood risk • Protect and enhance the quality of the water environment and water resources • Deliver reliable and resilient water supplies 	<ul style="list-style-type: none"> • Environment Agency Main Rivers • Flood Zones 2 and 3 • Surface Water Features • WFD River Waterbody Catchments • WFD River Waterbodies Cycle 2 • Bathing Waters (for desal options) • Shellfish Waters (desal options) • Source Protection Zones • WFD groundwater bodies 			The option would result in a major improvement(s) in water efficiency, reduces demand and improves resilience. Additional MI/d capacity over 50MI/d.
		++	Moderate Positive	<p>The option achieves savings through demand management and does not require abstraction to achieve yield.</p> <p>The option contributes to addressing failure of WFD Good Ecological Status / Good Ecological Potential.</p> <p>The option would result in a moderate improvement to flood risk.</p> <p>The option would result in a moderate improvement in water efficiency, reduces demand and improves resilience.</p> <p>Additional MI/d capacity between 25.1MI/d and 50MI/d.</p>
		+	Minor Positive	<p>The option achieves savings through demand management and does not require abstraction to achieve yield.</p> <p>The option would result in a minor improvement to flood risk.</p> <p>The option would result in minor improvements in water efficiency, reduces demand and improves resilience.</p> <p>Additional MI/d capacity between 0.1MI/d and 25MI/d.</p>
		0	Neutral	The option would have no discernible effect on river flows or surface/coastal water quality or on groundwater quality or levels. The option would not have an effect on or be affected by flood risk.
		-	Minor Negative	<p>The option would result in minor decreases in river flows. River and/or coastal water quality may be affected and lead to short-term or intermittent effects on receptors (e.g., designated habitats, protected species or recreational users of rivers and the coastline) that could not be avoided but could be mitigated.</p> <p>The option would result in minor decreases in groundwater quality or levels.</p> <p>The option is located in Flood Zone 2.</p> <p>The option would result in minor decreases in water efficiency, increases demand and reduces resilience.</p>
		--	Moderate Negative	<p>The option would result in moderate decreases in river flows. River and/or coastal water quality may be affected and lead to long-term or continuous effects on receptors (e.g., designated habitats, protected species or recreational users of rivers and the coastline) that could not reasonably be mitigated.</p> <p>The option results in the likely deterioration of WFD classification.</p> <p>The option would result in moderate decreases in groundwater quality or levels.</p> <p>The option is located in Flood Zone 3.</p> <p>The option would result in moderate decreases in water efficiency, increases demand and reduces resilience.</p>

SEA Objective	Datasets/Key Themes	Effect		Description
		---	Major Negative	<p>The option would result in major decreases in river flows. River and/or coastal water quality may be affected and lead to long-term or continuous effects on receptors (e.g., designated habitats, protected species or recreational users of rivers and the coastline) that could not reasonably be mitigated.</p> <p>The option results in the deterioration of WFD classification.</p> <p>The option would result in major decreases in groundwater quality or levels.</p> <p>The option is located in Flood Zone 3 and further contributes to flood risk.</p> <p>The option would result in major decreases in water efficiency, increases demand and reduces resilience.</p>
Air: <ul style="list-style-type: none"> Reduce and minimise air emissions 	<ul style="list-style-type: none"> AQMAs Air quality monitoring sites 	+++	Major Positive	The option would result in a major enhancement of the air quality within one or more AQMAs.
		++	Moderate Positive	The option would result in a moderate enhancement of the air quality within one or more AQMAs.
		+	Minor Positive	The option would result in an enhancement of the air quality.
		0	Neutral	The option would not result in any effects on air quality and AQMAs.
		-	Minor Negative	The option would result in a decrease of the air quality.
		--	Moderate Negative	The option would result in a decrease of the air quality within one or more AQMAs.
		---	Major Negative	The option would result in a major decrease in the air quality within one or more AQMAs.
Climate Factors: <ul style="list-style-type: none"> Reduce embodied and operational carbon emissions Reduce vulnerability to climate change risks and hazards 	<ul style="list-style-type: none"> Option Carbon data UKCP18 climate data Sea level rise projections 	+++	Major Positive	<p>The option will generate significant additional zero carbon energy that can be fed back into the grid/reduce carbon emissions (see carbon scale).</p> <p>The option will result in a major increase in carbon sequestration.</p> <p>The option will increase resilience/decrease vulnerability to climate change effects.</p>
		++	Moderate Positive	<p>The option will increase resilience/decrease vulnerability to climate change effects.</p> <p>The option will result in a moderate increase in carbon sequestration.</p> <p>The option will generate moderate additional zero carbon energy that can be fed back into the grid/reduce carbon emissions (see carbon scale).</p>
		+	Minor Positive	<p>The option will increase resilience/decrease vulnerability to climate change effects.</p> <p>The option will result in a minor increase in carbon sequestration.</p> <p>The option will generate minor additional zero carbon energy that can be fed back into the grid/reduce carbon emissions (see carbon scale).</p>
		0	Neutral	The option would have no discernible effect on greenhouse gas emissions, nor would the option increase resilience/decrease vulnerability to climate change effects.

SEA Objective	Datasets/Key Themes	Effect		Description
		-	Minor Negative	The option will have a minor impact on resilience/decrease vulnerability to climate change effects. The option will generate minor construction and/or operational carbon emissions (see carbon scale).
		--	Moderate Negative	The option will have a moderate impact on resilience/significantly decrease vulnerability to climate change effects. The option will generate moderate construction and/or operational carbon emissions (see carbon scale). The option will result in a moderate release of previously sequestered carbon.
		---	Major Negative	The option will have a major impact on resilience/significantly decrease vulnerability to climate change effects. The option will generate significant construction and/or operational carbon emissions (see carbon scale). The option will result in a major release of previously sequestered carbon.
Landscape: <ul style="list-style-type: none"> • Conserve, protect and enhance landscape, townscape and seascape character and visual amenity 	<ul style="list-style-type: none"> • Areas of Outstanding Natural Beauty (AONB) • National Character Areas • Green Belt land • National Park 	+++	Major Positive	The option would have a major positive contribution to designated landscape (AONB or National Park) management plan objectives. The option results in new, above-ground infrastructure that significantly enhances the local landscape, townscape or seascape.
		++	Moderate Positive	The option would have a moderate positive contribution to designated landscape management plan objectives. The option results in new, above-ground infrastructure that has a moderate positive effect on the local landscape, townscape or seascape.
		+	Minor Positive	The option results in new, above-ground infrastructure that has a minor positive effect on the local landscape, townscape or seascape.
		0	Neutral	The option would not result in any effects on the local landscape, townscape or seascape.
		-	Minor Negative	The option results in new, above-ground infrastructure that has a minor negative effect on the local landscape, townscape or seascape.
		--	Moderate Negative	The option would have a moderate negative effect on a designated landscape or feature (i.e., significant visually intrusive infrastructure) whose effects could not be reasonably mitigated. The option results in new, above-ground infrastructure that has a moderate negative effect on the local landscape, townscape or seascape.
		---	Major Negative	The option would have a negative effect on a designated landscape or feature (i.e., significant visually intrusive infrastructure) whose effects could not be reasonably mitigated. The option results in new, above-ground infrastructure that has a major negative effect on the local landscape, townscape or seascape.

SEA Objective	Datasets/Key Themes	Effect		Description
<p>Historic Environment</p> <ul style="list-style-type: none"> Conserve, protect and enhance the historic environment and heritage assets, including archaeological remains 	<ul style="list-style-type: none"> Listed buildings: <ul style="list-style-type: none"> Grade I listed structures Grade II* listed structures Grade II listed structures Registered Parks and Gardens: <ul style="list-style-type: none"> Grade I Registered Parks and Gardens Grade II* Registered Parks and Gardens Grade II Registered Parks and Gardens Protected Wreck Registered Battlefields Scheduled Monuments Conservation Areas World Heritage Sites 	+++	Major Positive	<p>The option will result in enhancements to designated heritage assets and/or their setting, fully realising the significance and value of the asset, such as:</p> <ul style="list-style-type: none"> Securing repairs or improvements to heritage assets, especially those identified in the Historic England Buildings/Monuments at Risk Register. Improving interpretation and public access to important heritage assets.
		++	Moderate Positive	The option will result in enhancements to designated heritage assets and/or their setting and improve interpretation and public access to important heritage assets.
		+	Minor Positive	The option will result in enhancements to non-designated heritage assets and/or their setting.
		0	Neutral	The option will have no effect on cultural heritage assets or archaeology.
		-	Minor Negative	<p>The option will result in the loss of significance of undesignated heritage assets and/or their setting, notwithstanding remedial recording of any elements affected.</p> <p>There will be limited damage to known, undesignated important archaeological sites with a consequent loss of significance only partly mitigated by archaeological investigation.</p>
		--	Moderate Negative	<p>The option will result in the loss of significance of undesignated heritage assets and/or their setting, notwithstanding remedial recording of any elements affected.</p> <p>The option will diminish the significance of designated heritage assets and/or their setting, notwithstanding remedial recording of any elements affected.</p>
		---	Major Negative	<p>The option will diminish the significance of designated heritage assets and/or their setting such as:</p> <ul style="list-style-type: none"> Demolition or further deterioration in the condition of designated heritage assets, especially those identified in the Historic England Buildings/Monuments at Risk Register. Loss of public access to important heritage assets and lack of appropriate interpretation. There will be major damage to known, designated important archaeological sites with a consequent loss of significance only partly mitigated by archaeological investigation.
<p>Population, Human Health</p> <ul style="list-style-type: none"> Maintain and enhance the health and wellbeing of the local community, including economic and social wellbeing Maintain and enhance tourism and recreation 	<ul style="list-style-type: none"> Noise action important area Indices of Multiple Deprivation 2015 Functional site: <ul style="list-style-type: none"> Schools Medical facilities OS Greenspace dataset: <ul style="list-style-type: none"> Allotments Bowling green 	+++	Major Positive	<p>The option leads to major positive effect on the health of local communities and will ensure that surface water and bathing water quality is maintained within statutory limits.</p> <p>The option creates new, and significantly enhances existing, recreational facilities, publicly accessible greenspace and/or tourism within the operational area.</p>
		++	Moderate Positive	<p>The option leads to a positive effect on the health of local communities and will ensure that surface water and bathing water quality is maintained within statutory limits.</p> <p>The option enhances existing, recreational facilities, publicly accessible greenspace and/or tourism within the operational area.</p>
		+	Minor Positive	The option has a temporary positive effect on the health of local communities and will ensure that surface water and bathing water quality is maintained within statutory limits.

SEA Objective	Datasets/Key Themes	Effect		Description
	<ul style="list-style-type: none"> - Cemetery - Golf course - Sports facility - Play space - Playing field - Public park or garden - Religious grounds - Tennis courts • Natural England - Country Parks • National Parks • Section 15 open access areas • CRoW S4 Conclusive Registered Common Land 	0	Neutral	The option would not result in any effects on human health and existing recreational facilities and/or tourism.
		-	Minor Negative	The option has a temporary effect on human health (e.g., noise or air quality). The option reduces the availability and quality of existing recreational facilities and/or tourism within the operational area.
		--	Moderate Negative	The option results in the permanent removal of existing recreational facilities, publicly accessible greenspace and/or tourism within the operational area.
		---	Major Negative	The option has a significant long-term effect on human health (e.g., noise or air quality). The option results in the removal of existing recreational facilities, publicly accessible greenspace and/or tourism within the operational area.
Material Assets	<ul style="list-style-type: none"> • Transport: <ul style="list-style-type: none"> - Major roads – A roads - Major roads motorway - Railway line - National cycle route - National trails • Minimise resource use and waste production • Avoid negative effects on built assets and infrastructure 	+++	Major Positive	The option will reuse or recycle substantial quantities of waste materials and any new infrastructure will incorporate substantial sustainable design measures and materials. There will be no increase in energy consumption or energy will be from 100% renewable sources. The option improves national cycle routes or national trails.
		++	Moderate Positive	The option will reuse or recycle moderate quantities of waste materials and any new infrastructure will incorporate some sustainable design measures and materials. There will be no increase in energy consumption or energy will be from 90% renewable sources. The option improves national cycle routes or national trails.
		+	Minor Positive	The option will reuse or recycle a limited quantity of waste materials and any new infrastructure will incorporate some limited sustainable design measures and materials. There will be no increase in energy consumption or energy will be from 80% renewable sources. The option improves national cycle routes or national trails.
		0	Neutral	The option would not result in any effects on material assets.
		-	Minor Negative	The option will require new infrastructure with only limited opportunities for the reuse or recycling of waste materials. There are limited opportunities for sustainable design or the use of sustainable materials. The option results in a minor increase in energy consumption with no renewable energy options. The option results in a minor disruption on built assets and infrastructure, including transport.

SEA Objective	Datasets/Key Themes	Effect		Description
		—	Moderate Negative	<p>The option will require new infrastructure with only limited opportunities for the reuse or recycling of waste materials.</p> <p>The option results in a moderate increase in energy consumption with no renewable energy options.</p> <p>The option results in a moderate disruption on built assets and infrastructure, including transport links.</p>
		—	Major Negative	<p>The option will require significant new infrastructure that cannot be provided through the reuse or recycling of waste materials. There are no opportunities for sustainable design or the use of sustainable materials.</p> <p>The option results in a major increase in energy consumption with no renewable energy options.</p> <p>The option results in a major distribution on built assets and infrastructure, including transport links.</p>

4.3 WRMP Investment Modelling

The multi-criteria optimisation approach set out in the WRPG⁴ guidance reflects the approach used for the WRSE regional plan and Thames Water's rdWRMP24, where the outcomes of the environmental assessments are translated into metrics to feed into the multi-criteria optimisation for option selection and programme appraisal. These metrics enabled the environment to be directly considered in analysis and selection of programmes of options at an early stage in the planning process.

The results of the environmental assessments were translated into the following metrics:

- SEA Metrics:
 - SEA Metric Positive
 - SEA Metric Negative
- BNG Metric Total net change in habitat units derived from application of the Defra BNG metric
- Natural Capital Metric – change in monetary value (£/year) of ecosystem services (combining carbon sequestration, food production, air pollutant removal, natural hazard management, and recreation and amenity)

SEA Metrics

By its nature, SEA does not include numerical values for scoring effects. However, in order to incorporate environmental considerations directly into the programme appraisal optimisation model, SEA metrics were developed to summarise the environmental performance of each option in numerical form. The SEA metrics were developed from the results of the SEA, HRA, WFD, INNS and NC (Water purification) assessment processes. However, the metrics themselves were generated solely for the investment modelling and were not used in the SEA process for the options assessment or the programme appraisal.

The metrics were based on the option post-mitigation (residual effects) results and included construction and operation effects combined. To generate the SEA metrics, the SEA scoring system was given defined numerical values, i.e., major positive = +8, moderate positive = +4, minor positive = +1, neutral = 0 (and -1 to -8 for corresponding negative effects), to counteract hidden effects. Two metrics are developed, one for positive effects and one for negative effects. The positive results are summed and the negative results are summed to give the two metrics. The advantages of this approach are that it is straightforward and easy to understand and it avoids the trading and cancelling out of effects. It also has the additional advantage of alleviating some of the issues of hidden significant effects and cumulative minor effects. However, it is noted that summing effects into one overall score can hide effects which is why the SEA and this Environmental Report focus on describing individual effects and proposed mitigation measures for these as appropriate.

Other Environmental Metrics

The BNG metric was generated directly from the BNG assessment, whereby a biodiversity baseline was developed from spatial data sets of habitats inventories and assessed in line with the Defra BNG metric 3.0 which was used to calculate BNG change through land use of each option. The output was a BNG net gain or loss score for each option that was used in the

⁴ WRPG [Water resources planning guideline - GOV.UK \(www.gov.uk\)](https://www.gov.uk/guidance/water-resources-planning-guideline)

investment model. For more information see the Thames rdWRMP24 Natural Capital and Biodiversity Net Gain Report (Appendix AA).

The Natural Capital metric was derived from the results of the natural capital assessment. Monetised values for the key ecosystem services provided within Enabling a Natural Capital Approach (ENCA) guidance and supplementary valuation databases were used to generate the overall monetary value for each option within the natural capital assessment. This was used as the natural capital metric and was given as a single figure in pounds sterling.. For more information see the Thames rdWRMP24 Natural Capital and Biodiversity Net Gain Report (Appendix AA).

4.4 Programme Appraisal

An adaptive planning approach was used to take account of future uncertainties. In line with the Environment Agency’s definition, WRSE’s and Thames Water’s Best Value Planning approach considered other factors alongside economic cost to seek to achieve an outcome that increases the overall net benefit to customers, the wider environment and overall society.

WRSE selected a total of nine branches (hereafter referred to as ‘situations’) to cover these uncertainties, which were derived based on combinations of the three key drivers presented in Table 4-3 below.

Table 4-3: Forecasts based on key drivers

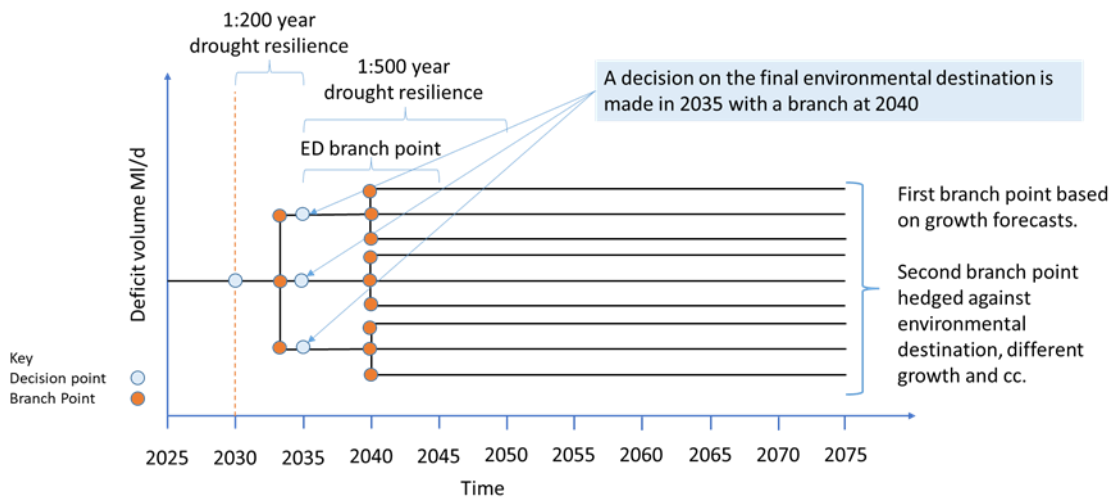
Driver	Forecast Change		
	High	Medium	Low
Population and housing growth	Housing Plan with Housing Need tested in the highest scenario	Housing Plan forecast	ONS18 forecast, with ONS18 low tested in the lowest scenario.
Climate Change impacts on DO for existing systems	WRSE Situation 6	Median	WRSE Situation 7 – high environmental destination (including licence capping) and high climate change
Levels of abstraction reduction associated with delivering Environmental Destination ambitions	‘Enhanced’ Scenario	‘Business As Usual (BAU)’ or ‘BAU+’ with lower groundwater /surface water interaction	‘BAU’ with lower groundwater/surface water interaction

The nine situations were made up of representative combinations of these driver specific forecasts within each plan. To make the plan ‘adaptive’ the forecasts were introduced in two stages over time, at so-called ‘branch points’. There were two main factors that were used when deriving the branch points:

- WRMPs run on five-year cycles, so branch points would typically occur at the start/end of an Asset Management Plan (AMP) period.
- For regional plans there are two options to set branch points:
 - Risk based trigger: When do the future uncertainties exceed target headroom?
 - Policy decision-based trigger: e.g. When can a policy decision regarding the environmental destination be made?

Following consultation on the WRSE emerging regional plan in January 2022, the branch points were changed in response to stakeholder feedback and regulatory expectations, so that the branch points occur earlier in the planning horizon. Figure 4-1 illustrates the final set of situations and branch points that were used as the baseline for the investment model for the revised plan.

Figure 4-1 : Summary of the Supply/Demand Situations and Branch Points used in the WRSE Investment Model



Population and housing growth are key drivers up to 2035 with variations in climate change and environmental destination scenarios then being brought in from 2035 onwards. These forecast drivers are set out in Table 4-4 below.

Table 4-4: Key forecast drivers and situations

2025 to 2030	2030 to 2035	2035 to 2075	
Medium Growth	High Growth	Situation 1	High Growth (H-Max)
			High Climate Change
			High Env Destination
		Situation 2	High Growth
			Medium Climate Change
			Medium Env Destination
	Situation 3	High Growth	
		Low Climate Change	
		Low Env Destination	
Medium Growth	Situation 4	Medium Growth	
		High Climate Change	
	Situation 5	High Env Destination	
		Situation 5	Medium Growth

2025 to 2030	2030 to 2035	2035 to 2075	
			Medium Climate Change
			Medium Env Destination
		Situation 6	Medium Growth
			Low Climate Change
			Low Env Destination
		Low Growth	Situation 7
	High Climate Change		
	High Env Destination		
	Situation 8		Low Growth
			Medium Climate Change
			Medium Env Destination
	Situation 9		Low Growth (H-Min)
		Low Climate Change	
Low Env Destination			

To support a robust evaluation of alternatives, WRSE ran the investment model multiple times to examine how the investment plan changed as the inputs to the values used in the adaptive framework changed. The alternative assessment runs fell into the following broad categories:

- Specific sensitivity assessments – individual large schemes removed, or costs altered for particular options to test the impact of increases or decreases in cost in line with the range that can be reasonably expected for a given option.
- Best Value runs – the trade-off between increasing cost and better performance against the optimisable Best Value metrics was investigated using ‘Pareto runs’ to determine how investment plans changed as the environmental and social metrics improved. This included SEA, Natural Capital, BNG and carbon footprint.
- Policy and global sensitivity assessments – this involved testing the implications of timings around policies associated with drought resilience and environmental destination, as well as the sensitivity to key economic inputs such as discount factors. The success of and government support for demand management interventions is also a key uncertainty that was tested.

It is important to note that a significant number of investment model runs were carried out by WRSE and that there could be any number of different permutations of options that could form alternative plans. However, to be considered as a reasonable or realistic alternative plan it is necessary that they meet the objectives of the plans and all of the legal and regulatory requirements and policy requirements underlying the planning process.

At a WRSE (regional) and company (TW) level a Best Value Plan and two reasonable alternative plans were selected for consideration / assessment through the SEA process, and the Best Value Plan has been adopted by Thames Water to form its plan. These three plans are set out below along with a justification for why they were progressed:

- **BVP** – the Guidelines state in Section 9.1 that:
 - *‘The aim of the regional plan and the WRMP is to present a best value plan.’*

- This programme meets all the legal / regulatory requirements, policy expectations and objectives of the plan. It is therefore a reasonable plan and was progressed for consideration through the SEA process.
- **LCP** – the Guidelines state in Section 10.4 that:
 - *‘You should produce a least cost programme as a benchmark to appraise your other programmes against. The least cost plan should meet your statutory requirements and be informed by your SEA and HRA. The least cost plan should include policy expectations around demand management.’*
 - This programme meets all of the legal / regulatory requirements, policy expectations and objectives of the plan. It is therefore a reasonable alternative and was progressed for consideration through the SEA process.
- **BESP** – the Guidelines state in Section 10.3 that:
 - *‘You should present in your WRMP a programme that represents a ‘Best Environment and Society’ programme in your programme appraisal. The ‘best environment and society’ programme should be one that is formed using this guidance and therefore takes into account the Strategic Environmental Assessment, Habitats Regulations Assessment, Biodiversity Net Gain and Natural Capital where appropriate... You should explain in your plan how you have considered your Best Environment programme, as part of your programme appraisal, and what influence it has had on your preferred programme.’*
 - This programme meets all the legal / regulatory requirements, policy expectations and objectives of the plan. It is therefore a reasonable alternative and was progressed for consideration through the SEA process.

As stated earlier, it is important to remember that a significant number of investment model runs were carried out by WRSE as part of programme appraisal. As a result there could be any number of different permutations of schemes that could form alternative plans. However, not all alternative programme runs will be ‘reasonable alternatives’ and therefore need to be considered within the SEA process. These plans will not necessarily be deliverable or desirable across a number of factors, including carbon impact, cost and customer acceptability, nor may they align with WRSE’s policy positions. The alternative plans outlined above are in line with the emerging regional context and address the key choices for Thames Water across the planning horizon.

Although the modelling encompasses all pathways, we are required to identify certain pathways within the situation tree for reporting purposes, particularly within the WRMP Tables. These include a ‘preferred pathway’, which represents the current best view based on company and regulator expectations, and also a ‘core pathway’ that Ofwat will use as a guide for minimum future investment.

Situation 4 has been as the preferred pathway. This is primarily because it aligns with the approach set out in the WRPG, which is the regulators’ policy guidance as to how a WRMP should be prepared and attracts significant weight:

- It uses Local Authority housing plan-based forecasts
- It includes ‘High’ environmental destination (according with the approach set out in the National Framework, Regional Plan and WRPG, when read together)

For Thames Water PR24 business plan, Ofwat has set out its expectations in relation to long-term management of assets through its 'long-term delivery strategy' (LTDS) guidance. This requires that long-term plans consider a core scenario, movements from which should represent best value.

We have identified 'situation 8' as being the 'core pathway' for Ofwat reporting purposes, because it includes ONS18 mid-range growth in the medium to long-term, likely statutory minimum environmental destination and median climate change. However, this pathway is not in accordance with the WRPG.

Situation 1 has additionally been selected for reporting because it represents the maximum need within the plan, as it includes maximum growth and high climate change and environmental destination scenarios.

The options selected across situations 1, 4 and 8 of the BVP fully encompass the options selected across all nine pathways, that is, there are no options selected in the other pathways which are not selected in either Situations 1, 4 or 8. These three pathways are therefore considered to be a representative range of situations within the plan. It is considered that carrying out plan-based environmental assessments of these three situations for the Best Value Plan enables us to accurately understand the environmental impacts and benefits across the adaptive plan, notwithstanding that the timing of option selection may vary in other situations.

Situation 4 of the LCP and BESP has been chosen as this is the preferred pathway and represents alternative plans; this approach also mirrors that taken by WRSE for its in-combination assessments of the regional plan.

A cumulative effects assessment for the BVP and the two alternative plans was undertaken at company level by Thames Water and at regional level by WRSE using the same scoring and SEA framework as the options assessments. The aim of the cumulative effects assessment was to assess each plan as a whole to identify any potential interactions between options and where necessary develop mitigation measures and inform option screening.

BVP Situation 4 is considered to be the preferred programme, with all other programmes forming reasonable alternatives for SEA purposes and therefore also subject to SEA:

- BVP – Situation 1, 4 and 8
- LCP – Situation 4
- BESP – Situation 4.

4.5 Links with the other Plans, Programmes and Projects

The BVP was considered in-combination with other plans, programmes and projects including:

- Other water company WRMPs and Drought Plans – Draft plans were used for companies outside the WRSE region (in line with what was available at the time of writing). The WRSE cumulative effects assessment was used to identify potential interaction between the six member company options.
- River Basin Management Plans (RBMPs) – The relevant current RBMPs were reviewed to identify any potential interactions with the BVP.

- Local Development Plans (LDPs) – LDPs for Local Authorities were reviewed where options are proposed to be located and interactions with site allocations were identified.
- Planning Applications – DCOs and major planning applications within 5km of the options were reviewed to identify potential interactions.

4.6 Limitations of the Assessment and Environmental Report

The Environmental Report has relied on published data and information held by Thames Water. The baseline information collected in this Report is the most up-to-date information currently available; however, it is possible that conditions described in this report may change over time. This dataset has been reviewed and updated as appropriate throughout the SEA process, as new information becomes available.

Thames Water's rdWRMP24 covers a substantial geographical area. Therefore, the baseline is a high-level review of conditions within the region. It is based on the WRSE Regional Plan SEA Scoping Report additionally includes local baseline information specific to Thames Water's supply area to inform the SEA. A GIS was developed with environmental and social baseline layers to undertake the option specific assessments.

The cumulative effects assessment was undertaken for Situations 1, 4 and 8 of the rdWRMP24, as these represent the preferred pathway and highest and lowest demand pathways.

4.7 How the SEA has influenced Thames Water's rdWRMP24

The SEA has been undertaken as an iterative process with the development of the rdWRMP24. It has influenced the rdWRMP24 option design and decision-making as follows:

- The outcomes of the assessments of the feasible options were used to refine option designs, for example, where major adverse effects were identified for sensitive receptors such as ecological sites or heritage assets, the option design was refined, including re-routing pipelines away from receptors.
- Alongside the HRA and WFD, the SEA led to the rejection of some options on environmental grounds where effects could not be adequately mitigated.
- The SEA fed directly into the selection of options through use of the environmental metrics in the investment model. Environmental metrics were included within of the BVP criteria for the selection of options.
- The programme appraisal identified potential cumulative effects and mitigation to ensure the rdWRMP24 minimises environmental impacts and maximising benefits.
- Further mitigation measures, enhancement opportunities and monitoring have been recommended through the SEA to protect the environment, whilst maximising benefits.

4.8 Other Environmental Assessments (WFD, HRA, NCA, BNG, INNS)

The option development and selection process were informed by several other environmental assessments as part of the rdWRMP24 development. These processes also helped inform the SEA findings, as set out in Section 1. This section summarises each assessment, with further methodological details available in Appendices AA, B, BB, C, D.

Habitat Regulations Assessment

The results of the HRA fed into the SEA objective on biodiversity (Objective 1, see Table 4-2). HRA results fed iteratively into the option development process, eliminating those options for which Appropriate Assessment identified adverse impacts on the conservation objectives Habitat Sites even in the presence of mitigation, or for which alternative design or option was not feasible. Alongside the SEA cumulative effects assessment of the rdWRMP24, an HRA in-combination effects assessment of the plan as a whole was undertaken. The HRA methodology included the Test of Likely Significance and an Appropriate Assessment. A WFD cumulative effects assessment of the plan as a whole was also undertaken. The WFD Assessment and full method statement can be found in the WFD Report - Appendix D.

Natural Capital Assessment via assessment of selected Ecosystem Services

The outputs of the NCA were used to inform option selection and feed into decision-making as part of the Best Value Planning process. Expected changes in natural capital stocks were assessed for each option, along with implications for four ecosystem services outlined in the supplementary guidance note 'Environment and Society in decision-making': biodiversity and habitat, climate regulation, natural hazard regulation, and water purification. Note that biodiversity and habitat services were assessed using the BNG methodology outlined below. Water regulation has not been included for assessment to avoid the potential double accounting of benefits with capacity-based and financial assessment. The full NCAs for the options are outlined within the Natural Capital and Biodiversity Net Gain Assessment Report - Appendix AA.

Biodiversity Net Gain Assessment

BNG was considered at both the option and programme level, with biodiversity-optimised programmes considered as part of programme appraisal. The design of each option sought to minimise biodiversity loss and maximise BNG, and any required biodiversity impact mitigation was included in the option cost. A biodiversity baseline was developed from spatial datasets of habitat inventories and assessed in line with Defra's BNG 3.0 metric, which assesses BNG based on land use change associated with each option. By quantifying the spatial extents of habitats and applying habitat-specific metrics, the approach used aligns with the methodology of the WRPG Environment and Society guidance. In this way, the approach also allowed consideration of biodiversity and habitat as an ecosystem service in the NCAs. Anticipated changes in land use as a result of option construction were used to assess change in the BNG scores. The full BNG assessments for the options are outlined within the Natural Capital and Biodiversity Net Gain Assessment Report - Appendix AA.

Invasive Non-Native Species

The results of the INNS assessment fed into the SEA objective on biodiversity (Objective 1, see Table 4-2). The INNS assessments were also used to inform option development. Mitigation options appraisals were conducted for those options determined as having a risk for the potential spread of INNS. This involved reviewing known mitigation technologies and determining their effectiveness with regard to species type, transmission pathway and feasibility. Further information about the INNS Risk Assessment methodology and full assessments can be found in the INNS Risk Assessment - Appendix BB.

The SEA process is a core component of considering the wider environmental net gain (ENG) of the rdWRMP24, in line with WRPG expectations. The UK government is developing a tool ('Eco-metric') to assess quantifiable ENG benefits; however, this was not ready for use within regional and company WRMP24s at the time of their development. Therefore, the findings across the

SEA, NCA and BNG assessments are considered across the rdWRMP24 to ensure it would leave the natural environment in a measurably better state than it is currently in. Demonstrating achievement of BNG was a key requirement, and in addition the ENG approach included consideration of wider environmental gains, such as improvements in air and water quality identified by the SEA and NCA. This allowed the benefits of the plan to customers, society, and the environment to be measured, understood, and clearly explained as part of the rdWRMP24.

5 Assessment of Feasible Options

5.1 Introduction

As part of the regional planning and WRMP development process, WRSE and Thames Water undertook modelling to identify areas with a surplus or deficit of water supply. Thames Water developed a range of options for maintaining the supply demand balance throughout the planning period, and these options were then fed into the regional planning process. Through the WRSE regional planning process, environmental metrics (translated from the assessment results) were included in the investment modelling to influence the selection of options within the WRSE revised draft Regional Plan (rdRP) and correspondingly Thames Water's rdWRMP24 (see Section 4.3).

These options fall into the following broad categories:

- Supply options – options that will provide a water supply to customers including transfers, maximising existing resources, trading, tankering, and new resources
- Demand management options – options that will reduce the demand for water including metering, water efficiency, and leakage reduction
- Catchment management – options types that fall under this category include:
 - flow augmentation and licensing
 - integrated catchment management
 - knowledge exchange, education, and agricultural activity
 - natural water retention measures (including natural flood management and wetland creation)
 - nutrient and sediment reduction
 - pesticide reduction
 - river restoration
 - Sustainable Urban Drainage Systems (SuDS)
 - terrestrial habitat creation/management

The WRMP process involved Thames Water working with regional stakeholders and neighbouring water companies to identify the best options to include as part of the WRSE Regional Plan, and the company's rdWRMP24.

5.2 WRMP Option Types

As discussed above a range of different types of options were considered in the feasible options list and are summarised below.

The supply-side option types considered included:

- Aquifer storage and recovery – aquifer storage options involve abstracting water from a river or reservoir, treating it and injecting it underground to be stored in natural aquifers.
- Desalination – desalination options involve pumping sea water or brackish water (from an estuary) for treatment and release into supply. The water will be blended before putting into supply, with the brine typically piped out to sea for disposal (in the case of sea desalination) or to a sewer (in the case of brackish water desalination).

- Distribution capacity expansion – intra-zonal network enhancements (increased pipeline capacity or booster pumping capacity) to enable water to be transferred from new sources to demand centres within the water resource zone.
- Drought intervention – drought intervention options include drought order; drought permit recommission of abandoned sources; and temporary transfer.
- Groundwater sources – usually a borehole which abstracts water from an aquifer which then goes to a treatment works.
- Increase WTW capacity and efficiency - increase deployable output by removing constraints within the treatment works.
- Effluent reuse – effluent is treated and discharged into rivers or piped into supply.
- Reservoirs – reservoir options include dam raising (increasing the capacity of existing reservoirs), or creation of new reservoirs. It is likely that most of these will be bunded reservoirs (i.e., not within a valley) with piped transfers in and out of supply.
- Redevelopment of existing resources with increased yields – increase the potential yield of an existing water resource asset to increase deployable output.
- Tankering – sea and road tankering options have been considered. In the case of sea tankering storage and offloading, facilities will be required in the UK with water piped or tankered to WTWs or reservoirs.
- Transfers – transfers include asset transfers, and bulk transfers within/into region, either of raw or treated water.
- Trading – involves an agreement with another water company to trade water where there is a surplus.

Within the regional plans there are Strategic Resource Options (SROs) are significant strategic options that in some cases span across water companies. SROs in which Thames Water are a partner have been selected in WRSE's regional plan and therefore these SROs form part of Thames Water's rdWRMP24. The environmental assessments undertaken for the SROs as part of the Regulators' Alliance for Progressing Infrastructure Development (RAPID) gated process, including SEA, HRA (Screening and Appropriate Assessment), WFD (Level 1 and Level 2) and INNS were used to inform the Thames Water rdWRMP24.

The list of SROs that have informed the Thames Water rdWRMP24 include different supply option types:

- London Water Recycling
- Thames to Affinity Transfer (T2AT)
- Thames to Southern Transfer (T2ST)
- South East Strategic Reservoir Option (SESRO)
- Severn to Thames Transfer (STT)

The demand option types considered include:

- Metering – involves measuring water consumption and can include compulsory metering for household and non-household uses, smart metering, and other metering such as optant metering and metering of sewage flow.
- Consumption reduction – involves measuring non-metering savings. It can include tariffs/fees (introduction of special fees, changes to existing measured tariffs, introduction of special tariffs for specific users) and water recycling (rainwater harvesting / grey water reuse for new or existing households and non-households). It can also

include water efficiency measures such as the provision of advice and information on direct abstraction and irrigation techniques or leakage detection and fixing techniques, water use audit and inspection, awareness campaigns, sponsoring water efficiency enabling activities by others, home visits to reduce plumbing losses, and the promotion of water saving devices.

- Loss reduction – involves measuring non-metering savings from leakages, either from network level/company side (capital works, operational) or customer side. Network level/company side leakages can include leakage reduction from trunk mains and service reservoir (SR), pressure reduction programmes, or asset renewal, and leakage enabling schemes. Customer side leakages can include customer supply pipe leakage reduction and customer engagement/education/incentives. Another loss reduction option includes diagnostic studies for production losses.

Catchment management options were also considered. These options include:

- Flow augmentation and licensing
- Integrated catchment management
- Knowledge exchange, education, and agricultural activity
- Natural water retention measures (including natural flood management and wetland creation)
- Nutrient and sediment reduction
- Pesticide reduction
- River restoration
- SuDS
- Terrestrial habitat creation/management

Alternative sources of water via proposed SROs have been identified as potential solutions to some of the key supply demand balance issues.

5.3 Feasible Assessment Outcomes

This section summarises the SEA option level assessments for the feasible list of options that went into the investment modelling, including supply side options and SROs, demand management options, drought plan options, and catchment management options.

Each option was assessed using the SEA objectives and framework as set out in Section 4.2. The full scoring key and definitions are provided in Section 4.2 and a summary for reference is provided in Table 5-1 below.

Table 5-1: SEA Significance and Numerical Score

Qualitative Score	Description	Numerical Score
+++	Major Positive	8
++	Moderate Positive	4
+	Minor Positive	1
0	Neutral	0

Qualitative Score	Description	Numerical Score
-	Minor Negative	-1
--	Moderate Negative	-4
---	Major Negative	-8

Please also note that the abbreviations “C” and “O” in the assessment summary tables below represent **C**onstruction effects and **O**perational effects.

5.4 Supply Side Options

Numerous supply side options were put forward and a list of the options and option descriptions is provided in Table 5-2. The supply side options were assessed as part of the SEA process. The summary results for each option are presented in Table 5-3 below and the full assessment sheets are available in Annex F (available as excel sheets on request).

The SEA findings can be summarised as follows, reflecting potential effects in the absence of mitigation:

- Transfers – transfer options had varying effects depending on their location and proximity to sensitive receptors. Construction effects associated with laying pipelines included disturbance, dust, noise, vibration and visual intrusion. Operational effects depended on the nature of the transfer. Transfers between existing assets had few effects, whilst transfers involving new abstractions had the potential to result in change to flows affecting water quality and ecology. Raw water transfers also pose an INNS risk.
- Groundwater sources – groundwater options including aquifer storage and recovery generally had fewer effects given the contained nature of the options. However, operational effects can include effects on waterbodies and WFD status.
- Desalination – desalination options had construction effects associated with building a new plant and conveyance pipelines. Operational effects included potential issues with brine discharge affecting salinity concentrations and high energy usage due to water treatment processes.
- Reservoirs – new reservoir options can have prolonged construction periods causing disturbance, noise, dust, vibration and visual intrusion. Reservoirs can also change the landscape significantly and effects depend on what land use is currently at the site and surrounding it. Reservoirs can also have beneficial effects during operation from landscape and habitat creation and recreational opportunities.
- Water recycling – water recycling options had construction effects associated with building a new plant and conveyance pipelines. These options use water which would otherwise be lost to sea, making the most of water resources. However, they can also reduce the water discharged which can have effects on water flow and quality and ecology.

Table 5-2: Supply Side Options List

Option ID	Option name	Description overview
TWU_LON_HI-LRE_WT1_ALL_copperwtwmecana200/480/680	Coppermills WTW - filtration pre-treatment 680MI/d	A 200, 480 or 680MI/d Mecana filtration system for primary filtration of surface water at the Coppermills WTW, including three new shaft connections, inlet pipework diversions, inlet pumping station (PS) and pipe bridge for return pipework.
TWU_LON_HI-DES_ALL_CNO_beckton desal 50/100/150	Beckton Desalination	Abstraction of 187MI/d raw water for production of 150MI/d desalinated water (conveyance within option below). DO 142MI/d for 150MI/d capacity. The 50 and 100 options involve raw water abstraction for production of 50MI/d and 100MI/d desalinated water.
TWU_LON_HI-TFR_LON_CNO_beckton-coppermills	Beckton to Coppermills tunnel (treated) - Construction	Treated desalination water is to be conveyed via tunnel from Beckton desalination works to Coppermills WTW for blending. (Part of the Beckton Desalination Scheme with the option above.)
TWU_LON_HI-TFR_SES_ALL_woodwtw-epsomdowns	Transfer - Woodmansterne to Epsom - Resource Element	Proposed new trunk mains to transfer potable water from Woodmansterne (SES) to Epsom including a new PS at Woodmansterne WTW.
TWU_SWX_HI-GRW_ALL_ALL_ashton keynes	Groundwater Development - Ashton Keynes borehole pumps - Removal of Constraints to DO	Installation of larger pumps and/or lowering of the pumps in some or all of five existing boreholes, abstracting from the confined Great Oolite aquifer. Change in operational philosophy to improve peak source output.
TWU_LON_HI-TFR_LON_ALL_nrv-groundimprov	New River Head - Ground improvements	Rehabilitation and recommissioning of disused groundwater source. This option comprises: <ul style="list-style-type: none"> - ground stabilisation around the New River Head borehole, comprising the grouting of the potential voids created by sand migration; - installation of four near surface ground anchors placed at convenient locations around the borehole; - installation of a turbidity meter; and - recommissioning of the licensed but currently disused groundwater source.
TWU_LON_HI-ROC_NET_CNO_hampton-battersea	TWRM extension - Hampton to Battersea - Construction	New ring main tunnel from Hampton to Battersea.
TWU_SWX_HI-TFR_KVZ_ALL_kennet-swox2.3	Kennet Valley to SWOX Transfer - 2.3 MI/d	The works proposed include: treated water pipeline from Pangbourne WTW to Cleeve WTW 9.4km (250dia), a PS at Pangbourne WTW (60kW), balance tank at Cleeve WTW (2 x the pipe volume), 800m (700dia) of replacement pipeline at the end of the Fobney WTW to Tilehurst SR main to increase flow, increased pump capacity at Fobney WTW treated water PS from 18MI/d to 23.88MI/d.
TWU_SWX_HI-TFR_KVZ_ALL_kennet-swox6.7	Kennet Valley to SWOX Transfer - 6.7 MI/d	The works proposed include: treated water pipeline from Pangbourne WTW to Cleeve WTW 9.4km (350dia), a PS at Pangbourne WTW (150kW), balance tank at Cleeve WTW (2 x the pipe volume), 800m (700dia) of replacement pipeline at the end of the Fobney WTW to Tilehurst SR main to increase flow. Increase pump capacity at Fobney WTW treated water PS from 18MI/d to 28.34MI/d.
TWU_SWX_HI-IMP_SWX_CNO_oxc-dukes cutswox	Oxford Canal - Duke's Cut (SWOX) - Construction	A supported conveyance pipeline option from Duke's Cut on the Oxford Canal to the River Thames upstream of the existing Farmoor intake with a 15MI/d capacity. This element includes upgrades to the canal network to transfer 15 MI/d surplus from the Wolverhampton Levels to upstream of Duke's Cut.
TWU.UTC_HI-IMP.UTC_CNO_oxcanal-cropredy	Oxford Canal - Cropredy - Construction	15MI/d resource option for Oxford Canal to the River Thames transfer. Option includes transfer of water to canal at Cropredy for discharge to River Cherwell and subsequent discharge into the River Thames.
TWU_SWX_HI-TFR_SWX_ALL_dukescut-farmoor	Oxford Canal - Transfer from Duke's Cut to Farmoor	15MI/d conveyance option from the Oxford Canal to Farmoor Reservoir, with abstraction from a point approximately 800m north of Duke's Cut on the Oxford Canal, discharging into the River Thames for subsequent re-abstraction at the existing Farmoor Reservoir intake. It has been assumed that, as the transfer will only be used in periods of low flow, no works will be required to upgrade the existing intake structure or treatment facilities at Farmoor Reservoir.
TWU_LON_HI-TFR_LON_ALL_lockwood ps-kgv res	Thames-Lee Tunnel extension from Lockwood PS to King George V Reservoir intake	New connection from Lockwood PS to the intake of KGV reservoir.
TWU_SWX_HI-TFR_HEN_ALL_henley-swox2.4	Henley to SWOX Transfer – 2.4 MI/d	The option is for a new main from New Farm SR (Henley) to Nettlebed Service reservoir (SWOX). This will require a new 5.9km (250dia) main from New Farm to Nettlebed and a new PS at New Farm. 2.4MI/d capacity.
TWU_SWX_HI-TFR_HEN_ALL_henley-swox5	Henley to SWOX Transfer – 5 MI/d	The option is for one new main from New Farm SR (Henley) to Nettlebed SR (SWOX). This will require a new 5.9km, 350mm diameter main from New Farm to Nettlebed and a new PS at New Farm. 5MI/d capacity.
TWU_LON_HI-GRW_RE1_ALL_asrhortonkirby	Manager Aquifer Recharge - Horton Kirby ASR	Construction of pipelines between two existing ASR boreholes in the Lower Greensand aquifer to an existing WTW at Horton Kirby in Kent. Water abstracted from existing Chalk aquifer boreholes (via the mains supply) will be recharged into the two ASR boreholes during periods of water surplus and abstracted when needed and treated at the WTW.
TWU_SWA_HI-GRW_ALL_ALL_datchet do	Groundwater Development - Datchet Existing Source DO Increase	Increase capacity of Datchet site.
TWU_LON_HI-GRW_ALL_ALL_honoroak do	Groundwater Development - Increase DO of Existing Honor Oak Source	Restore Honor Oak well and WTW back into service by refurbishing the treatment works and replacing the pump. This option would utilise the existing license.

Option ID	Option name	Description overview
TWU_HEN_HI-TFR_KVZ_ALL_tw(kv)to(hen)con	Transfer - Kennet Valley to Henley - Conveyance Element	Existing Potable Water Transfer - Thames Water (Kennet Valley) to Thames Water (Henley) Conveyance.
TWU_LON_HI-GRW_ALL_ALL_s'fleet lic disagg	Groundwater Development - Southfleet & Greenhithe	Southfleet-Greenhithe licence disaggregation and new headworks and PS at borehole sites and new 3km main from Greenhithe to new WTW. DO benefit is 8MI/d average, 9MI/d peak.
TWU_LON_HI-GRW_ALL_ALL_addington gw	Groundwater Development - Addington	New abstraction borehole and upgrade to WTW. DO benefit 1MI/d average, 1.5MI/d peak.
TWU_SWX_HI-GRW_ALL_ALL_woods farm do	Groundwater Development - Woods Farm Existing Source Increase DO	New borehole to be constructed on site to bring DO up to licence (this is an additional 2.4MI/d to average licence of 4.99MI/d or an additional 2.91MI/d to peak licence of 5.5MI/d). The option includes a new borehole and a 1.4km raw water pipeline from the new satellite borehole to Woods Farm WTW.
TWU_GUI_HI-TFR_RZ5_ALL_sewtogui	Transfer - SEW to Guildford - Conveyance Element	10MI/d transfer from South East Water (Hogsback) to Mount SR Guildford.
TWU_LON_HI-ROC_WT1_CNO_kemptonwtw100/150/300	New WTW at Kempton - 100MI/d - Construction	100/150/300MI/d new capacity at WTW at Kempton treating raw reservoir water in west London. Purpose is to accommodate additional future demand.
TWU_SWX_HI-GRW_ALL_ALL_moulsford gw	Groundwater Development - Moulsford Groundwater Source	Construction of an abstraction borehole in the unconfined Chalk north of Streatley on the west bank of the River Thames. Water abstracted from the borehole will be treated at the existing Cleeve WTW located on the eastern side of the River Thames. DO benefit is 3.5MI/d peak and 2MI/d average.
TWU_SWA_HI-TFR_SWX_ALL_swoxswa48	Transfer from WTW in Abingdon to SWA - 48MI/d	Abingdon WTW to Long Crendon to supply SWA.
TWU_SWA_HI-TFR_SWX_ALL_swoxswa72	Transfer from WTW in Abingdon to SWA - 72MI/d	Abingdon to north SWA
TWU_SWX_HI-TFR_SWA_ALL_tw(swa)to(swx)con	SWA to SWOX Transfer - Conveyance Element	Existing Potable Water Transfer -from SWA WRZ to SWOX WRZ.
TWU_KVZ_HI-TFR_UTC_ALL_thamestofobney	River Thames to Fobney Transfer	40MI/d raw water transfer option from River Thames to Fobney WTW to supply Kennet Valley WRZ.
TWU_SWX_HI-TFR_STR_ALL_abing-farmoor pipe	Abingdon Reservoir to Farmoor Reservoir pipeline	Construction of a transfer pipeline to convey 24MI/d of raw water between a proposed reservoir at Abingdon and the existing Farmoor reservoir, in the SWOX WRZ. (Note: Abingdon reservoir creation is not part of this option.) The engineering scope includes the provision of a booster pump station at the proposed Abingdon reservoir site to facilitate the transfer. Treatment would be provided at the existing WTW.
TWU_GUI_HI-GRW_ALL_ALL_dapdune lic disagg	Groundwater Development - Dapdune Licence Disaggregation	Licence disaggregation. DO benefit 0MI/d average, 2.2MI/d peak
TWU_KVZ_HI-GRW_ALL_ALL_mortimer recomm	Groundwater Development - Recommission Mortimer Disused Source	Refurbishment of two disused abstraction boreholes located on-site at the existing, but disused Mortimer WTW. Water abstracted from the boreholes will be sourced from the underlying deep confined Chalk and treated at the disused WTW which will be upgraded for ammonia and iron removal and recommissioned. DO benefit 4.5MI/d average and peak.
TWU_LON_HI-TFR_LON_ALL_crossness to beckton	Crossness to Beckton tunnel (treated) - Construction	Transfer of 190MI/d desalinated water to Beckton site via pipeline inside tunnel beneath the Thames.
TWU_LON_HI-TFR_LON_CNO_beckton-crossness	Beckton to Crossness tunnel (raw) - Construction	The estuarine water abstracted from the Thames at the Beckton site is to be conveyed under the River Thames via a tunnel to the Crossness desalination treatment site.
TWU_LON_HI-GRW_ALL_ALL_merton recommission	Groundwater Development - Merton Recommissioning	The option comprises the recommissioning and upgrade of the Merton Abbey WTW in order to treat the maximum peak DO of 8MI/d from the Merton Abbey Well. DO benefit 7.86MI/d peak, 2MI/d average
TWU_LON_HI-REU_RE1_ALL_deephams reuse 46.5	Deephams Reuse – 46.5 MI/d, direct to KGV - Construction	Transfer of Deephams sewage treatment works (STW) final effluent to the new water reuse works with the following technology: pre-screens, ultrafiltration (UF), reverse osmosis (RO), ultraviolet (UV) treatment, inter-process pumping, buildings and disinfection, pH adjustment chemicals. Includes conveyance to KGV.
TWU_KGV_HI-REU_RE1_CNO_deephams reuse 46.5b	Deephams Reuse – 46.5 MI/d, to TLT - Construction	Transfer of Deephams STW final effluent to the new water reuse works with the following technology: pre-screens, UF, RO, UV treatment, inter-process pumping, buildings and disinfection, pH adjustment chemicals. Includes conveyance to TLT extension.
TWU_LON_HI-GRW_ALL_ALL_london conchalk	Groundwater Development - Confined Chalk North London	New abstraction borehole. DO benefit 2MI/d average and peak.
TWU_GUI_HI-TFR_SES_ALL_reigatetoguildford5/20	Transfer - Reigate (SES) to Guildford 20MI/d	Either a 5MI/d or 20MI/d transfer from Reigate (SES) to Guildford.

Option ID	Option name	Description overview
TWU_HON_HI-ROC_NET_CNO_cop'mills-honoroak	TWRM extension - Coppermills to Honor Oak - Construction	New ring main tunnel from Coppermills to Honor Oak.
TWU_KVZ_HI-GRW_ALL_ALL_east woodhay roc	Groundwater Development - East Woodhay borehole pumps Removal of Constraints to DO	Upgrade of pumps and pump control to increase DO. DO benefit 2.1MI/d peak, 0 average.
TWU_LON_HI-DES_ALL_ALL_crossnessdesal50/100	Crossness Desalination	Development of a 50MI/d or 100MI/d desalination plant located south of Crossness, using brackish estuarine feedwater from the River Thames. Transfer of treated water to Coppermills WTW for blending.
TWU_LON_HI-GRW_ALL_ALL_addington asr	Managed Aquifer Recharge - Addington	Two new ASR boreholes near Addington PS, and one borehole refurbishment, 300m length of sewer for conditioning discharges, booster recharge pumps due to artesian head pressures in aquifer. DO benefit 3MI/d average, 5MI/d peak.
TWU_LON_HI-GRW_ALL_ALL_honor oak gw	Groundwater Development - Honor Oak	Two new abstraction boreholes, connections to existing WTW, DO benefit 1MI/d average, 2.82MI/d peak.
TWU_LON_HI-GRW_ALL_ALL_streatham ar	Managed Aquifer Recharge - Streatham (SLARS2)	One new ASR borehole at Streatham PS, and one borehole refurbishment, new 17MI/d WTW. DO benefit is 4MI/d average, 4.5MI/d peak.
TWU_LON_HI-GRW_ALL_ALL_thames valley asr	Managed Aquifer Recharge - Thames Valley, South London	Two new ASR boreholes at Ashford WTW, 1km length of sewer for conditioning discharges, booster injection pumps due to artesian head pressures in aquifer. DO benefit 3MI/d average, 5MI/d peak.
TWU_LON_HI-GRW_ALL_CNO_kidbrooke slars	Managed Aquifer Recharge - Kidbrooke (SLARS1) Construction	The scheme comprises the upgrade of the existing borehole at the Rochester Way site, another at the Bromley Reservoir site and the construction of a new AR borehole on private land in Eltham Green. Six observation boreholes will be constructed for groundwater level monitoring, four at the Eltham Green site and two off-site the Eltham Green location. Benefit is 8.1MI/d peak and 7MI/d average. The scheme also includes: construction of a new 10MI/d WTW located on the existing Kidbrooke borehole site to serve the Rochester Way, Bromley Reservoir and a new AR borehole, a 5.7km (300mm) raw water transfer main between Bromley Reservoir and new AR borehole, a 6.4km (400mm) bi-directional raw water transfer main between Rochester Way AR borehole and a new AR borehole via Kidbrooke WTW (3.5km between Rochester Way and Kidbrooke WTW, 2.6km between new borehole and Kidbrooke WTW), a 1.8km (450mm) treated water main between Kidbrooke WTW and Bermondsey (Well Hall PS).
TWU_LON_HI-GRW_ALL_CNO_merton ar	Managed Aquifer Recharge - Merton (SLARS3) Construction	The scheme comprises the upgrade of the existing well and adit system at the Merton Abbey WTW for recharge/abstraction purposes and the construction of a new AR borehole at the nearby Byegrove Road site. DO benefit is 5MI/d average and 6MI/d peak. The scheme also includes the construction of a new 4.5MI/d WTW located at the existing Merton Abbey WTW site to serve the Byegrove Road AR borehole, and the installation of a 1.1km raw water main from the Byegrove Road AR borehole to the new Merton Abbey WTW.
TWU_LON_HI-ROC_NET_ALL_barrowhillpump	Replace pump infrastructure at Barrow Hill - TWRM	Pump 6 at Barrow Hill is to be replaced.
TWU_LON_HI-ROC_WT1_CNO_eastlondonwtw100/150/200/300	New East London WTW	184MI/d treatment works for reservoir water in London. Purpose is to accommodate additional future demand. Water discharged for treatment could result from various option types including wastewater reuse and water transfers. The capex calculations represent a 184MI/d plant. The opex is calculated to represent a 184MI/d opex less the saving associated with discontinuing the treatment of 84MI/d through the slow sand filters, resulting in an opex that corresponds to 100MI/d. There are also 150MI/d, 200MI/d and 300MI/d versions of the option.
TWU_LON_HI-TFR_LON_ALL_ch'ford s intake	Intake Capacity Increase - Chingford South	Increase capacity of Chingford South intake.
TWU_LON_HI-TFR_LON_ALL_datchet int-qm	Intake Capacity Increase - Datchet	Increase capacity of Datchet PS site.
TWU_LON_HI-TFR_LON_ALL_littleton int-qm	Intake Capacity Increase - Queen Mary	Increase capacity of Littleton intake PS site by 300MI/d capacity.
TWU_LON_HI-TFR_LON_ALL_newriverhead pump 4	Replace New River Head Pump - TWRM	Pump 4 at New River Head is to be replaced.
TWU_LON_HI-TFR_LON_CNO_second spine tunnel	Raw Water System Upgrade - Tunnel from Walthamstow 5 to Coppermills - Construction	Second Spine Tunnel from break tank to Reservoir 5 upstream of Coppermills WTW.
TWU_LON_HI-TFR_LON_CNO_surbiton int-walton	Surbiton intake capacity increase with transfer to Walton inlet channel - Construction	Increase capacity of Surbiton intake.
TWU_LON_HI-TFR_LON_CNO_tlt upgrade – roc	Intake Capacity Increase - Chingford South	TLT reinforcement for a section of the tunnel, a new shaft 6m diameter at a depth of 30m and a new air valve.

Option ID	Option name	Description overview
TWU_STR_HI-RSR_RE1_CNO_res_marsh gibbon	New Reservoir - Marsh Gibbon 30Mm3 - Construction	New non-impounding bunded reservoir situated within Oxfordshire, 2km south of Marsh Gibbon with a volume of 30Mm ³ /50Mm ³ /70Mm ³ .
TWU_SWA_HI-GRW_ALL_ALL_dorney do	Groundwater Development - Dorney Existing Source DO Increase	Drilling of one new borehole and provision of two new submersible pumps (two per borehole) to increase the overall site capacity up to the source DO. DO benefit 4.3MI/d (peak). 300m pipeline to connect to existing raw feed pipeline which runs to WTW and 100m run-to-waste pipeline.
TWU_SWA_HI-GRW_ALL_ALL_taplowincreasedo	Groundwater Development - Taplow Existing Source DO Increase	Aims to increase SDO up to licensed quantities. This is expected to bring peak SDO from 44MI/d to 50MI/d. The scope is as follows: increase Taplow to peak licence (50MI/d) by drilling a new chalk abstraction borehole at the Dorney WTW site but added to the Taplow abstraction licence. Adding two pumps, duty/stand-by fitted with variable speed drives (VSDs). 300m rising main and 300m run to waste.
TWU_SWA_HI-ROC_WT1_CNO_medmenhamwtw	New Medmenham Surface Water WTW	24MI/d treatment works for river water near Medmenham (SWA). Purpose is to accommodate additional future demand. Includes a treated water PS, treated water transfer pipeline and new storage reservoir at Widdenton.
TWU_SWA_HI-TFR_HEN_ALL_henley-swa2.4	Henley to SWA Transfer - 2.4 MI/d	The option is for one new main from Sheeplands WTW (Henley) to Hambleden WTW (SWA). This will require a new 9.94km main from Sheeplands WTW and a new PS at Sheeplands. Transfer 2.4MI/d from Sheeplands WTW to Hambleden WTW.
TWU_SWA_HI-TFR_HEN_ALL_henley-swa5	Henley to SWA Transfer – 5 MI/d	The option is for one new main from Sheeplands WTW (Henley) to Hambleden WTW (SWA). This will require a new 9.94km main from Sheeplands WTW and a new PS at Sheeplands. Transfer 5MI/d from Sheeplands WTW to Hambleden WTW.
TWU_SWA_HI-TFR.UTC_ALL_medmenham intake 53/80	New Medmenham Surface Water Intake - 53 MI/d	The Medmenham intake element includes the construction of an intake structure on the River Thames located approximately 1.75km west of the village of Medmenham, close to the village of Mill End. In addition to the intake structure, a PS will be constructed. The intake structure, PS and raw water transfer main would supply water from the River Thames to a new water treatment works at Medmenham. The intake and all associated infrastructure will be constructed with an abstraction capacity of either 53MI/d or 80MI/d.
TWU_SWX_HI-ROC_WT1_ALL_radcotwtw	New WTW - Radcot	24MI/d treatment works for reservoir water in Radcot (SWOX). Purpose is to accommodate additional future demand.
TWU_WLJ_HI-ROC_NET_CNO_twrn shaft kempton	New shaft on the TWRM at Kempton - Construction	This option includes a new shaft on the TWRM to accommodate 800MI/d of treated water flow from the expanded Kempton WTW.
TWU_WLJ_HI-TFR_WLJ_CNO_qm res-kempton wtw	Additional conveyance from Queen Mary Reservoir to Kempton WTW - Construction	New conveyance of raw water from Queen Mary Reservoir to Kempton WTW.
TWU.UTC_HI-RSR_RE1_CNO_res_chinnor_2	New Reservoir - Chinnor 30Mm3 - Construction	New non-impounding bunded reservoir situated within Oxfordshire, 5km southwest of Chinnor with a volume of 30Mm ³ .
TWU_STT_HI-TFR_STT_ALL_stt-sesro	STT to SESRO Link	Potential increase in DO by integrating the Severn to Thames Transfer (STT) pipeline and the Abingdon Reservoir (SESRO) SROs.

Table 5-3: Summary SEA Assessments for Supply Side Options

Options ID	SEA Objectives and Assessment Questions																											
	Biodiversity		Soil		Water						Air		Climatic Factors				Landscape		Historic Environment		Population and Human Health				Material Assets			
	1		2		3		4		5		6		7		8		9		10		11		12		13		14	
	C	O	C	O	C	O	C	O	C	O	C	O	C	O	C	O	C	O	C	O	C	O	C	O	C	O	C	O
Supply Side Options																												
Coppermills WTW - filtration pre-treatment 680MI/d	-1	0	-1	0	-1	0	-1	-1	0	1	-1	0	-1	-1	0	0	-1	0	-1	0	-1	0	-1	0	-1	0	-1	0
Beckton Desalination	-1	0	0	0	-1	-1	0	-1	0	8	-1	0	-1	-8	0	0	-1	-1	-1	0	-1	0	-1	0	-1	0	-1	0
Beckton to Coppermills tunnel (treated) - Construction	-1	0	-1	0	-1	0	-1	-1	0	8	-1	0	-1	-4	0	0	-1	-1	-1	0	-1	0	-1	0	-1	0	-1	0
Transfer - Woodmansterne to Epsom - Resource Element	-1	0	0	0	0	0	-1	0	0	1	-1	0	-1	-1	0	0	-1	0	-1	0	-1	0	-1	0	-1	0	-1	0
Groundwater Development - Ashton Keynes borehole pumps - Removal of Constraints to DO	-1	0	0	0	0	0	-1	-1	0	1	-1	0	-1	-1	0	-1	-1	0	-1	0	-1	0	-1	0	-1	0	-1	0
New River Head - Ground improvements	-1	0	-1	0	0	0	0	0	0	1	-1	0	-1	-1	0	-1	-1	0	-1	0	-1	0	-1	0	-1	0	-1	0
TWRM extension - Hampton to Battersea - Construction	-1	0	-1	0	-1	-1	-1	0	0	8	-1	0	-1	-4	0	0	-1	0	-1	0	-1	0	-1	0	-1	0	-1	0
Kennet Valley to SWOX Transfer - 2.3 MI/d	-1	0	0	0	-1	0	-1	0	0	1	-1	0	-1	-1	0	0	-1	0	-1	0	-1	0	-1	0	-1	0	-1	0
Kennet Valley to SWOX Transfer - 6.7 MI/d	-1	0	0	0	-1	0	-1	0	0	1	-1	0	-1	-1	0	0	-1	0	-1	0	-1	0	-1	0	-1	0	-1	0
Oxford Canal - Duke's Cut (SWOX) - Construction	-1	-1	-1	0	-1	1	0	-1	0	1	-1	0	-1	-1	0	0	1/-1	0	-1	0	-1	0	-1	0	-1	0	-1	0
Oxford Canal - Cropredy - Construction	-1	-1	-1	0	-1	1	0	-1	0	1	-1	0	-1	-1	0	0	1/-1	0	-1	0	-1	0	-1	0	-1	0	-1	0
Oxford Canal - Transfer from Duke's Cut to Farmoor	-1	0	0	0	-1	0	0	-1	0	1	-1	0	-1	-1	0	1	-1	0	-1	0	-1	0	-1	0	-1	0	-1	0
Thames-Lee Tunnel extension from Lockwood PS to King George V Reservoir intake	-1	0	-1	0	-1	0	-1	-1	0	8	-1	0	-1	-1	0	1/-1	-1	0	-1	0	-1	1	-1	0	-1	-1	-1	0
Henley to SWOX Transfer – 2.4 MI/d	-1	-1	0	0	0	0	0	0	0	1	-1	0	-1	-1	0	0	-1	0	-1	0	-1	0	-1	0	-1	-1	-1	0
Henley to SWOX Transfer – 5 MI/d	-1	-1	0	0	0	0	0	0	0	1	-1	0	-1	-1	0	0	-1	0	-1	0	-1	0	-1	0	-1	-1	-1	0
Manager Aquifer Recharge - Horton Kirby ASR	-1	-1	-1	0	-1	0	0	-1	0	1	-1	0	-1	-1	0	1	-1	0	-1	0	-1	0	-1	0	-1	-1	-1	0
Groundwater Development - Datchet Existing Source DO Increase	-1	0	0	0	-1	0	0	-1	0	1	-1	0	-1	-1	0	-1	-1	0	-1	0	-1	0	-1	0	-1	0	-1	0
Groundwater Development - Increase DO of Existing Honor Oak Source	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Options ID	SEA Objectives and Assessment Questions																											
	Biodiversity		Soil		Water						Air		Climatic Factors				Landscape		Historic Environment		Population and Human Health				Material Assets			
	1		2		3		4		5		6		7		8		9		10		11		12		13		14	
	C	O	C	O	C	O	C	O	C	O	C	O	C	O	C	O	C	O	C	O	C	O	C	O	C	O	C	O
Transfer - Kennet Valley to Henley - Conveyance Element	-1	0	-1	0	0	0	-1	-1	0	1	-1	0	-1	-1	0	0	-1	0	-1	0	-1	0	-1	0	-1	-1	-1	0
Groundwater Development - Addington	-1	-1	0	0	0	0	-1	-1	0	1	-1	0	-1	-1	0	-1	-1	0	-1	0	-1	0	0	0	-1	-1	-1	0
Groundwater Development - Woods Farm Existing Source Increase DO	-1	0	-1	0	-1	0	-1	-1	0	1	-1	0	-1	-1	0	-1	-1	0	-1	0	-1	0	-1	0	-1	0	-1	0
Transfer - SEW to Guildford - Conveyance Element	-1	0	0	0	0	0	-1	0	0	1	-1	0	-1	-1	0	0	-1	0	-1	0	-1	0	-1	0	-1	0	-1	0
New WTW at Kempton - 100MI/d - Construction	-1	0	0	0	-1	0	-1	0	0	8	-1	0	-1	-4	0	0	-1	0	-1	0	-1	0	0	0	-1	0	-1	0
Groundwater Development - Moultsford Groundwater Source	-1	0	0	0	-1	0	-1	-1	0	1	-1	-1	-1	-1	0	-1	-1	0	-1	0	-1	0	-1	0	-1	-1	-1	0
Transfer from WTW in Abingdon to SWA - 48MI/d	-1	0	-1	0	-1	0	-1	0	0	4	-1	0	-1	-1	0	0	-1	0	-1	0	-1	0	-1	0	-1	0	-1	0
SWOX WRZ to SWA (Slough, Wycombe and Aylesbury) WRZ (Abingdon WTW to Long Crendon to supply SWA)	-1	0	-1	0	-1	0	-1	0	0	8	-1	0	-1	-1	0	0	-1	0	-1	0	-1	0	-1	0	-1	0	-1	0
SWA to SWOX Transfer - Conveyance Element	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
River Thames to Fobney Transfer	-1	-1	-1	0	-1	-1	0	-1	0	4	-1	0	-1	-1	0	-1	-1	0	-1	0	-1	0	-1	0	-1	0	-1	0
Abingdon Reservoir to Farmoor Reservoir pipeline	-1	-1	-1	0	-1	0	-1	0	0	1	-1	0	-1	-1	0	0	-1	0	-1	0	-1	0	-1	0	-1	0	-1	0
Groundwater Development - Dapdune Licence Disaggregation	0	-1	0	0	0	0	0	0	0	1	0	0	0	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Groundwater Development - Recommission Mortimer Disused Source	0	0	0	0	0	0	0	0	0	1	0	0	-1	-1	0	-1	0	0	0	0	0	0	0	0	0	-1	0	0
Crossness to Beckton tunnel (treated) - Construction	-1	0	-1	0	-1	0	-1	0	0	8	-1	0	-1	-4	0	0	-1	0	-1	0	-1	0	-1	0	-1	0	-1	0
Beckton to Crossness tunnel (raw) - Construction	-1	0	-1	0	-1	0	-1	0	0	8	-1	0	-1	-4	0	0	-1	0	-1	0	-1	0	-1	0	-1	0	-1	0
Groundwater Development - Merton Recommissioning	-1	0	0	0	0	0	-1	-1	0	1	-1	0	-1	-1	0	0	-1	0	-1	0	-1	0	-1	0	-1	-1	-1	0
Deephams Reuse – 46.5 MI/d, direct to KGV - Construction	-1	0	-1	0	-1	0	0	0	0	4	-1	0	-1	-1	0	0	-1	-1	-1	0	-1	0	-1	0	-1	0	-1	0
Deephams Reuse – 46.5 MI/d, to TLT - Construction	-1	-1	-1	0	-1	0	0	0	0	4	-1	0	-1	-1	0	0	-1	-1	-1	0	-1	0	-1	0	-1	0	-1	0
Groundwater Development - Confined Chalk North London	-1	0	0	0	0	0	-1	-1	0	1	-1	0	-1	-1	0	-1	-1	0	-1	0	-1	0	-1	0	-1	-1	-1	0

Options ID	SEA Objectives and Assessment Questions																											
	Biodiversity		Soil		Water						Air		Climatic Factors				Landscape		Historic Environment		Population and Human Health				Material Assets			
	1		2		3		4		5		6		7		8		9		10		11		12		13		14	
	C	O	C	O	C	O	C	O	C	O	C	O	C	O	C	O	C	O	C	O	C	O	C	O	C	O	C	O
Transfer - Reigate (SES) to Guildford 20MI/d	-1	0	0	0	-1	0	-1	0	0	1	-1	0	-1	-1	0	0	-1	0	-1	0	-1	0	-1	0	-1	-1	-1	0
TWRM extension - Coppermills to Honor Oak - Construction	-1	0	0	0	-1	0	-1	0	0	8	-1	0	-1	-4	0	0	-1	0	-1	0	-1	0	-1	0	-1	0	-1	0
Groundwater Development - East Woodhay borehole pumps Removal of Constraints to DO	-1	0	0	0	0	0	0	0	0	1	0	0	-1	-1	0	0	0	0	0	0	0	0	0	0	0	-1	0	0
Crossness Desalination	-1	0	0	0	-1	-1	0	-1	0	8	-1	0	-1	-8	0	0	-1	-1	-1	0	-1	0	-1	0	-1	0	-1	0
Managed Aquifer Recharge - Addington	-1	0	0	0	0	0	0	-1	0	1	-1	0	-1	-1	0	-1	-1	0	0	0	-1	0	-1	0	-1	0	-1	0
Groundwater Development - Honor Oak	-1	0	-1	0	0	0	-1	-1	0	1	-1	0	-1	-1	0	-1	-1	0	-1	0	-1	0	-1	0	-1	0	-1	0
Managed Aquifer Recharge - Streatham (SLARS2)	-1	0	0	0	0	0	0	0	0	1	-1	0	-1	-1	0	0	-1	-1	-1	0	-1	0	-1	0	-1	0	-1	0
Managed Aquifer Recharge - Thames Valley, South London	-1	0	-1	0	-1	0	0	0	0	1	-1	0	-1	0	0	1/-1	-1	0	-1	0	-1	0	-1	0	-1	-1	-1	0
Managed Aquifer Recharge - Kidbrooke (SLARS1) Construction	-1	0	0	0	-1	0	-1	0	0	1	-1	-1	-1	-1	0	1/-1	-1	-1	-1	0	-1	-1	-1	0	-1	-1	-1	0
Managed Aquifer Recharge - Merton (SLARS3) Construction	-1	0	0	0	-1	0	-1	-1	0	1	-1	0	-1	-1	0	-1	-1	0	-1	0	-1	0	-1	0	-1	0	-1	0
Replace pump infrastructure at Barrow Hill - TWRM	0	0	0	0	0	0	0	0	0	4	0	0	-1	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
New East London WTW	-4	-1	0	0	0	0	-4	0	0	8	-1	0	-1	-8	0	0	-1	0	-1	0	-1	0	-1	0	-1	0	-1	0
Intake Capacity Increase - Chingford South	-1	-8	0	0	-1	0	0	-4	0	8	-1	0	-1	-1	0	0	-1	-1	-1	0	-1	0	-1	0	-1	0	-1	0
Intake Capacity Increase - Datchet	-1	-1	0	0	-1	0	-1	-1	0	4	0	0	-1	-1	0	0	-1	-1	-1	0	-1	0	-1	0	-1	0	-1	0
Intake Capacity Increase - Queen Mary	-1	-1	-1	0	-1	0	-1	-1	0	8	-1	0	-1	-1	0	0	-1	0	-1	0	0	0	-1	0	-1	0	-1	0
Replace New River Head Pump - TWRM	0	0	0	0	0	0	0	0	0	1	-1	-1	-1	-1	0	0	0	0	0	0	0	0	0	0	0	-1	0	0
Raw Water System Upgrade - Tunnel from Walthamstow 5 to Coppermills - Construction	-1	-4	-1	0	-1	0	-1	0	0	8	-1	0	-1	-4	0	0	-1	0	-1	0	-1	0	-1	0	-1	0	-1	0
Surbiton intake capacity increase with transfer to Walton inlet channel - Construction	-1	-4	0	0	-1	-1	-1	-1	0	8	-1	0	-1	0	0	-1	-1	0	-1	0	-1	0	-1	0	-1	0	-1	0
Intake Capacity Increase - Chingford South	-1	-1	0	0	0	0	-1	0	0	8	-1	0	-1	-4	0	0	-1	0	-1	0	-1	0	-1	0	-1	0	-1	0
New Reservoir - Marsh Gibbon 30Mm3 - Construction	-1	4/-4	-1	0	-1	0	-1	-4	0	4	-1	0	-1	-1	0	1/-1	-4	-1	-1	0	-1	0	-1	4	-1	0	-1	0

Options ID	SEA Objectives and Assessment Questions																											
	Biodiversity		Soil		Water						Air		Climatic Factors				Landscape		Historic Environment		Population and Human Health				Material Assets			
	1		2		3		4		5		6		7		8		9		10		11		12		13		14	
	C	O	C	O	C	O	C	O	C	O	C	O	C	O	C	O	C	O	C	O	C	O	C	O	C	O	C	O
Groundwater Development - Dorney Existing Source DO Increase	-1	0	-1	0	-1	0	-1	0	0	1	-1	0	-1	-1	0	-1	-1	0	-1	0	-1	0	-1	0	-1	0	-1	0
Groundwater Development - Taplow Existing Source DO Increase	-1	0	-1	0	0	0	-1	-4	0	1	-1	0	-1	-1	0	-1	-1	0	-1	0	-1	0	-1	0	-1	0	-1	0
New Medmenham Surface Water WTW	-1	0	0	0	0	0	-1	0	0	1	-1	-1	-1	-1	0	1	-1	-1	-1	-1	-1	0	-1	0	-1	0	-1	0
Henley to SWA Transfer - 2.4 MI/d	-1	0	0	0	-1	0	-1	0	0	1	-1	0	-1	-1	0	0	-1	0	-1	0	-1	0	-1	0	-1	0	-1	0
Henley to SWA Transfer – 5 MI/d	-1	0	0	0	-1	0	-1	0	0	1	-1	0	-1	-1	0	0	-1	0	-1	0	-1	0	-1	0	-1	0	-1	0
New Medmenham Surface Water Intake - 53 MI/d	0	-1	0	0	-1	0	-1	-1	0	8	0	0	-1	-1	0	-1	-1	0	-1	0	-1	0	-1	0	-1	0	-1	0
New WTW - Radcot	-1	0	0	0	-1	0	0	0	0	1	-1	0	-1	-1	0	0	-1	-1	-1	-1	-1	0	-1	0	-1	0	-1	0
New shaft on the TWRM at Kempton - Construction	-1	0	0	0	0	0	0	0	0	8	-1	0	-1	-1	0	0	-1	0	-1	0	-1	0	-1	0	-1	0	-1	0
Additional conveyance from Queen Mary Reservoir to Kempton WTW - Construction	-1	0	-1	0	-1	0	-1	0	0	8	-1	0	-1	-1	0	1	-1	0	-1	0	-1	0	-1	0	-1	0	-1	0
New Reservoir - Chinnor 30Mm3 - Construction	-1	4/-4	-1	0	-1	-1	-4	-4	0	4	-1	0	-1	-1	0	1	-1	-1	-1	0	-1	0	-1	4	-1	0	-1	0
STT to SESRO Link	-1	0	0	0	-1	0	0	0	0	1	-1	0	-1	-1	0	0	-1	0	-1	0	-1	0	-1	0	-1	0	-1	0
Transfer from SES WTW to Merton TWRM shaft	-1	0	0	0	-1	0	-1	0	0	4	-1	0	-1	-1	0	0	-1	0	-1	0	-1	0	-1	0	-1	0	-1	0

5.5 Demand Management Options and Drought Options

A description of each of the demand management options and drought options assessed as part of the SEA process is provided in Table below. The drought options include both actions to reduce demand, in the form of temporary use bans (TUBs) and non-essential use bans (NEUBs), as well as supply-side drought permits.

The summary results for each option are presented in Table 5-5 below and the full assessment sheets are available in Annex F (on request as excel files).

The SEA findings can be summarised as follows:

- Demand management options – there are no significant differences between the demand management and media strategies set out for each Thames Water Region. No major negative effects are predicted and there are positive effects for operation, ranging from minor to major depending on the extent of implementation; these are for both biodiversity and water objectives resulting from water being retained within the environment.
- TUBs and NEUBs – the TUBs and NEUBs options resulted in a mix of minor positive operational effects for the biodiversity, water and climatic objectives by retaining water within the environment, while also resulting in minor negative operational effects for the landscape, historic environment, population and human health objectives by reducing water used to maintain landscape and heritage assets, and reducing water use across the community for commercial and tourism purposes.
- Drought Permit options – There a few significant effects envisaged for the drought permit options, although a moderate beneficial effect is predicted on Population and Human Health, as these options maintain public water supply during periods of drought.

Table 5-4: Demand Management Options and Drought Options

ID	Option Name	Description
Demand management options include the following for: Consumption Reduction (High Plus, High, Medium) Leakage Reduction (High Plus, High, Medium) Government Led For water resource zones: Guildford Henley Kennet Valley London SWA SWOX	Demand Management Strategy (DMS)	To determine the likelihood for significant effects of DMSs, groups or 'baskets' of strategies consisting of metering, consumption reduction, and loss reduction techniques were developed and assessed based on three scenarios: Medium, High and High Plus. Each scenario aims to achieve bigger water savings requiring greater inputs to achieve these savings. The Government led scenario sits above the Thames DMOs providing additional benefit.
Media Campaigns - Guildford Media Campaigns - Henley Media Campaigns - Kennet Valley Media Campaigns - London Media Campaigns - SWA Media Campaigns- SWOX	Media	Media campaigns to reduce usage.

ID	Option Name	Description
TUB - Guildford TUB - Henley TUB - Kennet Valley TUB - London TUB - SWA TUB - SWOX	Temporary Use Bans (TUBs)	During a period of drought, powers can be granted to water companies to allow them to impose TUBs restrictions on customers' water use to help to reduce demand. Activities restricted under TUBs can include: <ul style="list-style-type: none"> • Watering a garden using a hosepipe • Cleaning a private motor-vehicle using a hosepipe • Watering plants on domestic or other non-commercial premises using a hosepipe • Cleaning a private leisure boat using a hosepipe • Filling or maintaining a domestic swimming or paddling pool • Drawing water, using a hosepipe, for domestic recreational use • Filling or maintaining a domestic pond using a hosepipe • Filling or maintaining an ornamental fountain • Cleaning walls, or windows, of domestic premises using a hosepipe • Cleaning paths or patios using a hosepipe • Cleaning other artificial outdoor surfaces using a hosepipe
Thames Water: NEUB - Guildford NEUB - Henley NEUB - Kennet Valley NEUB - London NEUB - SWA NEUB - SWOX	Non-Essential Use Bans (NEUBs)	During periods of exceptional / sustained drought, water companies can further increase water restrictions past the TUBs described above. Activities restricted under NEUBs can include: <ul style="list-style-type: none"> • Watering outdoor plants on commercial premises • Filling or maintaining a non-domestic swimming or paddling pool • Filling or maintaining a pond • Cleaning non-domestic premises • Cleaning a window of a non-domestic building • Operating a mechanical vehicle-washer • Cleaning any vehicle, boat, aircraft, or railway rolling stock • Cleaning industrial plant • Suppressing dust • Operating cisterns in any building that is unoccupied or closed
TWU_GUI_RE-DRP_ALL_ALL_dp-shalford-guild	Shalford Drought Permit	Under normal conditions, the abstraction comprises 30Ml/d from the River Wey (licence number 28/39/30/0066, aggregated with abstraction from the Tillingbourne licence 28/39/30/319).

ID	Option Name	Description
		<p>Implementation of the drought permit would involve an increase to the existing surface water abstraction from the River Wey and removing the licence aggregates. The benefit would be 5MI/d. The drought permit may be implemented for up to six consecutive months between May and December inclusive subject to approval, although it could be implemented any time of year. The River Wey is a mainly rural catchment of mixed geology, with baseflow originating from both the Chalk and Lower Greensand aquifers. Shalford WTW treats surface water abstracted from both the River Wey and River Tillingbourne just upstream of their confluence.</p>
TWU_HEN_RE-DRP_ALL_ALL_dp-sheep/harp-hen	Sheeplands/Harpsden Drought Permit	<p>The Harpsden abstraction consists of three boreholes abstracting from the unconfined Chalk aquifer (which is overlain by superficial gravels). The River Thames is located about 750m east of the abstraction, with the settlement Lower Shiplake lying between the river and the abstraction. The abstraction is licenced in aggregate with the Sheeplands abstraction, a group of three boreholes, also abstracting from the Chalk. The Sheeplands boreholes are located 3km south east of Harpsden, on the other side of the River Thames to the Harpsden boreholes. The proposed drought option will be to relax the aggregate condition of the current abstraction licence and increase total abstraction from both locations to 27.9MI/d. Abstraction at Sheeplands will continue to be pumped at 11.4MI/d which is within the boundaries of the normal operating licence. Typically, 10.5MI/d of water is abstracted from the Harpsden boreholes under the normal operating licence, therefore an increase of 6MI/d during drought would be taken, amounting to a total output of 16.5MI/d.</p>
TWU_KVZ_RE-DRP_ALL_ALL_dp-playhatch-kv	Playhatch Drought Permit	<p>The abstraction is located in the South-West Chilterns Chalk groundwater body. It consists of two boreholes abstracting from the Chalk. Normal abstraction is 7.27MI/d for annual average abstraction and 8.2MI/d for peak abstraction. Proposed abstraction is 2.8MI/d to 4.1MI/d, an increase in peak abstraction of existing licence from 8.2MI/d to 12.3MI/d providing a benefit of 4.1MI/d. The drought permit could be implemented at any time of year</p>

ID	Option Name	Description
		subject to approvals, however, it is anticipated to be applied for up to six consecutive months between May and December inclusive. There is no construction phase associated with this drought permit.
TWU_SWX_RE-DRP_ALL_ALL_dp-gatehampton-swox	Gatehampton Drought Permit	Under normal licence conditions water is abstracted from the Cretaceous Chalk aquifer at Gatehampton. The Gatehampton abstraction consists of seven boreholes (four boreholes are within 100m of the River Thames; the other three are approximately 250m from the river). Normal abstraction comprises: the existing abstraction licence (28/39/23/173) permits abstraction from the Chalk aquifer at Gatehampton at a peak day rate of 105MI/d, with an average rate of 95MI/d, and an annual maximum of 3,4770MI/year. The operation of the existing abstraction licence is limited by flow conditions in the River Thames at Caversham Gauging Station. When flows are less than 400MI/d for five days, abstraction must be maintained at or below 101.5MI/d. Proposed abstraction comprises 3.5MI/d, a continuation of abstraction from boreholes beyond licence conditions. This would provide a benefit of 3.5MI/d. There is no construction phase associated with this drought option.

Table 3 : Summary SEA Assessments for Demand Management, Media, NEUB, and TUB options

Options ID	SEA Objectives and Assessment Questions																											
	Biodiversity		Soil		Water				Air		Climatic Factors				Landscape		Historic Environment		Population and Human Health				Material Assets					
	1		2		3		4		5		6		7		8		9		10		11		12		13		14	
	C	O	C	O	C	O	C	O	C	O	C	O	C	O	C	O	C	O	C	O	C	O	C	O	C	O	C	O
Demand Management Options																												
DMO Guildford Consumption – High Plus	0	8	0	0	0	0	0	8	0	8	0	0	-1	1	0	1	-1	1	-1	0	-1	1	0	0	-1	0	-1	0
DMO Guildford Leakage – High Plus																												
DMO Guildford Consumption – High	0	8	0	0	0	0	0	8	0	8	0	0	-1	1	0	1	-1	1	-1	0	-1	1	0	0	-1	0	-1	0
DMO Guildford Leakage – High																												
DMO Guildford Consumption – Medium	0	4	0	0	0	0	0	4	0	4	0	0	-1	1	0	1	-1	1	-1	0	-1	1	0	0	-1	0	-1	0
DMO Guildford Leakage – Medium																												
DMO Guildford – Gov led	0	1	0	0	0	0	0	1	0	1	0	0	-1	1	0	1	-1	1	-1	0	-1	1	0	0	-1	0	-1	0
DMO Henley Consumption – High Plus	0	8	0	0	0	0	0	8	0	8	0	0	-1	1	0	1	-1	1	-1	0	-1	1	0	0	-1	0	-1	0
DMO Henley Leakage – High Plus																												
DMO Henley Consumption – High	0	8	0	0	0	0	0	8	0	8	0	0	-1	1	0	1	-1	1	-1	0	-1	1	0	0	-1	0	-1	0
DMO Henley Leakage – High																												
DMO Henley Consumption – Medium	0	4	0	0	0	0	0	4	0	4	0	0	-1	1	0	1	-1	1	-1	0	-1	1	0	0	-1	0	-1	0
DMO Henley Leakage – Medium																												

Options ID	SEA Objectives and Assessment Questions																												
	Biodiversity		Soil		Water						Air		Climatic Factors				Landscape		Historic Environment		Population and Human Health				Material Assets				
	1		2		3		4		5		6		7		8		9		10		11		12		13		14		
	C	O	C	O	C	O	C	O	C	O	C	O	C	O	C	O	C	O	C	O	C	O	C	O	C	O	C	O	
DMO Henley – Gov led	0	1	0	0	0	0	0	0	1	0	1	0	0	-1	1	0	1	-1	1	-1	0	-1	1	0	0	-1	0	-1	0
DMO KV Consumption – High Plus DMO KV Leakage – High Plus	0	8	0	0	0	0	0	0	8	0	8	0	0	-1	1	0	1	-1	1	-1	0	-1	1	0	0	-1	0	-1	0
DMO KV Consumption – High DMO KV Leakage – High	0	8	0	0	0	0	0	0	8	0	8	0	0	-1	1	0	1	-1	1	-1	0	-1	1	0	0	-1	0	-1	0
DMO KV Consumption – Medium DMO KV Leakage – Medium	0	4	0	0	0	0	0	0	4	0	4	0	0	-1	1	0	1	-1	1	-1	0	-1	1	0	0	-1	0	-1	0
DMO KV – Gov led	0	1	0	0	0	0	0	0	1	0	1	0	0	-1	1	0	1	-1	1	-1	0	-1	1	0	0	-1	0	-1	0
DMO London Consumption – High Plus DMO London Leakage – High Plus	0	8	0	0	0	0	0	0	8	0	8	0	0	-1	1	0	1	-1	1	-1	0	-1	1	0	0	-1	0	-1	0
DMO London Consumption – High DMO London Leakage – High	0	8	0	0	0	0	0	0	8	0	8	0	0	-1	1	0	1	-1	1	-1	0	-1	1	0	0	-1	0	-1	0
DMO London Consumption – Medium DMO London Leakage – Medium	0	4	0	0	0	0	0	0	4	0	4	0	0	-1	1	0	1	-1	1	-1	0	-1	1	0	0	-1	0	-1	0

Options ID	SEA Objectives and Assessment Questions																												
	Biodiversity		Soil		Water						Air		Climatic Factors				Landscape		Historic Environment		Population and Human Health				Material Assets				
	1		2		3		4		5		6		7		8		9		10		11		12		13		14		
	C	O	C	O	C	O	C	O	C	O	C	O	C	O	C	O	C	O	C	O	C	O	C	O	C	O	C	O	
DMO London – Gov led	0	1	0	0	0	0	0	0	1	0	1	0	0	-1	1	0	1	-1	1	-1	0	-1	1	0	0	-1	0	-1	0
DMO SWA Consumption – High Plus DMO SWA Leakage – High Plus	0	8	0	0	0	0	0	0	8	0	8	0	0	-1	1	0	1	-1	1	-1	0	-1	1	0	0	-1	0	-1	0
DMO SWA Consumption – High DMO SWA Leakage – High	0	8	0	0	0	0	0	0	8	0	8	0	0	-1	1	0	1	-1	1	-1	0	-1	1	0	0	-1	0	-1	0
DMO SWA Consumption – Medium DMO SWA Leakage – Medium	0	4	0	0	0	0	0	0	4	0	4	0	0	-1	1	0	1	-1	1	-1	0	-1	1	0	0	-1	0	-1	0
DMO SWA – Gov led	0	1	0	0	0	0	0	0	1	0	1	0	0	-1	1	0	1	-1	1	-1	0	-1	1	0	0	-1	0	-1	0
DMO SWOX Consumption – High Plus DMO SWOX Leakage – High Plus	0	8	0	0	0	0	0	0	8	0	8	0	0	-1	1	0	1	-1	1	-1	0	-1	4	0	0	-1	0	-1	0
DMO SWOX Consumption – High DMO SWOX Leakage – High	0	8	0	0	0	0	0	0	8	0	8	0	0	-1	1	0	1	-1	1	-1	0	-1	1	0	0	-1	0	-1	0
DMO SWOX Consumption – Medium DMO SWOX Leakage – Medium	0	4	0	0	0	0	0	0	4	0	4	0	0	-1	1	0	1	-1	1	-1	0	-1	1	0	0	-1	0	-1	0

Options ID	SEA Objectives and Assessment Questions																												
	Biodiversity		Soil		Water					Air		Climatic Factors				Landscape		Historic Environment		Population and Human Health				Material Assets					
	1		2		3		4		5		6		7		8		9		10		11		12		13		14		
	C	O	C	O	C	O	C	O	C	O	C	O	C	O	C	O	C	O	C	O	C	O	C	O	C	O	C	O	
DMO SWOX – Gov led	0	1	0	0	0	0	0	0	1	0	1	0	0	-1	1	0	1	-1	1	-1	0	-1	1	0	0	-1	0	-1	0
Media Options																													
Media Campaigns - Guildford	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
Media Campaigns - Henley	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
Media Campaigns - Kennet Valley	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
Media Campaigns - London	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
Media Campaigns - SWA	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
Media Campaigns- SWOX	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
Temporary Use Bans																													
TUB - Guildford	0	1	0	1	0	0	0	0	1	0	1	0	0	0	0	1	0	-1	0	0	0	0	-1	0	-1	0	0	0	0
TUB - Henley	0	1	0	1	0	0	0	0	1	0	1	0	0	0	0	1	0	-1	0	0	0	0	-1	0	-1	0	0	0	0
TUB - Kennet Valley	0	1	0	1	0	0	0	0	1	0	1	0	0	0	0	1	0	-1	0	0	0	0	-1	0	-1	0	0	0	0
TUB - London	0	1	0	1	0	0	0	0	1	0	1	0	0	0	0	1	0	-1	0	0	0	0	-1	0	-1	0	0	0	0
TUB - SWA	0	1	0	1	0	0	0	0	1	0	1	0	0	0	0	1	0	-1	0	0	0	0	-1	0	-1	0	0	0	0
TUB - SWOX	0	1	0	1	0	0	0	0	1	0	1	0	0	0	0	1	0	-1	0	0	0	0	-1	0	-1	0	0	0	0
Non-essential Use Bans																													

Options ID	SEA Objectives and Assessment Questions																											
	Biodiversity		Soil		Water						Air		Climatic Factors				Landscape		Historic Environment		Population and Human Health				Material Assets			
	1		2		3		4		5		6		7		8		9		10		11		12		13		14	
	C	O	C	O	C	O	C	O	C	O	C	O	C	O	C	O	C	O	C	O	C	O	C	O	C	O	C	O
NEUB – Guildford	0	1	0	1	0	0	0	1	0	1	0	0	0	0	1	0	-1	0	0	0	-1	0	-1	0	0	0	0	
NEUB – Henley	0	1	0	1	0	0	0	1	0	1	0	0	0	0	1	0	-1	0	0	0	-1	0	-1	0	0	0	0	
NEUB - Kennet Valley	0	1	0	1	0	0	0	1	0	1	0	0	0	0	1	0	-1	0	0	0	-1	0	-1	0	0	0	0	
NEUB – London	0	1	0	1	0	0	0	1	0	1	0	0	0	0	1	0	-1	0	0	0	-1	0	-1	0	0	0	0	
NEUB – SWA	0	1	0	1	0	0	0	1	0	1	0	0	0	0	1	0	-1	0	0	0	-1	0	-1	0	0	0	0	
NEUB – SWOX	0	1	0	1	0	0	0	1	0	1	0	0	0	0	1	0	-1	0	0	0	-1	0	-1	0	0	0	0	
Drought Permit Options																												
Shalford Drought Permit	0	0	0	0	0	0	0	0	0	1	0	0	0	-1	0	-1	0	0	0	0	0	4	0	0	0	0	0	
Sheeplands/Harps den Drought Permit	0	0	0	0	0	0	0	0	0	1	0	0	0	-1	0	-1	0	0	0	0	0	4	0	0	0	0	0	
Playhatch Drought Permit	0	0	0	0	0	0	0	0	0	1	0	-1	0	-1	0	-1	0	0	0	0	0	4	0	0	0	0	0	
Gatehampton Drought Permit	0	0	0	0	0	0	0	0	0	1	0	-1	0	-1	0	-1	0	0	0	0	0	4	0	0	0	0	0	

5.6 Catchment Management Options

A small number of catchment management portfolios have also been assessed as part of the constrained feasible list of options. These portfolios contain a range of strategies to deliver catchment improvements and have been assessed under three separate implementation scenarios which include 'standard', 'upscaled', and 'augmented' implementation.

Similar to the DMO options, there are few differences between the catchment management options. No major negative effects are predicted and there are positive effects for operation, ranging from minor to moderate depending on the extent of implementation. These are for both biodiversity and water objectives resulting from water being retained within the environment. The 'upscaled' and 'augmented' schemes potentially realise greater environmental benefits to water and climate, again due to the retention of water in the environment.

The summary results for each option are presented in Table 5-6 below and the full assessment sheets are available in Annex F (upon request as excel files).

Table 5-6: Catchment Management Options

Options ID	SEA Objectives and Assessment Questions																													
	Biodiversity		Soil		Water				Air		Climatic Factors				Landscape		Historic Environment		Population and Human Health				Material Assets							
	1		2		3		4		5		6		7		8		9		10		11		12		13		14			
	C	O	C	O	C	O	C	O	C	O	C	O	C	O	C	O	C	O	C	O	C	O	C	O	C	O	C	O		
Catchment Options																														
Portfolio 1 (Standard)	-4	4/-4*	-1	1	0	1	-1	4	0	1	0	0	0	0	0	1	-1	1	-1	0	-1	1	-1	1	-1	1	-1	1	-1	0
Portfolio 2 (Upscaled)	-4	0	-1	1	0	4	-1	4	0	4	0	0	0	0	0	4	-1	1	-1	0	-1	1	-1	1	-1	1	-1	1	-1	0
Portfolio 3 (Augmented)	-4	0	-1	1	-1	4	-1	4	0	4	0	0	0	0	0	4	-1	1	-1	0	-1	1	-1	1	-1	1	-1	4	-1	0

*Options that result in both positive (beneficial) and negative (adverse) effects presented 'positive score/negative score'

5.7 Strategic Resource Options

This section presents the summary SEA findings for the Strategic Resource Options (SROs), which comprise the following:

- Severn to River Thames Transfer (STT)
- South East Strategic Reservoir Option (SESRO)
- London Water Recycling (LWR)
- Thames Water to Affinity Water (T2AT)
- Thames Water to Southern Water (T2ST)

Severn to River Thames Transfer (STT)

The text in this section is taken from the Strategic Regional Water Resource Solutions: Annex B4.1: Initial Environmental Appraisal Report Standard Gate Two Submission for River Severn to River Thames Transfer (STT), which is a Gate 2 document.

The Gate 2 SEAs built on the environmental assessment in line with All Company Working Group (ACWG) guidance undertaken at Gate 1.

Biodiversity, flora and fauna

For Biodiversity objective 1.2, moderate positive residual effects were concluded, due to the delivery of biodiversity net gain resulting in benefits to natural capital stocks and ecosystem service provision.

Moderate negative residual effects were identified for Biodiversity objective 1.2 during construction, as a result of loss of degradation of enclosed farmland, woodland and freshwater impacts to natural capital stock and impacts to recreation and wellbeing.

Impact on key habitat areas will be minimised during construction, however effects are likely to remain.

Further information regarding biodiversity STT has been taken from the WRSE Report.

Risks identified relate to the River Clun SAC, the River Usk SAC, the River Wye SAC, the Severn Estuary SAC, SPA and Ramsar, Grafton Lock Meadows SSSI; as well as for protected fish, macroinvertebrate, macrophyte, and phytobenthos communities. The relevant activities and impacts include:

- River Clun SAC: Impacts during operation as a result of the transfer of effluent currently discharged from Minworth WwTW into the River Tame into the River Avon, which has potential to impact on migratory cues (chemical) for migratory species and Atlantic salmon that may affect the number of juvenile salmonids in the watercourse that contribute to the lifecycle of freshwater pearl mussel.
- River Usk and River Wye SAC: Impacts during operation as a result of the transfer of effluent currently discharged from Minworth WwTW into the River Tame into the River Avon, which has potential to impact on migratory cues (chemical) for migratory species.
- Severn Estuary SAC, SPA and Ramsar: Impacts during operation as a result of the transfer of effluent currently discharged from Minworth WwTW into the River Tame into the River Avon, which may have potential to impact on migratory cues (chemical) for

migratory species (in the case of the SAC and Ramsar) and/or on supporting habitats of the Severn Estuary (the latter in the case of the SAC, SPA and Ramsar).

- Grafton Lock Meadows SSSI: Construction of the Deerhurst to Culham (Interconnector) pipeline may cause disruption to groundwater flows/levels as vegetation within the site is driven by groundwater levels (site within 180m of working area). Additional mitigation has been identified in this case and includes pipeline optimisation informed by habitat mapping and condition surveys. Discussions with Natural England are recommended to agree additional mitigation measures.
- Protected species (fish): Impacts during operation as a result of the transfer of effluent currently discharged from Minworth WwTW into the River Tame into the River Avon, which may have potential to impact on migratory cues (chemical) for migratory species of fish within the River Severn and tributaries.
- Macroinvertebrate, macrophyte, and phytobenthos communities: Impacts during operation as a result of the transfer of effluent currently discharged from Minworth WwTW into the River Tame into the River Avon, which may have potential to impact on habitat availability/suitability for macrophytes and macroinvertebrates with a preference for marginal habitats (slow flowing water) within reaches of the River Avon upstream of Alveston.

The ecological data and information used to undertake the HRA at Gate 2 is considered sufficient, however, there is some uncertainty with regards to the current condition of some of the features of the Severn Estuary SAC. The following recommendations for future survey work at Gate 3 have been made due to uncertainties identified during the Gate 2 AA:

- Sufficient physical environment and water quality evidence is available for the Gate 2 assessment. However, there remain gaps in understanding the possible scheme operation: this can be assessed through further scenario modelling using the 1D hydraulic models as the gated process progresses. For example, further model scenarios can be developed to assess alternative STT operating regimes, and cumulative assessments with other water resources options selected by both WRW and WRSE in their respective Regional Plans.
- For the River Severn and Avon environmental water quality model, there are significant missing data, which means that for some sources (rivers and WwTWs), there are no data for certain parameters at all or there are periods of missing data. This includes many of the determinants that are known to be olfactory inhibitors and/or act as endocrine disruptors. Monitoring of these determinants needs to continue at the current monitoring locations to ensure that sufficient data are available to complete further modelling and assessment in Gate 3. In addition, the likely presence of several pesticides at one time and their interactive effects (i.e., additive, antagonistic, or synergistic) requires further investigation at Gate 3.
- It is recommended that the in-channel habitat analysis that has been undertaken for the River Vyrnwy should be undertaken for other locations and reaches. This would generate detailed information on changes in water level, flow and velocities providing greater understanding of the potential effects of the scheme on ecological receptors, allowing more robust conclusions to be reached in terms of changes to habitat availability.
- Further information is also required regarding the proposed advanced treatment processes at the Minworth and Netheridge WwTWs to fully understand the efficacy of

the proposed treatment process and the overall risk to the ecological features of the Severn Estuary European site and associated tributaries.

- As potential functionally linked habitat is present (coastal and floodplain grazing marsh priority habitat) for qualifying birds of the Severn Estuary SPA and Ramsar site at the intake and pipeline route, additional wintering surveys are recommended to determine species presence and movement from feeding and roosting grounds. This will determine if qualifying bird populations present are associated with the Severn Estuary SPA and Ramsar site.
- Fish habitat surveys are also recommended at the outfall location of Vyrnwy Bypass (option 27) to determine if suitable silt beds are present for lamprey ammocoetes.
- Fish habitat surveying (for all the notified migratory species of the SAC) should also be undertaken, along the downstream reach where flows will be significantly elevated, to understand the ecological impact.

Soil

Minor negative residual effects during on the Soil objective were noted during construction, due to the option crossing multiple areas of Grade 2 agricultural land.

The option route should be reviewed to minimise disruption to the best and most versatile agricultural land, however minor negative effects are expected to remain.

Water

Major positive residual effects were concluded for Water objective 3.5 due to the option contributing to a resilient water supply during operation.

Water objectives 3.1 and 3.3 scored minor negative residual effects during construction predominately caused by areas of the option crossing five Main Rivers and being located within Flood Zone 3 and in proximity of existing flood defences.

Minor negative residual effects were also recorded during operation for Water objective 3.3. This was deemed as a result of water quality due to the dilution capacity at low flows. Discharge would be subject to treatment and regulatory permitting of water quality to ensure no effect on WFD status.

Although mitigation to minimise flood risk will be implemented and discharge would be subject to treatment and regulatory permitting of water quality to ensure no effect on WFD, minor negative effects are likely to remain.

Further information regarding water has been taken from the WRSE Environmental Report.

Risks have been identified for several WFD waterbodies, including:

- Operational impacts due to the Minworth WwTW discharge diversion and potential impact on migratory cues (chemical) for migratory fish species within the River Severn and tributaries (potentially affecting six WFD waterbodies).
- Operational impacts resulting from potential pass forward effects into the River Severn from the Minworth WwTW discharge diversion (potentially affecting two WFD waterbodies).
- Operational impacts on habitat availability/suitability for macrophytes and macroinvertebrates with a preference for marginal habitats (slow flowing water) within

reaches of the River Avon upstream of Alveston (potentially affecting three WFD waterbodies). There is potential for changes in environmental water quality, velocity, and depth during scheme operation (potentially affecting five WFD waterbodies).

Air

For the Air objective, minor negative residual effects are predicted due to anticipated HGV movements through urban areas during construction and traffic movements for operational activities.

The use of rail for transporting materials should be considered during construction, however minor effects are likely to remain.

Climate Factors

For Climatic Factors objective 5.1, major positive residual effects during operation were identified, as a result of the option reducing vulnerability to risks associated with climate change, through providing additional water resource and assisting with the reliable transfer of water.

Major negative residual effects were concluded during operation for the Climatic Factors objective 5.2. This is a consequence of the amount of operational carbon required for the option, anticipated to be 58,654tCO₂e/yr.

Mitigation for negative effects is based upon exploring an energy recovery option, nevertheless negative effects are still likely.

Landscape

Moderate negative residual effects for the Landscape objective were identified during construction. This is predominantly due to the option passes through areas of Priority Habitat and Green Belt, and its proximity to ancient woodland and Cotswold Area of Outstanding Natural Beauty (AONB).

Consideration should be given to minimising the extent of construction works within the AONB and near to the viewpoints at any one time, and use of trenchless techniques for pipeline construction. Having said this, minor negative effects will likely remain.

Historic Environment

For the Historic Environment objective, minor negative residual effects during construction were noted. This is in response to the number of heritage assets within 500m of the option, including scheduled monuments, listed buildings and conservation areas.

Refinement of the option alignment and location of construction compounds should be considered in order to minimise effects, however minor negative effects are likely to remain.

Population and Human Health

The Population and Human Health objectives 8.1 and 8.3 scored major positive residual effects, as a result of the option increasing resilience in drinking water supply and providing essential water supply infrastructure during operation.

Moderate positive residual effects were noted for the Population and Human Health objective 8.1 during construction, due to the significant capital investment potential of the option.

Material Assets

Moderate negative residual effects during construction were identified for Materials Assets objective 9.1, due to the use of raw materials and energy required, and the waste generated, from construction.

Waste minimisation measures will be adopted and materials sourced locally where possible, however negative effects are still likely.

Summary and Recommendations

Based on the STT solution assessed at Gate 2, there are no 'showstoppers', or unsurmountable obstacles that mean the scheme is unfeasible due to environmental impacts at this stage. Across all topics, environmental impacts have been avoided or mitigated, with opportunities for enhancements highlighted. Where uncertainty remains, including within the HRA and WFD compliance assessment, a robust plan to address those uncertainties in Gate 3 has been presented. Environmental stakeholders and regulators who have participated in workshops and discussed the assessment results have commented that there is no reason not to progress to Gate 3.

The following studies and information will be gathered through Gate 2:

- The need for better understanding of the distribution of interest features across designated sites, and for habitat and condition surveys.
- The need to improve understanding of hydrological connectivity.
- The need to complete SSSI assessment with detailed design information.
- There is limited data on the proportionate change in load and performance efficacy and operational reliability for the planned treatment processes at Netheridge WwTW and Minworth WwTW, with no cases to date in the UK of reduction performance efficacy and operational reliability for the planned treatment processes.
- Continued need to review the evidence base in relation to endocrine disruptors which may act as olfactory inhibitors.
- Monitoring of determinands that are known to be olfactory inhibitors and/or act as endocrine disruptors to continue at the current monitoring locations to ensure that sufficient data is available to complete further modelling and assessment in Gate 3.
- For some WFD chemicals, there are difficulties with commercially available limits of detection not being sufficiently low compared to EQS values.
- For potential olfactory inhibitors in fish, it is recognised that the commercially available limit of detection may be altogether too high to draw conclusions.
- There is no measured data to inform the risk to weir pool habitats in the River Avon and associated with the physical changes upstream of Alverston.
- Gate 2 hydraulic modelling of the River Thames is of limited reliability, and outcomes have been assessed with low confidence. This may have repercussions for the reliability of water quality modelling in the River Thames. The hydraulic model itself requires further work for use in Gate 3 and further flow scenarios will be required to progress the assessment made at Gate 2.

South East Strategic Reservoir Option (SESRO)

The text in this section is taken from the South East Strategic Reservoir Option (SESRO): Technical Supporting Document B7 SEA, which is a Gate 2 document.

The Gate 2 SEAs built on the environmental assessment in line with All Company Working Group (ACWG) guidance undertaken at Gate 1.

The following discussion summarises the key significant effects identified as part of the SEA of the appraised largest reservoir option, following mitigation. The assessments focus on the largest SESRO option at Gate 2 (i.e. 150 Mm³ as it encompasses the same, and in some cases, greater footprint of each of the other five options, so is precautionary for the smaller reservoir capacity options. It is understood that the concept design elements developed for the largest capacity option for Gate 2 would be adopted for the other smaller options.

The assessment updated the findings of previous regional SEA work undertaken at Gate 1.

Biodiversity

No direct land take for any statutory designated sites is anticipated. However, there is potential for indirect impacts on Barrow Farm Fen Site of Special Scientific Interest (SSSI) during construction due to its location within 0.5km of the indicative location for SESRO. For the three Special Areas of Conservation (SAC) located within 10km, a separate Habitat Regulations Assessment concluded that no likely significant effects upon SAC would occur as a result of the construction or operation.

Impacts on all other SSSI, National and Local Nature Reserves are not anticipated due to distance and absence of downstream hydrological links.

For non-statutory designated sites, the indicative location for SESRO directly overlaps the Cuttings and Hutchin's Copse Local Wildlife Site (LWS). The preferred SESRO option could be designed to avoid or reduce direct impacts to the LWS. This would include siting the new railway siding outside of the LWS. Should the LWS be unavoidably impacted by SESRO, appropriate mitigation proposals would be required.

It is anticipated that notable and protected species may be impacted through the loss of suitable habitat. An ancient woodland survey and ancient woodland indicator species survey would be undertaken to determine which of the woodlands on site and within the zone of influence, are ancient. Appropriate protection measures would be put in place to ensure ancient woodland is retained where reasonably practicable or losses minimised and compensated for through a bespoke mitigation strategy.

An ancient tree within the footprint of the indicative location for SESRO would be unavoidably lost. As the tree is considered to be an 'irreplaceable habitat', the scheme cannot achieve BNG. However, the project would generate meaningful gains for other biodiversity features such as neutral grassland, wet woodland and wetland areas. Compensation for the loss of 'irreplaceable habitats' cannot be provided on a 'like for like' basis that reduces the impact on those habitats to neutral.

Any compensation would need to be proportionate. Bespoke would need to be agreed with Natural England.

Four habitats of principal importance have been recorded in the study area; coastal and floodplain grazing marsh, traditional orchard, wood pasture and parkland and deciduous woodland. Where reasonably practicable these habitats would be retained. Some parcels of habitats would be lost although clearance would be kept to a minimum.

Biodiversity Net Gain calculations indicate that all Reservoir options exceed the required 10% net gain in biodiversity except in relation to the loss of the irreplaceable ancient tree.

Population and Human Health

An update of the Population and Human Health assessment was not conducted at Gate 2 and there are no anticipated changes from the Gate 1 assessment.

At Gate 1, moderate adverse effects were considered likely during construction, owing to losses of residential and commercial properties, roads, solar farms, allotments, and sport facilities. The impacts on local bridleways were considered and measures to both mitigate this impact and go beyond restoration to enhance access and provision is set out in the Gate 2 Report. We will continue to explore these measures as part of the next stages of reservoir development.

During operation, improved recreational value of the site associated with planned water sports facilities and an events centre amongst other improvements contribute to a moderate and major beneficial effect. Increased resilience of water supply associated with the largest option result in a major beneficial effect in terms of the health and wellbeing of customers.

Water

Each of the reservoir options would increase capacity and therefore improve resilience for supply although it is noted that the largest option would have a greater resilience. SESRO would also help reduce abstractions in more vulnerable areas and during times of low flow.

Additional design work undertaken in Gate 2 has significantly reduced the uncertainties around compliance with the WFD for the key water bodies (Cow Common Brook, Portobello Ditch, Childrey Brook and Norbrook at Common Barn). The key waterbodies are currently of poor WFD status, although the Gate 2 assessment indicates that SESRO provides an opportunity to provide significant enhancement of condition and value to both. This is despite a short deterioration of around 6-9 months while habitats recover to the newly enhanced channel form.

Soil

The majority of this land comprises of best and most versatile (BMV) soils. The areas of permanent land take to construct the largest SESRO option would result in permanent loss of this agricultural land, representing a potentially significant adverse effect.

There is potential to encounter unexploded ordnance (UXO) during construction, also presenting a potentially significant adverse effect.

Contamination of surface and groundwater and harm to human health through construction activities causing exposure to, or mobilisation of potential existing contamination accidental spills and mismanagement of solid and liquid wastes may also present potentially significant adverse effects.

There is also potential for sterilisation of mineral resources during construction on or near to sand and gravel resources towards the eastern end of the indicative location for SESRO. Mitigation measures include re-using topsoil and subsoil to improve the quality of agricultural land elsewhere, developing a Soil Management Plan (SMP), clearance of UXO, developing a remediation strategy for any contaminated areas, and further assessment of mineral extraction. Through these measures, significant adverse effects can be avoided.

Air

It is anticipated that there would be no significant air quality effects associated with the operation phase of SESRO. Therefore, the scope of air quality impacts is restricted to the construction phase. The air quality impacts on key sensitive human and ecological receptors (designated sites of nature conservation) have been considered.

The changes in the concentrations of pollutants at these human receptors from emissions from road traffic, plant and machinery is considered to be negligible. However, there is a medium to high risk of dust soiling and a low to medium risk of human health impacts associated with dust emissions.

Hyde's Copse ancient woodland (approximately 550m north of the indicative location for SESRO) and Barrow Farm Fen SSSI (approximately 470m north) are the closest relevant ecological receptors to the scheme. As per IAQM guidance the absence of any relevant ecological sites within 50m of the indicative location for SESRO or within 50m of the route(s) used by construction vehicles up to 500m from the main site exit, means the potential effects of construction dust on ecological sites is not required to be considered further.

Noise

There are four Noise Action Planning Important Areas in or in close proximity to the study area. There is potential for significant effects associated with construction noise. Vibration impacts, both in terms of human response and building damage, during construction also have the potential to be significant. It is anticipated that vibration impacts can be controlled, and significant adverse effects can be avoided, through mitigation. Damage to buildings is considered to be unlikely, and significant effects are not predicted, provided mitigation measures are followed. No significant construction traffic impacts, nor effects from construction rail noise, are anticipated.

In operation, no significant effects are anticipated for road traffic changes. Similarly, significant noise effects from the operation of the pump station would be avoided with appropriate mitigation.

Climate Factors

At Gate 1, it was determined that the ability of the reservoir to release water into rivers during low flow and drought conditions would help reduce the negative impacts of abstraction in more vulnerable areas. This is a moderate beneficial effect during operation. During construction, embodied carbon will be present in the materials used to construct the reservoir. It is anticipated that the enhancement potential for carbon sequestration relative to the existing predominantly arable land cover, will result in an overall neutral effect. As the general footprint and design capacity have not changed since Gate 1 it is anticipated that the construction impacts and operational benefits would remain the same.

An updated Carbon Report was produced, detailing the carbon assessment supporting the Gate 2 submission. Capital carbon emission estimates were produced and were slightly higher for the larger reservoir capacity options, with the phased options being the greatest. The largest 'carbon hotspot' is associated with the embankment works, followed by roads. The assessment of operational carbon concluded the largest operational emissions source would be maintenance activities, followed by indirect emissions associated with grid power consumption. The whole life carbon assessment for the largest SESRO option, 150 Mm³, estimated total emissions at 485,563 tCO₂e. Carbon mitigation opportunities identified include electric/hybrid powered plant, materials reuse, solar panel reuse, low carbon construction materials, hydropower turbines and EV charging provision.

Climate resilience was not considered as, although an appraisal of natural hazard regulation was conducted which assessed the flood regulation benefits provided by woodland and other habitats, drought resilience was not appraised as there is no current guidance yet. It is noted that the principal purpose of SESRO is to improve the resilience of the Thames Water and Affinity Water regions through the creation of a regional storage and transfer hub.

Historic Environment

The indicative location for SESRO lies within a highly sensitive archaeological environment, including locally, regionally and nationally important archaeological remains. Multiple medieval, Romano-British and prehistoric assets are located within the indicative option for SESRO boundary, as well as two Grade II listed buildings. There are 12 Scheduled Monuments, two registered historic parks and gardens, multiple other listed buildings and numerous archaeological assets recorded within the wider area. The largest SESRO option is likely to change the setting of many of these designated and non-designated historic environment assets in the area around it. The scale of the largest SESRO option would require a significant amount of geophysical survey and trial trench investigation to inform future assessment. Archaeological investigation would need to be implemented at the earliest opportunity and carried out in line with a Written Scheme of Investigation agreed with Oxfordshire County Council's archaeological advisory service. On a scheme of this scale, a strategic Written Scheme of Investigation would be required.

Landscape

North Wessex Downs Area of Outstanding Natural Beauty (AONB), Oxford Green Belt, Ancient Woodland, veteran trees, tree preservation orders and biodiversity and cultural heritage designations are located within the landscape. During construction and year one of operation, small adverse impacts on North Wessex Downs AONB are anticipated, reducing to negligible adverse after year 15 of operation. When considering the high sensitivity of the AONB, effects could potentially be significant during construction and year one of operation. It is unlikely that effects on the AONB would be significant in year 15 of operation. Affected Landscape Character Areas may experience negligible to large adverse effects during construction and year one of operation. In year 15 of operation, effects on Landscape Character Areas vary between small beneficial and large adverse.

Material Assets

An update of the Material Assets assessment was not conducted at Gate 2. At Gate 1, moderate adverse effects were anticipated during construction, associated with loss of private

property, agricultural and other businesses including Solar PV farms. In operation, the reservoir presents a significant asset in terms of recreation, water resource, and attracting development and increasing tourism potential in the local and wider area. resulting in moderate beneficial effects.

Cumulative Assessment

A sift of major planning allocations (not already complete or in construction) within a 2km buffer of the indicative location for SESRO was conducted using information from the Vale of White Horse District Council Local Plan (2031). Much of these land allocations were with respect to strategic and additional housing allocations, in addition to land safeguarded for highways improvements. Three of the allocations identified were located directly adjacent to the indicative site for SESRO. This review also considered major planning applications that had planning approved, or were pending approval, within 2km of SESRO that have not yet begun construction. For each of these there is the potential that construction dates may align with the construction period for SESRO. Furthermore, any operational impacts of nearby developments not captured within the baseline assessment for SESRO would need to be considered for their potential to contribute to cumulative effects. From this initial and high-level cumulative assessment sift, specific disciplines and receptors of concern included rail and road noise, setting impacts upon listed buildings and scheduled monuments, landscape impacts upon the Upper Thames Clay Vales NCA, degradation of agricultural land and overlap with existing flood zones.

There were no other Nationally Significant Infrastructure Projects (NSIP) identified within the Zone of Influence.

Taking into consideration the expected commencement of construction and delivery of SESRO expected in the early 2030s, the majority of other developments may have already been completed and there would be no cumulative construction effects.

There are a number of SRO under consideration. The SRO within the Thames Water domain, in addition to SESRO, are:

- London water recycling;
- River Severn to River Thames transfer;
- Thames – Affinity transfer; and
- Thames – Southern transfer.

The cumulative and in combination effects associated with the other SRO would be borne out of the Regional Plans and WRMP identifying when the water resource is anticipated to be needed from each individual scheme. Further cumulative assessment of concurrent SRO and major planning allocations and applications would be further developed at subsequent project stages once the chosen options and designs are established. Other major developments and, in particular, NSIP should also be taken into consideration once designs and programmes are better defined.

Summary and Recommendations

On the whole there are limited changes from the baseline and associated appraisals identified at Gate 1 to the SEA for Gate 2. Each of the reservoir options would provide significant benefit in achieving resilient water supplies for the region though the largest of the options (150Mm³) would go furthest and is attributed Major Beneficial effects.

In SEA terms, the potential for significant adverse effects associated with the 150Mm³ option has been identified with respect to Soils, Landscape and Visual and Material Assets. Many of the significant adverse effects can be addressed through appropriate mitigation.

London Water Recycling (LWR)

The text in this section is taken from London Water Recycling Initial Environmental Appraisal Report Annex B5, which is a Gate 2 document. The options making up London Water Recycling were assessed using a different set of SEA objectives as part of the Gate 2 submission to Rapid; the full SEA spreadsheets are located in Annex F and are available upon request. The summary of the SEAs are provided below.

Beckton Water Recycling

The Beckton Water Recycling scheme involves a significant conveyance route (circa 22.3 km long) transferring water from the treatment plant at Beckton STW to the River Lee Diversion Channel north of the King George V Reservoir. The conveyance route will be constructed in two parts: Beckton Advanced Water Recycling Plant (AWRP) to Lockwood Reservoir Pumping Station and then Lockwood Reservoir Pumping Station to King George V (Thames Lee Tunnel Extension). The multi-disciplinary team has worked to create a design that minimises potential environmental impacts by utilising hardstanding or poorer quality habitats along the conveyance route for shaft locations, and considering construction techniques to minimise traffic on the local road network by removing spoil from the tunnel boring works at the start and end points. The majority of construction related impacts are considered to be mitigatable with best practice measures and in some cases specific additional mitigation measures, the effectiveness of which needs further investigation to Gate 3.

Operationally, flow impacts are limited to circa 600 m of the Enfield Island Loop where there will be major increases in flow and velocities, under very low flow conditions, prior to abstraction. This is in the context of the baseline low flow conditions being non-natural, and the channel being heavily modified (steep banks and limited bed variability). The reductions in Beckton STW final effluent input into the middle Tideway associated with a Beckton Water Recycling scheme (max of 300 Ml/d) would not impact upon the Thames Tideway, which has a significantly larger volume in comparison to the discharge.

Key risks from the Beckton Water Recycling scheme (assuming only embedded mitigation measures are adopted) identified at this appraisal stage, which will require further investigation at Gate 3 and/or additional mitigation, are listed below in order of severity and apply to all Beckton size variants:

- Careful management of construction activities will be required when working at Lockwood Reservoir as this is within the Lee Valley SPA and Ramsar site, requiring a small area of permanent habitat loss. Construction of infrastructure and shaft sites along the Lee Valley Reservoir complex (e.g., Coppermills site) will need to ensure disturbance and habitat degradation is minimised.
- Risk of ground gas is high as the two shaft locations (shafts 4 and 9) and conveyance route intersects three landfills which may require significant mitigation or a re-routing of the conveyance. Further investigation (e.g., Envirocheck report, establish conceptual model, intrusive site-based investigations) required to refine risk.

- Risks from air quality are considered to be significant, however further refinement will be required with modelling work undertaken to identify any exceedances in targets.
- Temporary disruption to community wellbeing (during construction) arising from noise, dust, vibration and traffic.
- Temporary disruption to recreational facilities and impact to landscape and visual amenity where shafts are constructed in, or in close proximity to open land (e.g., Wanstead Flats).
- Potential loss of habitats (including a small amount of priority habitat) and disturbance to a range of protected species at the site of the treatment plant, with further surveys required to determine presence/likely absence.
- Flood risk and potential need for compensation at Beckton AWRP site and River Lee Diversion outfall. Flood risk assessments and drainage strategies required for these sites, and some shaft locations.
- There is the potential for permanent negative effects on the setting of heritage assets, including the Grade II listed building Retort House and King George Pumping Station, at the River Lee Diversion outfall site.
- There is an uncertain impact upon greenhouse gas emission levels during operation, as data for this is currently unavailable.

Mogden Water Recycling

The Mogden Water Recycling scheme requires two sections of conveyance route. One section is trenchless between Mogden STW and the site of the new AWRP near Kempton WTW. This will be one corridor but containing two pipelines: one for final effluent to the AWRP, and the other for reverse osmosis waste stream back to Mogden STW for discharge. The second section of conveyance route takes the recycled water from the AWRP to the discharge location at Walton Bridge. This route will be circa 5.9 km long and will be predominantly open cut trenched, with small sections of trenchless (e.g. under the River Ash).

The key risk associated with this scheme is the use of the potential AWRP site near Kempton WTW for the treatment plant, given the location next to the South West London Waterbodies SPA and Ramsar and its local designation as a Site of Importance for Nature Conservation (SINC), with habitats having potential for protected species on the site. The layout within the site has been devised to minimise habitat loss, however, between Gate 2 and Gate 3, alternative sites for the treatment plant are to be optioneered to ensure that the site with the least environmental, planning and engineering constraints is selected. Due to the built-up nature of the latter section of the conveyance route, approximately 1.4 km of trenching will be required in highways/road network, which is likely to lead to increased disturbance and disruption to local residents. The majority of construction related impacts are considered to be mitigatable with best practice measures and in some cases specific additional mitigation measures. The effectiveness of these needs further investigation to Gate 3.

Operationally, moderate impacts on flows are predicted when compared to the baseline conditions in the River Thames. However, these changes are negligible when considering impacts to water level, depth and average flow velocities. No impacts have been identified on fish pass barrier passability, wetted habitat, water level and suspended sediment concentration in the Thames Tideway.

Key risks from the Mogden Water Recycling scheme (assuming only embedded mitigation is adopted) identified at this appraisal stage, which will require further investigation at Gate 3 and/or additional mitigation, are listed below in order of severity and apply to all Mogden size variants unless otherwise stated:

- Temporary construction, and potential permanent (e.g., lighting, noise) disturbance to the South West London Waterbodies SPA and Ramsar given direct proximity.
- Potential impacts from with the larger scheme size 150 MI/d have been identified in relation to the discharge temperature during rare and infrequent river and effluent temperature conditions. Mitigation in the form of operating procedures that implement cessation of operation during periods of significant temperature difference between the recycled water and the receiving water body when under low river flow conditions may need to be considered further in Gate 3.
- Risks from air quality are considered to be significant, however, further refinement will be required with modelling work undertaken to identify any exceedances in targets.
- Permanent change in character of the immediate area around new AWRP near Kempton WTW and Walton Bridge discharge. Visual amenity changes at Walton Bridge for recreational users of local rights of way, the Thames Path and users of Walton Bridge.
- Loss of habitat and area of a non-statutory designated site of local importance depending on the exact location of the AWRP as well as priority habitats including lowland calcareous grassland and deciduous woodland.
- High levels of traffic movements around the Kempton WTW area where the new AWRP is to be located, potentially on small road network, and when trenching pipeline at Kempton Park and for circa 1.4 km in local highways. Further consideration of the haul routes to be used and exact traffic numbers to be undertaken for Gate 3.
- Majority of sites will need further consideration of flood risk and potential for drainage strategies to reduce surface water runoff.
- Risk of ground gas is high as the two shaft locations and the conveyance routes intersects four landfills for Mogden water recycling scheme. Further investigation (e.g., Envirocheck report, establish conceptual model) is required to refine the risk.
- Potential permanent negative effect upon setting of Rosecraft Gardens Conservation Area.
- There is an uncertain impact upon greenhouse gas emission levels during operation, as data for this is currently unavailable.

Teddington DRA

The Teddington DRA scheme involves the rearrangement of storm tanks at Mogden STW to accommodate a tertiary treatment plant (TTP) to treat a portion of the final effluent. A short conveyance route (circa 4.7 km) is required between Mogden STW and the proposed outfall south of Ham, above Teddington Weir. A new abstraction on the River Thames to the existing Thames Lee Tunnel is proposed circa 140 m upstream of the outfall.

The key risk associated with this scheme relates to the new infrastructure required at the intake and outfall location. The multi-disciplinary team has worked to minimise the environmental impacts of this part of the scheme, by placing the main structures outside the boundaries of the SINCs where possible, noting the River Thames and tidal tributaries SINC extends along the banks of the River Thames where the intake and outfall will be sited, and minimising habitat loss. Further work will be required to Gate 3 around the connections to the Thames Lee Tunnel and

investigating any alternative locations, that would still meet the engineering requirements for the connection. Although new infrastructure is required at Mogden STW, this will be within the existing site boundary rather than occupying a previously undeveloped space.

The majority of construction related impacts are considered to be mitigatable with best practice measures and in some cases specific additional mitigation measures, the effectiveness of which needs further investigation to Gate 3. Operationally, the Teddington DRA scheme may lead to up to moderate reduction in flows when compared to the baseline conditions in the ~250m of the River Thames between the intake and outfall. However, these changes are negligible when considering impacts to water level depth and flow velocities. No impacts have been identified regarding fish pass barrier passability, wetted habitat, water level and suspended sediment concentration in the Thames Tideway.

Key risks from the Teddington DRA scheme (assuming only embedded mitigation is adopted) identified at this appraisal stage, which will require further investigation at Gate 3 and/or additional mitigation, are listed below in order of severity and apply to every Teddington scheme variant unless otherwise stated:

- Conveyance route intersects one landfill site. Further investigation (e.g., Envirocheck report, establish conceptual model) required to refine risk.
- Construction on the Thames Path and Ham Lands, which is in proximity of a number of different recreational assets, impacting upon their community value during construction.
- Potential permitting issues with the larger scheme sizes (150 Ml/d only) have been identified in relation to the discharge temperature during rare and infrequent river and effluent temperature conditions.
- Potential permanent negative effect upon setting and character of Riverside North Conservation Area (intake and outfall location).
- Risks from air quality are considered to be significant, however, further refinement will be required with modelling work undertaken to identify any exceedances in targets.
- Permanent change in the open character of the riverside as a result of the intake structure, with views for the local community and recreational users permanently altered, and will impact on the existing open views of the undeveloped riverside. However, intake and outfall structures are not uncommon across the whole stretch of the River Thames, but the design and landscaping of the area will need careful consideration to Gate 3.
- There is an uncertain impact upon greenhouse gas emission levels during operation, as data for this is currently unavailable.

Thames Water to Affinity Water

The text in this section is taken from Thames to Affinity Transfer, Technical Supporting Document B4, Strategic Environmental Assessment Review, which is a Gate 2 document. Major positive effects have been identified for both options for the SEA objective on delivering reliable and resilient water supplies given the options improve the transfer of water across regions.

Carbon would be generated as a result of construction as well as during operation. The SEA identified minor negative effects associated with carbon emissions during the construction phase and moderate negative effects during the operational phase.

Major negative effects (pre-mitigation) and moderate negative effects (post-mitigation) were identified for biodiversity, flora and fauna for the construction of the Beckton Reuse Indirect Option given the new intake is located within the Chingford Reservoir SSSI. There is potential for effects on international and nationally designated sites, and potential impacts on priority habitat, protected species and woodland for both options during the construction phase.

The HRA ToLS for the Lower Thames Reservoir Option identified potential for uncertain effects on the South West London Waterbodies SPA and Ramsar site therefore HRA Stage 2 AA was undertaken. The AA identified, with appropriate mitigation, there is not likely to be adverse effects on the integrity of these sites, with no residual effects expected. The HRA ToLS for the Beckton Reuse Indirect Option identified the potential for LSE on the Lee Valley SPA and Ramsar site and Wormley Hoddesdonpark Woods SAC as a result of the construction phase and HRA Stage 2 AA was therefore undertaken. The AA identified no adverse effects on the integrity of the sites where appropriate mitigation is implemented with no residual effects expected. The HRA would be reviewed as the design develops and a full assessment undertaken pursuant to the consenting process. Refer to Technical Supporting Document B2, Habitats Regulations Assessment, for further information.

Moderate negative effects (pre-mitigation) and minor negative effects (post-mitigation) were also identified for the construction phase for the SEA objective on soil given the potential for disturbance and permanent loss of agricultural land (Grade 2, 3 and 4 for the Lower Thames Reservoir Option and Grade 3 for the Beckton Reuse Indirect Option). There is potential for both of the options to disturb contaminants given they intersect or are within close proximity to historic and authorised landfill sites. The construction phase of both options also has the potential to cause disruption to built assets and infrastructure therefore moderate negative effects (pre-mitigation) and minor negative effects (post-mitigation) identified.

The options both pass through AQMAs with moderate negative effects (pre-mitigation) and minor negative effects (post-mitigation) identified for the SEA objective on air quality at the construction phase.

Given both options pass through community or recreational facilities, moderate negative effects (pre-mitigation) and minor negative effects (post-mitigation) were identified for both objectives related to population and human health at the construction phase.

For the historic environment objective, moderate negative effects (pre-mitigation) and minor negative effects (post-mitigation) were identified for the Lower Thames Reservoir Option at the construction phase given there is a Grade II listed building within the indicative location of the new WTW.

For the SEA objective on flood risk, the Beckton Reuse Indirect Option is identified to have moderate negative effects (pre-mitigation) and minor negative effects (post-mitigation) for both the construction and operational phases given the locations of elements of the Option within Flood Zone 2 and 3. The Lower Thames Reuse Option is identified to have moderate negative

effects (pre-mitigation) and minor negative effects (post-mitigation) as a result of potential construction related flood risk as it passes through Flood Zones 2 and 3. Minor negative or neutral effects were identified for the remaining SEA objectives.

Mitigation measures to prevent, reduce or off-set adverse environmental effects have been identified as part of the SEA. These measures do not always completely eliminate effects or result in the downgrading of effects, from moderate to minor for example, however they do contribute to reducing the effects identified for the SEA objective. It should be noted that these mitigation measures are indicative at this stage and would be confirmed as the design develops at subsequent project stages; any residual effects are therefore also indicative at this stage.

Thames Water to Southern Water

The text in this section is taken from the Thames to Southern Transfer Technical Supporting Document B4, Strategic Environmental Assessment, which is a Gate 2 document.

The SEA identified that both options (Route B and C) have similar effects for each of the SEA objectives with both options scoring the same against each objective given they follow very similar routes.

Major positive effects (pre mitigation and post mitigation) have been identified for both options (Route B and C) for the SEA objective on delivering reliable and resilient water supplies given the options improve the transfer of water across regions. Minor positive effects (pre mitigation and post mitigation) have been identified for both options (Route B and C) in relation to climate resilience given the options contribute to efficient use of water resources, providing protection against future drought scenarios (and potentially avoids abstractions in more vulnerable areas).

WFD Level 1 Assessments were undertaken for both options (Route B and Route C) and triggered the requirement for WFD Level 2 Assessments. The WFD Level 2 Assessments for both options (Route B and Route C) identified that there are potential effects associated with the construction and operational phases, however these effects can be mitigated and further WFD assessment is therefore not required. Minor negative effects (pre mitigation and post mitigation) were identified for the objective on the water environment for both options (Route B and C).

Carbon will be generated as a result of construction as well as during operation of both Route B and C. For both options (Route B and C), the SEA identified minor negative effects (pre mitigation and post mitigation) associated with carbon emissions during the construction phase and major negative effects (pre mitigation and post mitigation) during the operational phase.

Major negative effects were identified for biodiversity, flora and fauna (pre-mitigation) for both options (Route B and Route C) as a result of the options intersecting international (Natura 2000 sites) and nationally designated sites. Route B is identified to have potential effects on Bere Mill Meadows SSSI whereas Route C does not. Both of the options (Route B and Route C) have the potential to result in impacts on priority habitats and Ancient Woodland. Ancient woodland is classed as 'irreplaceable habitat' and both options (Route B and C) intersect an area of Ancient Woodland. However, Route C is within close proximity (within 15m) to a greater number of Ancient Woodlands compared to Route B. A HRA Stage 1 Screening and Stage 2 Appropriate Assessment has been undertaken (Annex B2) which identified that with appropriate mitigation, no likely significant effects are identified for Natura 2000 and National Site Network sites for

both options (Route B and C alone and in-combination with other projects or plans). The route corridors bisect a Local Wildlife Site and several SSSIs (some of which are GWDTE). Therefore, having potential for direct impact from habitat loss and disturbance. Assuming the routes can be re-routed to avoid these sites and the ancient woodland then residual effects are likely to be reduced, however moderate effects are identified post-mitigation given the uncertainty in baseline data and potential mitigation measures required.

The options (Route B and C) both pass through the North Wessex Downs AONB and the above ground assets are also located within the AONB, as such moderate negative effects for landscape were identified for the construction and operational phases (pre-mitigation). With careful design and screening residual effects (post-mitigation) are likely to be minor. Moderate negative effects were also identified for the construction phase for the SEA objective on soil (pre-mitigation) given both options (Route B and C) have the potential for disturbance on agricultural land (Grade 2 – 5) and there is potential for the options to disturb contaminants given they intersect or are within close proximity to historic and authorised landfill sites. Cliffeville landfill site is within the option corridor for Route B, however it is not within Route C. Given that land will be reinstated, soil management procedures are recommended and best practice to reduce contamination risk is recommended, the residual effects (post-mitigation) are likely to be minor. The construction phase of both options (Route B and C) also have the potential to cause disruption to built assets and infrastructure therefore moderate negative effects were identified pre-mitigation. Use of pipejack or micro tunnel crossings under major roads and motorways and implementation of a CTMP will help reduce effects and therefore minor negative effects are identified for both options (Route B and Route C) post mitigation. Minor negative or neutral effects were identified for the remaining SEA objectives.

Mitigation measures to prevent, reduce or off-set adverse environmental effects were identified as part of the SEA.

6 Assessment of Alternative Plans and rdWRMP24 Decision-Making

6.1 Role of SEA in programme appraisal and decision-making

The options developed by Thames Water have fed directly into the regional planning process for WRSE by providing opportunities to address strategic water resource management issues. WRSE have adopted a best value approach for the regional plans. In the context of water resources planning, this means seeking solutions that not only secure supplies for customers, but also increases the overall benefit to customers, the wider environment and society. An investment model has been used with information on options inputted and different scenarios run to select options based on programmed parameters.

The options selected by the investment modelling for the draft regional plans have then been used to identify the options included in the draft and subsequently revised draft Water Resources Management Plan (WRMP24). In this way, the best value plan approach adopted for the regional planning process has fed directly into the best value plan approach adopted for the emerging WRMP24, as set out in Section 2.2. The collaborative interaction between the two processes has resulted in a streamlined approach to the environmental assessment process, as well as ensured consistency across water company assessments.

6.2 Assessment of Reasonable Alternatives Plans

In line with the WRPG, two alternative plans were developed (selected from hundreds of model runs undertaken) as described in Section 4.4:

- Least Cost Plan
- Best Environment and Societal Plan

Once alternative plan/portfolios of options were chosen, a cumulative effects assessment was undertaken to consider the intra-plan effects (that is, the effects of each selected plan as a whole), as well as its inter-plan effects (that is, the effects of the plan with other plans and programmes).

6.3 Options within Least Cost Plan and Best for Environmental and Social

Table 6-1 presents the selected option in the LCP Situation 4 and BESP Situation 4.

Table 6-1: Selected options within the LCP and BESP Situation 4

Option ID	Least Cost Plan	Best for Environmental and Social
Consumption Reduction Guildford High Basket	✓	✓
Guildford Demand: Gov C+2	✓	✓
Leakage Reduction Guildford High Basket	✓	✓
SouthEast Water to Guildford	✓	✓
Shalford Drought Permit		✓
Media Campaigns - Guildford	✓	✓
NEUB - Guildford	✓	✓
TUB - Guildford	✓	✓
Consumption Reduction Henley High Basket	✓	✓
Henley Demand: Gov C+2	✓	✓
Leakage Reduction Henley High Basket	✓	✓

Option ID	Least Cost Plan	Best for Environmental and Social
Transfer - Kennet Valley to Henley - Conveyance Element		✓
Sheeplands/Harpsden Drought Permit		✓
Media Campaigns - Henley	✓	✓
NEUB - Henley	✓	✓
TUB - Henley	✓	✓
Teddington to Kempton Conveyance Element	✓	✓
Direct River Abstraction - Teddington to Thames Lee Tunnel Shaft 75 MI/dMI/d	✓	✓
Consumption Reduction Kennet Valley High Basket	✓	✓
Kennet Valley Demand: Gov C+2	✓	✓
Leakage Reduction Kennet Valley High Basket	✓	✓
Direct River Abstraction - Teddington to Thames Lee Tunnel Shaft 75 MI/dMI/d	✓	✓
Groundwater Development - Recommission Mortimer Disused Source	✓	✓
T2ST Spur to Kennet Valley - Speen	✓	✓
Playhatch Drought Permit	✓	✓
Media Campaigns - Kennet Valley	✓	✓
NEUB - Kennet Valley	✓	✓
TUB - Kennet Valley	✓	✓
Catchment Portfolio: Darent and Cray	✓	✓
Consumption Reduction London High Basket	✓	✓
Leakage Reduction London High Basket	✓	✓
Groundwater Development - Addington	✓	✓
Groundwater Development - Southfleet & Greenhithe	✓	✓
Available Treatment Capacity at Coppermills WTW	✓	✓
Available Treatment Capacity at West London WTWs	✓	✓
New WTW at Kempton - 100MI/d - Construction	✓	
New shaft on the TWRM at Kempton - Construction	✓	
Replace New River Head Pump - TWRM	✓	
Media Campaigns - London	✓	✓
NEUB - London	✓	✓
TUB - London	✓	✓
New Reservoir - SESRO 150Mm3 - ConstructionMI/d	✓	✓
Consumption Reduction Slough, Wycombe and Aylesbury High Basket	✓	✓
Slough, Wycombe and Aylesbury Demand: Gov C+2	✓	✓
Reservoir Abingdon 75 (Lon) - Construction		✓
Leakage Reduction Slough, Wycombe and Aylesbury High Basket	✓	
Groundwater Development - Datchet Existing Source DO Increase	✓	✓
New Medmenham Surface Water WTW Ph1 - Construction	✓	✓
Thames Water Horspath (SWOX) to Thames Water Ashenden (SWA) Conveyance	✓	✓

Option ID	Least Cost Plan	Best for Environmental and Social
New Medmenham Surface Water Intake - 53 MI/d	✓	✓
Media Campaigns - SWA	✓	✓
NEUB - SWA	✓	✓
TUB - SWA	✓	✓
Consumption Reduction Swindon and Oxfordshire High Basket	✓	✓
Swindon and Oxfordshire Demand: Gov C+2	✓	✓
Leakage Reduction Swindon and Oxfordshire High Basket	✓	✓
Moulsford 1	✓	✓
Groundwater Development - Woods Farm Existing Source Increase DO	✓	✓
Oxford Canal - Duke's Cut (SWOX) - Construction	✓	✓
Henley to SWOX Transfer – 5 MI/d		✓
Abingdon Reservoir to Farmoor Reservoir pipeline	✓	✓
SWA to SWOX Transfer - Conveyance Element	✓	✓
Thames Water Radnage (SWA) to Thames Water Bledlow (SWOX) Conveyance	✓	✓
Thames Water Stokenchurch (SWA) to Thames Water Chinnor (SWOX) Conveyance	✓	✓
Oxford Canal - Transfer from Duke's Cut to Farmoor	✓	✓
DP-Gatehampton-SWOX	✓	✓
Media Campaigns- SWOX	✓	✓
NEUB - SWOX	✓	✓
TUB - SWOX	✓	✓
Teddington Direct River Abstraction (Indirect Water Recycling) 75 MI/d - ConstructionMI/d	✓	✓
Transfer of Treated Effluent from Mogden to Teddington 75MI/d	✓	✓
Beckton Desalination - Phase 1: 100 MI/d - Construction		✓
Groundwater Development - Confined Chalk North London	✓	✓
Groundwater Development - Merton Recommissioning	✓	✓
Managed Aquifer Recharge - Kidbrooke (SLARS1) Construction		✓
Managed Aquifer Recharge - Merton (SLARS3) Construction	✓	✓
Manager Aquifer Recharge - Horton Kirby ASR	✓	✓
Beckton to Coppermills tunnel (treated) - Construction		✓
Cheam to Merton - London Ring Main	✓	✓
Henley to SWOX Transfer – 2.4 MI/d	✓	

6.4 Least Cost Plan SEA Summary

A summary of the SEA scores for the options within the Least Cost Plan is presented below, per SEA assessment objective.

Objective 1: Biodiversity, Flora and Fauna- Protect and enhance biodiversity, priority species, vulnerable habitats and habitat connectivity (no loss and improve connectivity where possible)

Residual Construction +ve	Residual Construction -ve	Residual Operational +ve	Residual Operational -ve
Neutral	Minor	Moderate	Neutral

Plan Summary

Across the LCP there will be minor negative residual construction effects due to disturbance to species and habitats from construction activities, and moderate positive residual effects due to more water being kept in the environment as a result of the 'High' Environmental Destination (a decision to deliver long-term sustainability and environmental resilience) and demand management options.

Option Summary

Minor positive residual effects for operation were identified for the demand management options as they aim to reduce water demand, leaving more water in the environment.

No major residual negative effects have been identified. Abingdon Reservoir identified moderate residual negative effects due to permanent loss of priority habitat, woodland and protected species and habitats for the reservoir footprint. However a programme of planned mitigation measures will be implemented. Several options required HRA AA due to likely significant effects on Habitats Sites. However, the AAs concluded that with appropriate mitigation there would be no adverse effects on site integrity. Several options concluded minor negative effects due to temporary disturbance effects and assuming habitat would be reinstated to its original or better condition following pipeline construction.

A number of options within the Least Cost Plan scored neutral residual operational effects in relation to biodiversity. This is predominately due to implementation of mitigation, including use of clay stanks in pipeline routes where groundwater is potentially encountered and reinstatement of habitat, if possible.

Potential cumulative effects

Groundwater Development - Moulsoford Groundwater Source and Groundwater Development - Woods Farm Existing Source Increase DO have potential for disturbance effects during construction from noise, light and air pollution effects on Lardon Chase SSSI and Holies Down SSSI. Construction periods will not overlap therefore no cumulative effects are anticipated. Merton Recommissioning, and Managed Aquifer Recharge - Merton (SLARS3) Construction are all within 500m of Myrna Close LNR with overlapping construction periods as they components of the same option, there is potential for cumulative effects on the reserve resulting from disturbance effects from construction activities including noise, air and light pollution. However, best practice construction method to reduce noise, light and dust pollution will be implemented to reduce effects.

Oxford Canal - Transfer from Duke's Cut to Farmoor and Oxford Canal - Duke's Cut (SWOX) are in proximity to Pixey and Yarnton Meads SSSI (GWDTE), and Port Meadow with Wolvercote Common & Green SSSI (GWDTE), Port Meadow with Wolvercote Common & Green SSSI (GWDTE) and Hook Meadow and The Trap Grounds SSSI (GWDTE), with overlapping construction periods. There is potential for cumulative effects on designated sites from noise air and light pollution. However, best practice construction method to reduce noise, light and dust pollution will be implemented to reduce effects.

Abingdon Reservoir to Farmoor Reservoir pipeline and New Reservoir - SESRO 150Mm3 - Construction - 283 Ml/d both have potential for indirect construction effects on Frilford Heath, Ponds & Fens (SSSI) (GWDTE) and Barrow Farm Fen (SSSI) (GWDTE), with potential for cumulative effects on the designated sites during construction resulting from light, noise and air pollution. However, best practice construction method to reduce noise, light and dust pollution will be implemented to reduce effects.

The HRA cumulative effect assessment identified no cumulative effects on international designated sites.

Objective 2: Soil

Residual Construction +ve	Residual Construction -ve	Residual Operational +ve	Residual Operational -ve
Neutral	Moderate	Neutral	Neutral

Plan Summary

Across the LCP there will be moderate negative residual construction effects as most options will involve disruption to agricultural land, especially for laying of pipelines. Some agricultural land will be permanently lost but the majority will be reinstated above the pipelines.

Option Summary

The majority of options in the Least Cost Plan scored neutral residual effects during construction and operation, attributed to the reinstatement of soil quality upon completion.

Where options scored minor negative residual operational effects, this was predominantly due to the permanent loss of small areas of Grade 1 or Grade 2 agricultural land.

Moderate negative residual construction effects and minor positive residual operational effects were noted for Abingdon Reservoir. There will be a loss of Grade 2 and 3a agricultural land for the reservoir resulting in negative effects. Minor positive effects may occur for Abingdon Reservoir due to potential to integrate arable farming on reservoir embankments.

Minor positive effects have also been identified as a result of the catchment management portfolio and drought management options. As noted the plan will also likely result in more water being kept in the environment, relevant in potential drought scenarios with potential beneficial effects on soil moisture retainment.

Potential cumulative effects

SESRO (New Reservoir - SESRO 150Mm3 - Construction - 283 MI/d, Groundwater Development - Southfleet & Greenhithe and T2ST intersect grade 2 ACL with potential for cumulative effects of permanent loss of grade 2 ACL. Best practice construction techniques including soil storage and reinstatement will be implemented to reduce loss of soil where possible. Potential minor cumulative effects identified.

Abingdon Reservoir to Farmoor Reservoir pipeline and New Reservoir - SESRO 150Mm3 - Construction- 283 MI/d (Lon only) with overlapping construction periods, intersect the same historic landfill site, with for potential for major cumulative effects of pollution resulting from the potential to disturb buried contaminants. Mitigation will be to avoid directly intersecting landfill sites, either by drilling under the site or routing pipeline around the landfill; therefore post-mitigation cumulative effects are not anticipated.

Objective 3: Increase resilience and reduce flood risk

Residual Construction +ve	Residual Construction -ve	Residual Operational +ve	Residual Operational -ve
Neutral	Minor	Neutral	Neutral

Plan Summary

Across the LCP there will be minor negative residual construction effects associated with works within flood risk areas.

Option Summary

Minor positive residual operational effects for Abingdon reservoir and Oxford Canal to Dukes Cut were identified, due to the proposed reservoir potentially reducing flood risk downstream and the potential for improvements to the canal to increase resilience to flood risk, respectively.

Minor negative residual construction effects were concluded for the majority of the options in the Least Cost Plan. This is as a result of the option locations within Flood Zones 2 or 3, which creates the potential for the increased flood risk. Options which resulted in neutral residual construction effects were not located within Flood Zones 2 or 3 and are not likely to contribute to increased flood risk.

The majority of the options scored neutral residual operational effects, as flood risk is not anticipated to increase once the options are operational.

Potential cumulative effects

Abingdon Reservoir to Farmoor Reservoir pipeline and New Reservoir - SESRO 150Mm3 - Construction- 283 MI/d intersect the same area of flood zone 3 with overlapping construction periods, with potential for cumulative effects on flooding during construction. Flood risk mitigation and management will be applied during the construction phase through the development of a construction environmental management plan, therefore residual cumulative effects resulting from construction are not anticipated.

There is the potential for cumulative effects from the loss of active floodplain, due to the implementation of the LCP. However, there is a national planning requirement for schemes to demonstrate no net loss of floodplain storage and no obstruction to flood flows. This is enforced

during determination of a planning application. Therefore, subject to this requirement being enforced and no net loss of floodplain achieved (e.g. through compensation). LCP options involving predominately or entirely below ground infrastructure are expected to have no operational effect on flood risk.

Objective 4 Protect and enhance the quality of the water environment and water resources

Residual Construction +ve	Residual Construction -ve	Residual Operational +ve	Residual Operational -ve
Neutral	Minor	Moderate	Minor

Plan Summary

Across the LCP there will be minor negative construction effects from potential pollution events, although best practice construction should largely mitigate this. There will be moderate positive residual operational effects from the 'High' Environmental Destination and demand management options resulting in more water being kept in the environment.

Option Summary

The catchment management option and demand management options are anticipated to have positive effects on objective 4 resulting from more water being kept within the environment.

The majority of options within the LCP scored either minor negative residual or neutral residual construction effects in relation to protecting and enhancing the quality of the water environment and water resources. This is predominantly caused by the option being located close to a main river with potential for pollution effects. Several of the options required WFD Level 2 assessment due to effects associated with abstractions and discharges which could change flows and water quality. The WFD Level 2 assessments concluded with applied mitigation that no deterioration is expected to occur; in some cases, further studies will be undertaken to confirm this

Potential cumulative effects

Cheam to Merton - London Ring Main, Groundwater Development - Merton Recommissioning and Merton Aquifer Recharge (SLARS3) - Construction intersect the same SPZ1. New Medmenham Surface Water Intake - 53 MI/d and New Medmenham Surface Water WTW Ph1 - Construction intersect the same SPZ II. Best practice construction techniques will be implemented to prevent risk of pollution; cumulative effects are not anticipated.

The WFD cumulative effects assessment determined the LCP includes options that could lead to additional potential cumulative effects on two additional water bodies to those identified within the BVP situation 4 and changes to cumulative effects in one water body. The cumulative effects assessment has not identified any additional water bodies at increased risk of WFD deterioration due to these combinations of options.

Under the LCP the Thames (Reading to Cookham) water body would feature one less option than under the BVP (Situation 4): Sheeplands/Harpsden Drought Permit. However, as this does not change the outcome of the WFD cumulative effects assessment as set out in the preferred BVP (Situation 4) assessment, it has not been considered further.

A key aim of the LCP (and Situation 4 of each plan) is to achieve the environmental destination, which contributes to the WFD 'Good Ecological Status'. The high DMO options are likely to result in overall moderate beneficial cumulative effects for protecting and enhancing the water environment and water resources during operation. These results are expected with the high implementation of the associated strategies, including metering, consumption reduction, and loss reduction techniques.

Objective 5: Deliver reliable and resilient water supplies

Residual Construction +ve	Residual Construction -ve	Residual Operational +ve	Residual Operational -ve
Neutral	Neutral	Major	Neutral

Plan Summary

Across the LCP there will be major positive effects on the resilience of water supplies to customers due to new sources of water being available, maximising capacity of existing infrastructure, and moving water around the network.

Option Summary

Major positive residual operational effects were identified for options delivering over 50MI/d benefit and moderate residual positive effects for options delivering over 25MI/d benefit within the Least Cost Plan due to the delivery of new water supplies or improving water transfer across regions.

Potential cumulative effects

No construction phase cumulative effects are anticipated for this SEA objective. Major positive cumulative operational effects are anticipated on the resilience of water supplies across the plan.

Objective 6: Reduce and minimise air emissions

Residual Construction +ve	Residual Construction -ve	Residual Operational +ve	Residual Operational -ve
Neutral	Minor	Neutral	Neutral

Plan Summary

Across the LCP there will be minor negative residual construction effects from emissions to the atmosphere from construction activities. Best practice construction methods will be followed, and opportunities to reduce emissions from construction and operation activities further explored as options progress through more detailed design stages.

Option Summary

No residual positive effects were identified.

The majority of options in the Least Cost Plan scored minor negative residual construction effects and neutral residual operational effects for the air objective. This is attributed to the

emissions generated during construction likely decreasing local air quality temporarily and the operation of the options generally being unlikely to contribute to emissions. Having said this, some options identified minor negative residual operational effects due to the option involving ongoing equipment or pumping, which may contribute towards emissions.

Potential cumulative effects

Effects are anticipated to be local and short-term in nature. Where options are intersecting or in proximity to the same Air Quality Management Area (AQMA) with overlapping construction periods it is anticipated that with best practice construction there would be no cumulative effects on this SEA objective during the construction phase. Cumulative effects on air quality during operation are not anticipated.

Objective 7: Reduce embodied and operational carbon emissions

Residual Construction +ve	Residual Construction -ve	Residual Operational +ve	Residual Operational -ve
Neutral	Moderate	Neutral	Moderate

Plan Summary

Across the LCP there will moderate negative residual construction and operational effects due to embodied carbon of materials, emissions from construction and operation including carbon associated with electricity use. Best practice construction methods will be followed, including minimisation of carbon impact, and opportunities to reduce emissions from construction and operation activities further explored as options progress through more detailed design stages.

Option Summary

No residual positive effects were identified.

All the options will generate carbon emissions from construction associated with embodied carbon emission from construction materials, construction related transport and on-site activities. Options such as Abingdon Reservoir and new treatment works such as Kempton are likely to generate larger carbon emissions. However construction of long pipelines also generate emissions. Most options involve pumping stations or other electricity uses and will therefore generate carbon emissions during operation.

Potential cumulative effects

Each of the supply option require built infrastructure to varying degrees. Emissions related to construction activities are local and short-term and are not anticipated to result in cumulative effects. However, whilst the options are spatially, and temporally diverse Embodied carbon associated with the construction of these options will be cumulative. Moderate cumulative effects have been identified.

The options may also have further cumulative adverse effects for carbon sequestration, especially in areas where removal of wetland habitat and deciduous woodland is required. This is expected to be offset to a certain extent by habitat creation to achieve biodiversity net gain for impacted options.

Objective 8 Reduce vulnerability to climate change risks and hazards

Residual Construction +ve	Residual Construction -ve	Residual Operational +ve	Residual Operational -ve
Neutral	Neutral	Moderate	Minor

Plan Summary

Across the LCP there will be moderate positive residual operational effects due to more water being left in the environment through demand management and the 'High' Environmental Destination. There will be minor negative operational effects from abstraction of water, especially during drought conditions.

Option Summary

All options in the Least Cost Plan concluded neutral residual construction effects in relation to reducing vulnerability to climate change risks and hazards.

A small number of options recorded both minor negative and minor positive residual operational effects, due to the fact that groundwater abstraction maybe preferred to surface water abstraction in drought conditions, however this can still affect water table levels and therefore the of the natural environment.

Potential cumulative effects

Moderate positive cumulative effects have been identified for the operational phase of the selected options due to potential cumulative effects of the leakage reductions options, consumption reduction options and TUBs and NEUBs which will have major benefits for water environments as well as resilience of supply in a potential drought scenario.

Objective 9: Landscape Conserve, protect and enhance landscape, townscape and seascape character and visual amenity

Residual Construction +ve	Residual Construction -ve	Residual Operational +ve	Residual Operational -ve
Neutral	Minor	Minor	Minor

Plan Summary

Across the LCP there will be minor negative residual construction effects associated with visual intrusion from construction activities. There will be minor positive residual operational effects from new landscaping and habitat creation, and minor negative residual operational effects from new above ground infrastructure.

Option Summary

Abingdon Reservoir scored major potential residual construction and operation effects due to the visual intrusion of reservoir construction and the change in landscape character which may be visible from the North Wessex Downs AONB. The option also has minor positive benefits during operation associated with providing a new valued landscape.

A number of options in the Least Cost Plan identified minor negative residual construction effects, as a direct result of temporary construction activities, or neutral residual construction effects, due to the options involving no or limited construction works.

Potential cumulative effects

Oxford Canal - Duke's Cut (SWOX), Oxford Canal - Transfer from Duke's Cut to Farmoor and Abingdon Reservoir to Farmoor Reservoir pipeline have potential for temporary cumulative effects to visual amenity within the Upper Thames Clay Vales NCA during overlapping construction periods. Mitigation will include appropriate screening during construction and a Landscape and Ecological management plan (LEMP) for above ground infrastructure.

Groundwater Development - Moulsoford Groundwater Source, Groundwater Development - Woods Farm Existing Source Increase DO, New Medmenham Surface Water WTW Ph1 - Construction, Henley to SWOX Transfer– 2.4 MI/d and New Medmenham Surface Water Intake - 53 MI/d are within Chilterns NCA. Henley to SWOX – 2.4 MI/d, Medmenham WTW Ph1 and Medmenham intake – 53 are also within Chilterns ANOB. Given the distance between the options and minimal above ground infrastructure, cumulative effects are not anticipated.

Groundwater Development - Moulsoford Groundwater Source and Groundwater Development - Woods Farm Existing Source Increase DO are within North Wessex Downs AONB. Given the distance between the options and minimal above ground infrastructure, cumulative effects are not anticipated.

Objective 10: Conserve, protect and enhance the historic environment and heritage assets, including archaeological remains

Residual Construction +ve	Residual Construction -ve	Residual Operational +ve	Residual Operational -ve
Neutral	Minor	Neutral	Neutral

Plan Summary

Across the LCP there will be minor negative residual construction effects from construction activities affecting the setting of heritage assets. Mitigation will be progressed as the design proceeds through further stages.

Option Summary

Moderate negative residual construction effects were identified for Abingdon Reservoir attributed to the proposed reservoir boundary being located immediately adjacent to a listed building, also with potential for effects to the historic setting of the listed building.

The majority of options in the Least Cost Plan scored minor negative residual operational effects in relation to historic environment, due to proximity to heritage assets or impact on heritage setting it is considered that these effects can be mitigated through best practice and heritage protection during construction works.

Potential cumulative effects

There is potential for cumulative effects resulting from construction of Abingdon Reservoir to Farmoor Reservoir pipeline and New Reservoir - SESRO 150Mm3 - Construction - 283 MI/d - residual construction activities have the potential for cumulative effects to both the historic setting of the Scheduled monument: Sutton Wick settlement site and risk of impact to buried archaeological remains, if present. Best practice mitigation measures to be implemented during construction. In operation there are no hydrological effects anticipated and use of sympathetic building materials on surface structures will further help mitigate effects that may impact the setting of heritage assets. Best practice mitigation measures to be implemented during construction, therefore cumulative effects are not anticipated.

Objective 11: Maintain and enhance the health and wellbeing of the local community, including economic and social wellbeing

Residual Construction +ve	Residual Construction -ve	Residual Operational +ve	Residual Operational -ve
Neutral	Minor	Minor	Neutral

Plan Summary

Across the LCP there will be minor negative residual effects during construction due to disruption to community assets but these will be reinstated upon completion. There will be minor positive residual operational effects due to new recreational facilities and an improved environment through habitat creation. In addition it is considered there is the potential for job opportunities both during construction and operation.

Option Summary

A number of options in the Least Cost Plan have identified minor negative residual construction effects because of anticipated disturbance to community facilities. The majority of these assets are along pipeline routes and include assets such as playing fields which can be reinstated on completion of the works. However, Abingdon Reservoir involves the loss of allotments and sports facilities, therefore, moderate negative effects have been identified. Mitigation will likely consist of avoidance where practicable and replacement facilities were appropriate.

NEUB and TUB options concluded minor negative residual operational effects due to potential for restricted use of amenities and potential visual amenity impacts, however, these are only used in drought conditions.

Major positive residual operational effects were concluded for Abingdon Reservoir due to the proposed reservoir creating facilities which may contribute to improved health and wellbeing from recreation.

Potential Cumulative effects

Potential for cumulative disruption effects across communities from construction works, although for the majority of options these are spread out both geographically and within different time periods. Construction timing will be reviewed with regard to minimising impacts as options proceed towards planning.

Objective 12: Maintain and enhance tourism and recreation

Residual Construction +ve	Residual Construction -ve	Residual Operational +ve	Residual Operational -ve
Neutral	Minor	Minor	Neutral

Plan Summary

Across the LCP there will be minor negative residual construction effects from disruption and diversions across footpaths and cycleways affecting recreation. There will be minor positive residual operational effects from potential improvements to recreation through new facilities such as walking and cycling trails and higher quality green space

Option Summary

A number of options in the Least Cost Plan have identified minor negative residual construction effects because of anticipated disturbance to recreational assets such as footpaths or cycleways. The majority of these assets are along pipeline routes which will be reinstated on completion of the works.

Major positive residual operational effects were concluded for Abingdon Reservoir, as community opportunities have been identified, such as coarse game fishing and angling, cycle hire, equestrian Centre and associated bridleways, artists' studio and sculptures, and an increased footpath network.

The majority of options in the Least Cost Plan scored neutral residual operational effects as no changes to tourism and recreation are expected upon operation.

Potential cumulative effects on receptors

Potential for cumulative disruption effects across users of recreational areas such as walking and cycling routes affected by construction works. However, for the majority of options these are spread out both geographically and within different time periods. As option design progresses and proceed towards planning construction timings will be reviewed with regard to minimising impacts.

Objective 13: Minimise resource use and waste production

Residual Construction +ve	Residual Construction -ve	Residual Operational +ve	Residual Operational -ve
Neutral	Moderate	Neutral	Minor

Plan Summary

Across the LCP there will be moderate negative residual construction effects from use of resources and waste generation, and minor negative residual operational effects from maintenance and repairs. Opportunities beyond current best practise for waste minimisation and reuse and further use of recycled materials will be investigated during later design stages in line with our sustainability commitments.

Option Summary

The majority of options in the Least Cost Plan identified minor negative residual construction effects. This is predominately because of use of materials to construction the options, which will be sourced locally where possible.

Potential cumulative effects

Extensive new infrastructure will be required for the implementation of the options within the plan. Major negative cumulative effects have therefore been identified. Material resource use is required for construction and limited definitive opportunities for reuse or recycling of waste materials have been identified at present; this will be investigated further during later design stages in line with our sustainability commitments.

Objective 14: Avoid negative effects on built assets and infrastructure

Residual Construction +ve	Residual Construction -ve	Residual Operational +ve	Residual Operational -ve
Neutral	Minor	Neutral	Neutral

Plan Summary

Across the LCP there will be minor negative residual construction effects from disruption to road users due to diversion during construction.

Option Summary

The majority of options identified minor negative effects during construction from disruption to road users. It was considered that for crossing of motorways, major roads, and railway lines direction drilling will be used where feasible to avoid closures and diversions.

A large number of options in the Least Cost Plan identified neutral residual operational effects in relation to effects on built assets and infrastructure. This is as a result of built assets and infrastructure being reinstated upon option operation.

Potential cumulative effects

Many of the options cross railway lines and major roads and therefore there is likely to be disruption to built assets and infrastructure during the construction phase.

There is potential for in-combination effects on the B4017 and the A145 due to potential overlapping construction activities of Abingdon Reservoir to Farmoor Reservoir pipeline and New Reservoir - SESRO 150Mm³ - Construction - 283 Ml/d (Lon only) – Construction. Mitigation measures will be implemented including a plan wide Traffic Management Plan to minimise disruption and whilst the options are temporally diverse, this could lead to extended disruption over a long period of time.

6.5 Best for Environmental and Social Plan SEA Summary

Objective 1: Biodiversity, Flora and Fauna- Protect and enhance biodiversity, priority species, vulnerable habitats and habitat connectivity (no loss and improve connectivity where possible)

Residual Construction +ve	Residual Construction -ve	Residual Operational +ve	Residual Operational -ve
Neutral	Minor	Moderate	Neutral

Plan Summary

Across the BESP there will be minor negative residual construction effects due to disturbance to species and habitats from construction activities, and moderate positive residual effects due to more water being kept in the environment as a result of the 'High' Environmental Destination (a decision to deliver long-term sustainability and environmental resilience) and demand management options.

Option Summary

Minor positive residual effects for operation were identified for the demand management options as they aim to reduce water demand, leaving more water in the environment.

Major positive residual operational effects on biodiversity were also identified for Abingdon Reservoir due to the creation of aquatic and grassland habitat around the new reservoir.

No major residual negative effects have been identified. Abingdon Reservoir identified potential moderate residual negative effects from construction due to permanent loss of priority habitat, woodland and protected species and habitats for the reservoir footprint.

Several options required HRA AA due to likely significant effects on Habitats Sites. However, the AAs concluded that with appropriate mitigation there would be no adverse effects on site integrity. Several options concluded minor negative effects due to temporary disturbance effects and assuming habitat would be reinstated to its original or better condition following pipeline construction. The BESP includes the Beckton Desalination option which has the potential to cause effects due to abstraction and brine discharge into the Thames Estuary. Modelling was undertaken that demonstrated a low risk for salinity changes and negligible for tidal level and sedimentation. The low risk to twice daily cycles of such salinity variability would be seawards of Beckton at low tide when salinities are in the range of 5 parts per thousand (ppt); and seawards of Tower Bridge at high tide when salinities at Beckton are in the range of 20 ppt, with differences of around 0.3 ppt (seawater is around 35 ppt, river water 0 ppt). Based on this modelling it is considered that changes to salinity and temperature will not have adverse effects on the site integrity of the Thames Estuary and Marshes Ramsar and SPA.

A number of options within the BESP scored neutral residual operational effects in relation to biodiversity. This is predominately due to implementation of mitigation, including use of clay stanks in pipeline routes where groundwater is potentially encountered and reinstatement of habitat, if possible.

Potential cumulative effects

Oxford Canal - Transfer from Duke's Cut to Farmoor and Oxford Canal - Duke's Cut (SWOX) - Construction are in proximity to Pixey and Yarnton Meads SSSI (GWDTE), and Port Meadow with Wolvercote Common & Green SSSI (GWDTE), Port Meadow with Wolvercote Common & Green SSSI (GWDTE) and Hook Meadow and The Trap Grounds SSSI (GWDTE), with overlapping construction periods. Potential for cumulative effects on designated sites from noise air and light pollution. However, best practice construction method to reduce noise, light and dust pollution will be implemented to reduce effects.

Abingdon Reservoir to Farmoor Reservoir pipeline and New Reservoir - SESRO 75Mm3 - Construction both have potential for indirect construction effects on Frilford Heath, Ponds &

Fens (SSSI) (GWDTE) and Barrow Farm Fen (SSSI) (GWDTE), with potential for cumulative effects on the designated sites during construction resulting from light, noise and air pollution. However, best practice construction method to reduce noise, light and dust pollution will be implemented to reduce effects.

Groundwater Development - Merton Recommissioning, and Managed Aquifer Recharge - Merton (SLARS3) Construction are all within 500m of Myrna Close LNR with overlapping construction periods, there is potential for cumulative effects on the reserve resulting from disturbance effects from construction activities including noise, air and light pollution during construction. However, best practice construction method to reduce noise, light and dust pollution will be implemented to reduce effects.

New Medmenham Surface Water WTW Ph1 - Construction and New Medmenham Surface Water Intake - 53 Ml/dare within the same SSSI risk zone and within 2000m of Rodbed Wood-SSSI, with potential for cumulative effects on the site resulting from disturbance effects from construction activities including noise, air and light pollution during construction. However, best practice construction method to reduce noise, light and dust pollution will be implemented to reduce effects.

With best practice construction techniques and a CTMP to be implemented for the above options, cumulative effects are not anticipated.

The HRA cumulative effect assessment identified no cumulative effects on international designated sites.

Objective 2: Protect and enhance the functionality, quantity and quality of soils

Residual Construction +ve	Residual Construction -ve	Residual Operational +ve	Residual Operational -ve
Neutral	Moderate	Neutral	Neutral

Plan Summary

Across the BEP there will be moderate negative residual construction effects as most options will involve disruption to agricultural land, especially for laying of pipelines. Some agricultural land will be permanently lost but the majority will be reinstated above the pipelines.

Option Summary

The majority of options in the BEP scored neutral residual effects during construction and operation, attributed to the reinstatement of soil quality upon completion.

Where options scored minor negative residual operational effects, this was predominantly due to the permanent loss of small areas of Grade 1 or Grade 2 agricultural land.

Moderate negative residual construction effects and minor positive residual operational effects were identified for Abingdon Reservoir. There will be a loss of Grade 2 and 3a agricultural land for the reservoir resulting in negative effects. Minor positive effects may occur due to potential to integrate arable farming on reservoir embankments.

Minor positive effects have also been identified as a result of the catchment management portfolio and drought management options. As noted the plan will also likely result in more water being kept in the environment, relevant in potential drought scenarios with potential beneficial effects on soil moisture retainment.

Potential cumulative effects

New Reservoir - SESRO 75Mm3 - Construction and Groundwater Development - Southfleet & Greenhithe intersects grade 2 ACL with potential for cumulative effects of permanent loss of grade 2 ACL soil. Best practice construction techniques will be implemented to reduce loss of soil where possible.

Abingdon Reservoir to Farmoor Reservoir pipeline and New Reservoir - SESRO 75Mm3 - Construction with overlapping construction periods, intersect the same historic landfill site, with for potential for major cumulative effects of pollution resulting from the potential to disturb buried contaminants. Mitigation will be to avoid directly intersecting landfill sites, either by drilling under the site or routing pipeline around the landfill; therefore post-mitigation cumulative effects are not anticipated.

Objective 3: Increase resilience and reduce flood risk

Residual Construction +ve	Residual Construction -ve	Residual Operational +ve	Residual Operational -ve
Neutral	Minor	Neutral	Neutral

Plan Summary

Across the BEP there will be minor negative residual construction effects associated with works within flood risk areas.

Option Summary

Minor negative residual construction effects were concluded for the majority of the options in the BEP. This is as a result of the option locations within Flood Zones 2 or 3, which creates a flood risk. Options which resulted in neutral residual construction effects were not located within Flood Zones 2 or 3 and are not likely to contribute to increased flood risk.

A majority of the options scored neutral residual operational effects, as flood risk is not anticipated to increase once the options are operational.

Minor positive residual operational effects for Abingdon reservoir and Oxford Canal to Dukes Cut were identified, due to the proposed reservoir potentially reducing flood risk downstream and the potential for improvements to the canal to increase resilience to flood risk, respectively.

Potential cumulative effects

Beckton Desalination and Beckton to Coppermills tunnel (treated) - Construction intersect the same area of flood zone 3 with overlapping construction periods with potential for cumulative effects on flooding during construction. Flood risk mitigation and management will be applied during the construction phase, therefore cumulative effects resulting from construction are not anticipated.

Abingdon Reservoir to Farmoor Reservoir pipeline and New Reservoir - SESRO 75Mm3 - Construction intersect the same area of flood zone 3 with overlapping construction periods, with potential for cumulative effects on flooding during construction. Flood risk mitigation and management will be applied during the construction phase, therefore cumulative effects resulting from construction are not anticipated.

There is therefore the potential for cumulative effects from the loss of active floodplain, due to the implementation of the BESP. However, there is a national planning requirement for schemes to demonstrate no net loss of floodplain storage and no obstruction to flood flows. This is enforced during determination of a planning application. Therefore, subject to this requirement being enforced and no net loss of floodplain achieved (e.g. through compensation). BESP options involving predominately or entirely below ground infrastructure are expected to have no operational effect on flood risk.

Objective 4: Protect and enhance the quality of the water environment and water resources

Residual Construction +ve	Residual Construction -ve	Residual Operational +ve	Residual Operational -ve
Neutral	Minor	Moderate	Minor

Plans Summary

Across the BESP there will be minor negative construction effects from potential pollution events, although best practice construction should largely mitigate this. There will be moderate residual operational effects from the 'High' Environmental Destination and demand management options resulting in more water being kept in the environment.

Option Summary

The catchment management option and demand management options are anticipated to have positive effects on objective 4 resulting from more water being kept within the environment.

A majority of options within the Best for Environment and Social Plan scored either minor negative residual or neutral residual construction effects in relation to protecting and enhancing the quality of the water environment and water resources. This is predominantly caused by the option located close to a main river with potential for pollution effects. Several of the options required WFD Level 2 assessment due to effects associated with abstractions and discharges which could change flows and water quality. The WFD Level 2 assessments concluded no deterioration or that deterioration would be unlikely but further studies were needed to confirm this.

Potential cumulative effects

Cheam to Merton - London Ring Main, Groundwater Development - Merton Recommissioning and Managed Aquifer Recharge - Merton (SLARS3) Construction intersect the same SPZ1 with potential for cumulative effects on the groundwater body during construction for potential pollution from construction of below ground infrastructure. Operational effects are not anticipated. New Medmenham Surface Water Intake - 53 Ml/d and New Medmenham Surface Water WTW Ph1 - Construction are in the same SPZ II. With implementation of best practice construction techniques cumulative effects are not anticipated.

The WFD cumulative assessment determined when compared to the preferred pathway BVP (Situation 4), the BESP includes options that could lead to additional potential cumulative effects on three additional water bodies and changes to cumulative effects in two water bodies. However, the cumulative effects assessment has not identified any additional water bodies at increased risk of WFD deterioration due to these combinations of options.

Under the BESP the Lower Thames Gravels water body would feature fewer options than under the BVP (Situation 4). However, as this does not change the outcome of the WFD cumulative effects assessment as set out in the preferred pathway BVP (Situation 4) assessment, it has not been considered further.

A key aim of the BESP is to achieve the environmental destination, which contributes to the WFD 'Good Ecological Status'. The high DMO options are likely to result in overall major beneficial cumulative effects for protecting and enhancing the water environment and water resources during operation. These results are expected with the high implementation of the associated strategies, including metering, consumption reduction, and loss reduction techniques.

Objective 5: Deliver reliable and resilient water supplies

Residual Construction +ve	Residual Construction -ve	Residual Operational +ve	Residual Operational -ve
Neutral	Neutral	Major	Neutral

Plan Summary

Across the BESP there will be major positive effects on the resilience of water supplies to customers due to new sources of water being available, maximising capacity of existing infrastructure, and moving water around the network.

Option Summary

Major positive residual operational effects were identified for options delivering over 50MI/d benefit and moderate residual positive effects for options delivering over 25MI/d benefit within the BESP due to the delivery of new water supplies or improving water transfer across regions.

Potential cumulative effects

No construction phase cumulative effects are anticipated for this SEA objective. Major positive cumulative effects are anticipated on the resilience of water supplies across the plan.

Objective 6: Reduce and minimise air emissions

Residual Construction +ve	Residual Construction -ve	Residual Operational +ve	Residual Operational -ve
Neutral	Minor	Neutral	Neutral

Plan Summary

Across the BESP there will be minor negative residual construction effects from emissions to the atmosphere from construction activities.

Option Summary

The majority of options in the Best for Environment and Social Plan scored minor negative residual construction effects and neutral residual operational effects for the air objective. This is attributed to the emissions generated during construction likely decreasing the air quality temporarily and the operation of the option unlikely to contribute to emissions.

Having said this, some options identified minor negative residual operational effects due to the option involving ongoing equipment or pumping, which may contribute towards emissions. Best practice construction methods will be followed, and opportunities to reduce emissions from construction and operation activities further explored as options progress through more detailed design stages.

Potential cumulative effects

Groundwater Development - Merton Recommissioning, and Managed Aquifer Recharge - Merton (SLARS3) Construction are within Merton AQMA with overlapping construction periods. Beckton Desalination and Beckton to Coppermills tunnel (treated) - Construction intersects Barking and Dagenham AQMA, with potential for cumulative effects. Effects are anticipated to be local and short-term in nature. Where options are intersecting or in proximity to the same Air Quality Management Area (AQMA) with overlapping construction periods it is anticipated that with best practice construction there would be no cumulative effects on this SEA objective during the construction phase. Cumulative effects on air quality during operation are not anticipated.

Objective 7: Reduce embodied and operational carbon emissions

Residual Construction +ve	Residual Construction -ve	Residual Operational +ve	Residual Operational -ve
Neutral	Moderate	Neutral	Moderate

Plan Summary

Across the BESP there will moderate negative residual construction and operational effects due to embodied carbon of materials, emissions from construction and operation including carbon associated with electricity use.

Option Summary

All the options will generate carbon emissions from construction associated with embodied carbon emission from construction materials, construction related transport and on-site activities. Options such as Abingdon Reservoir, new treatment works such as Kempton and Beckton desalination are likely to generate larger carbon emissions. However, long pipelines also generate emissions. Most options involve pumping stations or other electricity uses and will therefore generate carbon emissions during operation. Desalination plants involve large amount of energy during operation and therefore, Beckton desalination identified major residual negative effects for energy use. Opportunities for increasing the use of renewable energy to supply this option will be further explored as the option is developed through further detailed design. Furthermore, best practice construction methods will be followed, and opportunities to reduce emissions from construction and operation activities further explored as options progress through more detailed design stages. Emissions are expected to be offset to a certain extent by habitat creation to achieve biodiversity net gain for impacted options.

Potential cumulative effects

Each option requires built infrastructure to varying degrees. Emissions related to construction activities are local and short-term and are not anticipated to result in cumulative effects. However, whilst the options are spatially, and temporally diverse Embodied carbon associated with the construction of these options will be cumulative.

The options may also have further cumulative adverse effects for carbon sequestration, especially in areas where removal of wetland habitat and deciduous woodland is required.

Objective 8: Reduce vulnerability to climate change risks and hazards

Residual Construction +ve	Residual Construction -ve	Residual Operational +ve	Residual Operational -ve
Neutral	Neutral	Moderate	Minor

Plan Summary

Across the BESP there will be moderate positive residual operational effects due to more water being left in the environment through demand management and the 'High' Environmental Destination. There will be minor negative operational effects from abstraction of water, especially during drought conditions.

Option Summary

All options in the BESP concluded neutral residual construction effects in relation to reducing vulnerability to climate change risks and hazards.

A small number of options recorded both minor negative and minor positive residual operational effects, due to the fact that groundwater abstraction maybe preferred to surface water abstraction in drought conditions, however this can still affect water table levels and therefore the vulnerability of the natural environment.

Potential cumulative effects

Moderate positive cumulative effects have been identified for the operational phase of selected options due to the potential cumulative effects of the leakage reductions options, consumption reduction options and TUBs and NEUBs which will have major benefits for water environments as well as resilience of supply in a potential drought scenario.

Objective 9: Landscape Conserve, protect and enhance landscape, townscape and seascape character and visual amenity

Residual Construction +ve	Residual Construction -ve	Residual Operational +ve	Residual Operational -ve
Neutral	Minor	Minor	Minor

Plan Summary

Across the BESP there will be minor negative residual construction effects associated with visual intrusion from construction activities. There will be minor positive residual operational effects from new landscaping and habitat creation, and minor negative residual operational effects from new above ground infrastructure.

Option Summary

Abingdon Reservoir scored major negative residual construction and operation effects due to the visual intrusion of reservoir construction and the change in landscape character which may be visible from the North Wessex Downs AONB. The option also has minor positive benefits during operation associated with providing a new valued landscape.

A number of options in the BESP identified minor negative residual construction effects, as a direct result of temporary construction activities, or neutral residual construction effects, due to the options involving no or limited construction works.

Potential cumulative effects

Oxford Canal – Duke's Cut (SWOX) Oxford Canal - Transfer from Duke's Cut to Farmoor and Abingdon Reservoir to Farmoor Reservoir pipeline have potential for temporary cumulative effects to visual amenity within the Upper Thames Clay Vales NCA during overlapping construction periods. Mitigation will include appropriate screening during construction and a Landscape and Ecological management plan (LEMP) for above ground infrastructure.

New Medmenham Surface Water Intake - 53 MI/d and New Medmenham Surface Water WTW Ph1 and Henley to SWOX Transfer – 2.4 MI/d are within Chilterns NCA. Henley to SWOX Transfer – 2.4 MI/d and New Medmenham Surface Water WTW Ph1 - Construction are also within Chilterns ANOB. Given the distance between the options and minimal above ground infrastructure, cumulative effects are not anticipated.

Beckton to Coppermills tunnel (treated) - Construction and Beckton Desalination are located within Greater Thames Estuary NCA. While Beckton Desalination is anticipated to have permanent effects on the landscape these should be minimal as it is adjacent to the existing works, Beckton to Coppermills tunnel (treated) – Construction will have minimal above ground infrastructure, cumulative effects on visual amenity within the area will be limited to the potential overlapping construction period and can be mitigated for by best practice construction.

Objective 10: Conserve, protect and enhance the historic environment and heritage assets, including archaeological remains

Residual Construction +ve	Residual Construction -ve	Residual Operational +ve	Residual Operational -ve
Neutral	Minor	Neutral	Neutral

Plan Summary

Across the BESP there will be minor negative residual construction effects from construction activities affecting the setting of heritage assets.

Option Summary

Moderate negative residual construction effects were identified for Abingdon Reservoir attributed to the proposed reservoir boundary being located immediately adjacent to a listed building, also with potential for effects to the historic setting of the listed building.

The majority of options in the BESP scored minor negative residual operational effects in relation to historic environment, due to proximity to heritage assets or impact on heritage setting being able to be mitigated through best practice and heritage protection during construction works.

Potential cumulative effects

Groundwater Development - Merton Recommissioning and Managed Aquifer Recharge - Merton (SLARS3) Construction may have overlapping construction with potential for construction activities to effect the setting of the scheduled monument: The Augustinian Priory of St Mary at Merton, 271m ENE of Abbey Wall Works. There is also potential for excavation to impact unknown buried archaeological remains. In addition, excavation for a pipeline for option Cheam to Merton - London Ring Main will be constructed under the scheduled monument. Further study is likely required to confirm the potential risks to buried archaeological remains prior to construction will be undertaken, and all legislation and internal standards regarding heritage complied with in the course of carrying out these works should they proceed

There is also potential for cumulative effects resulting from construction of Abingdon Reservoir to Farmoor Reservoir pipeline and New Reservoir - SESRO 75Mm3 - Construction, residual construction activities have the potential for cumulative effects to both the historic setting of the Scheduled monument: Sutton Wick settlement site and risk of impact to buried archaeological remans, if present. Best practice mitigation measures to be implemented during construction. In operation there are no hydrological effects anticipated and use of sympathetic building materials on surface structures will further help mitigate effects that may impact the setting of heritage assets.

Best practice mitigation measures to be implemented during construction, therefore cumulative effects are not anticipated.

Objective 11: Maintain and enhance the health and wellbeing of the local community, including economic and social wellbeing

Residual Construction +ve	Residual Construction -ve	Residual Operational +ve	Residual Operational -ve
Neutral	Minor	Minor	Neutral

Plan Summary

Across the BESP there will be minor negative residual effects during construction due to disruption to community assets but these will be reinstated upon completion. There will be minor positive residual operational effects due to new recreational facilities and an improved environment through habitat creation.

Option Summary

A number of options in the BESP have identified minor negative residual construction effects because of anticipated disturbance to community facilities. The majority of these assets are along pipeline routes and include assets such as playing fields which can be reinstated on completion of the works. However, Abingdon Reservoir involves the loss of allotments and sports facilities, therefore, moderate negative effects have been identified.

NEUB and TUB options concluded minor negative residual operational effects due to potential for restricted use of amenities and potential visual amenity impacts, however, these are only used in drought conditions.

Major positive residual operational effects were concluded for Abingdon Reservoir due to the proposed reservoir creating facilities which may contribute to improved health and wellbeing from recreation.

Potential cumulative effects

Potential for cumulative disruption effects across communities from construction works, although for the majority of options these are spread out both geographically and within different time periods.

Objective 12: Maintain and enhance tourism and recreation

Residual Construction +ve	Residual Construction -ve	Residual Operational +ve	Residual Operational -ve
Neutral	Minor	Minor	Neutral

Plan Summary

Across the BEP there will be minor negative residual construction effects from disruption and diversions across footpaths and cycleways affecting recreation. There will be minor positive residual operational effects from potential improvements to recreation through new facilities such as walks and habitat.

Option Summary

A number of options in the BEP have identified minor negative residual construction effects because of anticipated disturbance to recreational assets such as footpaths or cycleways. The majority of these assets are along pipeline routes which can be reinstated on completion of the works.

Major positive residual operational effects were concluded for New Reservoir - SESRO 75Mm3 - Construction, as community opportunities have been identified, such as coarse game fishing and angling, cycle hire, equestrian Centre and associated bridleways, artists' studio and sculptures, and increased footpath network.

The majority of options in the BEP scored neutral residual operational effects as no changes to tourism and recreation are expected upon operation.

Potential cumulative effects

Potential for cumulative disruption effects across users of recreational areas such as walking and cycling routes affected by construction works. However, for the majority of options these are spread out both geographically and within different time periods.

Objective 13: Minimise resource use and waste production

Residual Construction +ve	Residual Construction -ve	Residual Operational +ve	Residual Operational -ve

Neutral	Moderate	Neutral	Minor
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Plan Summary

Across the BESP there will be moderate negative residual construction effects from use of resources and waste generation, and minor negative residual operational effects from maintenance and repairs.

Option Summary

The majority of options in the BESP identified minor negative residual construction effects. This is predominately because of use of materials to construction the options, which will be sourced locally where possible. Opportunities beyond current best practise for waste minimisation and reuse and further use of recycled materials will be investigated during later design stages in line with our sustainability commitments.

Potential cumulative effects

Extensive new infrastructure will be required for the implementation of the options within the plan. Material resource use is required for construction and limited opportunities for reuse or recycling of waste materials have been identified at present, however this could be investigated further during later design stages.

Objective 14: Avoid negative effects on built assets and infrastructure

Residual Construction +ve	Residual Construction -ve	Residual Operational +ve	Residual Operational -ve
Neutral	Minor	Neutral	Neutral

Plan Summary

Across the BESP there will be minor negative residual construction effects from disruption to road users due to diversion during construction.

Option Summary

The majority of options identified minor negative effects during construction from disruption to road users. It was assumed that for crossing of motorways, major roads, and railway lines direction drilling would be used to avoid closures and diversions.

A large number of options in the BESP identified neutral residual operational effects in relation to effects on built assets and infrastructure. This is as a result of built assets and infrastructure being reinstated upon option operation.

Potential cumulative effects

Many of the options cross railway lines and major roads and therefore there is likely to be disruption to built assets and infrastructure during the construction phase.

There is potential for in-combination effects on the B4017 and the A145 due to potential overlapping construction activities of Abingdon Reservoir to Farmoor Reservoir pipeline and New Reservoir - SESRO 75Mm3 - Construction. Mitigation measures including a plan wide Traffic Management Plan could be implemented to minimise disruption and whilst the options are temporally diverse, this could lead to extended disruption over a long period of time.

6.6 Alternative Plans Summary

This section summarised the effects of the LCP and BESP. A comparison with the BVP is provided in Section 7.3.

The outcomes of the SEA cumulative effects assessment for the LCP are very similar to the BESP and BVP Situation 4 due to similar options being selected.

Compared to the BESP, the LCP contains New WTW at Kempton - 100MI/d additional phase, New River Head Pump - TWRM and New Reservoir - SESRO 150Mm³ - Construction, whilst the BESP contains New Reservoir - SESRO 75Mm³ - Construction, Beckton Desalination, two Drought Permit options, Henley to SWOX Transfer – 5 MI/d and Kidbrooke groundwater option. The majority of these options have minor residual effects and the differences are not likely to significantly affect scores between the two plans. Both plans contain a version of Abingdon Reservoir. The LCP contains New WTW at Kempton - 100MI/d - Construction which is a new WTW and the BESP contain Beckton desalination. However, both of these options will require large material and energy use and on their own do not change the scoring across the plans.

Least Cost Plan

Positive cumulative effects for the SEA objectives on biodiversity, water quality and vulnerability to climate risks were identified due to the inclusion in the LCP of a 'High' Environmental Destination, consumption reduction options, change in level of service to enhance water available for use (WAFU) (i.e. media campaigns, TUBs and NEUBs) and leakage reductions. The cumulative effects of these options will result in more water being kept within the natural environment. Positive cumulative effects were also identified for the SEA objective on delivering reliable and resilient water supply to customers through delivery of new water supply options, increased capacity and improving transfers across the region.

The SEA cumulative effects assessment identified cumulative negative effects for SEA objectives on soil due to cumulative loss of agricultural land, carbon due to construction and operational carbon emissions across the plan, and resource use due to the cumulative effects of materials and resource use and waste production across the plan. We will continue work to identify mitigation for these effects as we develop our options through to detailed design and delivery.

The SEA cumulative effects assessment identified several options with the potential for interactions with the same sensitive receptors. This was largely due to construction effects such as disturbance from noise, air and light pollution from different options where the construction periods overlapped. However, it was concluded that with implementation of best practice construction techniques and a Construction Transport Management Plan, cumulative effects are not anticipated.

Best Environmental and Social Plan

Positive cumulative effects for the SEA objectives on biodiversity, water quality and vulnerability to climate risks were identified due to the inclusion in the BESP of a 'High' Environmental Destination, consumption reduction options, change in level of service to enhance water available

for use (WAFU) (i.e. media campaigns, TUBs and NEUBs) and leakage reductions. The cumulative effects of these options will result in more water being kept within the natural environment. Positive cumulative effects were also identified for the SEA objective on delivering reliable and resilient water supply to customers through delivery of new water supply options, increased capacity and improving transfers across the region.

The SEA cumulative effects assessment identified cumulative negative effects for SEA objectives on soil due to cumulative loss of agricultural land, carbon due to construction and operational carbon emissions across the plan, and resource use due to the cumulative effects of materials and resource use and waste production across the plan. We will continue work to identify mitigation for these effects as we develop our options through to detailed design and delivery. Modelling has been undertaken to demonstrate that changes in salinity and temperature levels in the Thames Estuary from Beckton Desalination are low and will not affect Habitats Sites.

The SEA cumulative effects assessment identified several options with the potential for interactions with the same sensitive receptors. This was largely due to construction effects such as disturbance from noise, air and light pollution from different options where the construction periods overlap. These sensitive receptors included LNRs, SSSI, heritage assets and community assets. However, it was concluded that with implementation of best practice construction techniques and a Construction Transport Management Plan, cumulative effects are not anticipated.

7 Best Value Plan (rdWRMP24)

7.1 Introduction

This Section focuses on cumulative effects of Thames rWRMP24 (Best Value Plan). It sets out the cumulative intra-plan and inter-plan effects, providing a brief summary for each SEA Objective. It also identifies those cumulative inter-plan effects that are specific to the Best Value Plan.

Table 7-1 presents the selected option in the BVP Situation 1, 4 and 8.

Table 7-1: Selected options within the BVP Situation 1, 4 and 8

Option Name	BVP - Sit 1	BVP Sit 4	BVP Sit 8
Consumption Reduction Guildford High Basket	✓	✓	✓
Guildford Demand: Gov C+2	✓	✓	✓
Leakage Reduction Guildford High Basket	✓	✓	✓
SouthEast Water to Guildford	✓	✓	
Shalford Drought Permit		✓	✓
Media Campaigns - Guildford	✓	✓	✓
NEUB - Guildford	✓	✓	
TUB - Guildford	✓	✓	✓
Consumption Reduction Henley High Basket	✓	✓	✓
Henley Demand: Gov C+2	✓	✓	✓
Leakage Reduction Henley High Basket	✓	✓	✓
Transfer - Kennet Valley to Henley - Conveyance Element	✓	✓	
Sheeplands/Harpsden Drought Permit		✓	✓
Media - Henley	✓	✓	✓
NEUB - Henley	✓	✓	✓
TUB - Henley	✓	✓	✓
Teddington to Kempton Conveyance Element	✓	✓	✓
Consumption Reduction Kennet Valley High Basket	✓	✓	✓
Kennet Valley Demand: Gov C+2	✓	✓	✓
Leakage Reduction Kennet Valley High Basket	✓	✓	✓
Direct River Abstraction - Teddington to Thames Lee Tunnel Shaft 75 MLD	✓	✓	✓
Groundwater Development - Recommission Mortimer Disused Source	✓	✓	
Interzonal transfer (T2ST): Kennet Valley spur to Speen (10MI/d)	✓	✓	
Playhatch Drought Permit	✓	✓	✓
Media Campaigns - Kennet Valley	✓	✓	✓
NEUB - Kennet Valley	✓	✓	
TUB - Kennet Valley	✓	✓	✓

Option Name	BVP - Sit 1	BVP Sit 4	BVP Sit 8
Catchment Portfolio: Darent and Cray	✓	✓	
Consumption Reduction London High Basket	✓	✓	✓
London Demand: Gov C+2	✓	✓	✓
Leakage Reduction London High Basket	✓	✓	✓
Groundwater Development - Addington	✓	✓	✓
Groundwater Development - Southfleet & Greenhithe	✓	✓	
Available Treatment Capacity at Coppermills WTW	✓	✓	✓
Available Treatment Capacity at West London WTWs	✓	✓	✓
New WTW at Kempton - 100MI/d - Construction	✓	✓	
New shaft on the TWRM at Kempton - Construction	✓	✓	
Replace New River Head Pump - TWRM	✓	✓	
Media Campaign - London	✓	✓	✓
NEUB - London	✓	✓	✓
TUB - London	✓	✓	✓
New Reservoir - SESRO 150Mm3 - Construction	✓	✓	✓
Consumption Reduction Slough, Wycombe and Aylesbury High Basket	✓	✓	✓
Slough, Wycombe and Aylesbury Demand: Gov C+2	✓	✓	✓
Leakage Reduction Slough, Wycombe and Aylesbury High Basket	✓	✓	✓
Groundwater Development - Datchet Existing Source DO Increase	✓	✓	
New Medmenham Surface Water WTW Ph1 - Construction	✓	✓	
Thames Water Horspath (SWOX) to Thames Water Ashenden (SWA) Conveyance	✓	✓	
New Medmenham Surface Water Intake - 53 MI/d	✓	✓	
Media Campaigns - SWA	✓	✓	✓
NEUB - SWA	✓	✓	
TUB - SWA	✓	✓	✓
Consumption Reduction Swindon and Oxfordshire High Basket	✓	✓	✓
Swindon and Oxfordshire Demand: Gov C+2	✓	✓	✓
Leakage Reduction Swindon and Oxfordshire High Basket	✓	✓	✓
Groundwater Development - Moulsoford Groundwater Source	✓	✓	✓
Groundwater Development - Woods Farm Existing Source Increase DO	✓	✓	
Oxford Canal - Duke's Cut (SWOX) - Construction	✓	✓	

Option Name	BVP - Sit 1	BVP Sit 4	BVP Sit 8
Henley to SWOX Transfer – 5 MI/d		✓	
Henley to SWOX 2.4 ML/d	✓		
Abingdon Reservoir to Farmoor Reservoir pipeline	✓	✓	
SWA to SWOX Transfer - Conveyance Element	✓	✓	✓
Thames Water Radnage (SWA) to Thames Water Bledlow (SWOX) Conveyance	✓	✓	✓
Thames Water Stokenchurch (SWA) to Thames Water Chinnor (SWOX) Conveyance	✓	✓	✓
Oxford Canal - Transfer from Duke's Cut to Farmoor	✓	✓	
Gatehampton Drought Permit	✓	✓	✓
Media Campaigns - SWOX	✓	✓	✓
NEUB - SWOX	✓	✓	✓
TUB - SWOX	✓	✓	✓
Teddington Direct River Abstraction (Indirect Water Recycling) 75 MLD - Construction	✓	✓	✓
Transfer of Treated Effluent from Mogden to Teddington 75MI/d	✓	✓	✓
TWRM extension - Coppermills to Honor Oak - Construction	✓		
Deephams Water Recycling – 46.5 MI/d, to TLT - Construction	✓		
Thames-Lee Tunnel extension from Lockwood PS to King George V Reservoir intake	✓		
Beckton Desalination	✓		
Managed Aquifer Recharge - Addington	✓		
Groundwater Development - Confined Chalk North London	✓		
Groundwater Development - Merton Recommissioning	✓		
Managed Aquifer Recharge - Kidbrooke (SLARS1) Construction	✓		
Managed Aquifer Recharge - Merton (SLARS3) Construction	✓		
Manager Aquifer Recharge - Horton Kirby ASR	✓	✓	✓
Beckton to Coppermills tunnel (treated) - Construction	✓		
Cheam to Merton - London Ring Main	✓		
Didcot Power Station Licence Trading	✓	✓	✓

Table 4: Best Value Plan SEA Options Summary Table

Options ID	SEA Objectives and Assessment Questions																											
	Biodiversity		Soil		Water						Air		Climatic Factors				Landscape		Historic Environment		Population and Human Health				Material Assets			
	1		2		3		4		5		6		7		8		9		10		11		12		13		14	
	C	O	C	O	C	O	C	O	C	O	C	O	C	O	C	O	C	O	C	O	C	O	C	O	C	O	C	O
Supply Side Options																												
Oxford Canal - Duke's Cut (SWOX) - Construction	-1	-1	-1	0	-1	1	0	-1	0	1	-1	0	-1	-1	0	0	1/-1	0	-1	0	-1	0	-1	0	-1	0	-1	0
Oxford Canal - Transfer from Duke's Cut to Farmoor	-1	0	0	0	-1	0	0	-1	0	1	-1	0	-1	-1	0	1	-1	0	-1	0	-1	0	-1	0	-1	0	-1	0
Henley to SWOX Transfer – 5 MI/d	-1	-1	0	0	0	0	0	0	0	1	-1	0	-1	-1	0	0	-1	0	-1	0	-1	0	-1	0	-1	-1	-1	0
Manager Aquifer Recharge - Horton Kirby ASR	-1	-1	-1	0	-1	0	0	-1	0	1	-1	0	-1	-1	0	1	-1	0	-1	0	-1	0	-1	0	-1	-1	-1	0
Groundwater Development - Datchet Existing Source DO Increase	-1	0	0	0	-1	0	0	-1	0	1	-1	0	-1	-1	0	-1	-1	0	-1	0	-1	0	-1	0	-1	0	-1	0
Transfer - Kennet Valley to Henley - Conveyance Element	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Groundwater Development - Southfleet & Greenhithe	-1	0	-1	0	0	0	-1	-1	0	1	-1	0	-1	-1	0	0	-1	0	-1	0	-1	0	-1	0	-1	-1	-1	0
Groundwater Development - Addington	-1	-1	0	0	0	0	-1	-1	0	1	-1	0	-1	-1	0	-1	-1	0	-1	0	-1	0	0	0	-1	-1	-1	0
Groundwater Development - Woods Farm Existing Source Increase DO	-1	0	-1	0	-1	0	-1	-1	0	1	-1	0	-1	-1	0	-1	-1	0	-1	0	-1	0	-1	0	-1	0	-1	0
Transfer - SEW to Guildford - Conveyance Element	-1	0	0	0	0	0	-1	0	0	1	-1	0	-1	-1	0	0	-1	0	-1	0	-1	0	-1	0	-1	0	-1	0
New WTW at Kempton - 100MI/d - Construction	-1	0	0	0	-1	0	-1	0	0	8	-1	0	-1	-4	0	0	-1	0	-1	0	-1	0	0	0	-1	0	-1	0
Groundwater Development - Moulsoford Groundwater Source	-1	0	0	0	-1	0	-1	-1	0	1	-1	-1	-1	-1	0	-1	-1	0	-1	0	-1	0	-1	0	-1	-1	-1	0
SWA to SWOX Transfer - Conveyance Element	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Abingdon Reservoir to Farmoor Reservoir pipeline	-1	-1	-1	0	-1	0	-1	0	0	1	-1	0	-1	-1	0	0	-1	0	-1	0	-1	0	-1	0	-1	0	-1	0
Groundwater Development - Recommission Mortimer Disused Source	0	0	0	0	0	0	0	-1	0	1	0	0	-1	-1	0	-1	0	0	0	0	0	0	0	0	0	0	0	0
Replace New River Head Pump - TWRM	0	0	0	0	0	0	0	0	0	8	-1	-1	-1	-1	0	0	0	0	0	0	0	0	0	0	0	-1	0	0
New Medmenham Surface Water WTW	-1	0	0	0	0	0	-1	0	0	1	-1	-1	-1	-1	0	1	-1	-1	-1	-1	-1	0	-1	0	-1	0	-1	0
New Medmenham Surface Water Intake - 53 MI/d	0	-1	0	0	-1	0	-1	-1	0	8	0	0	-1	-1	0	-1	-1	0	-1	0	-1	0	-1	0	-1	0	-1	0
New shaft on the TWRM at Kempton - Construction	-1	0	0	0	0	0	0	0	0	8	-1	0	-1	-1	0	0	-1	0	-1	0	-1	0	-1	0	-1	0	-1	0

Options ID		SEA Objectives and Assessment Questions																											
		Biodiversity		Soil		Water						Air		Climatic Factors				Landscape		Historic Environment		Population and Human Health		Material Assets					
		1		2		3		4		5		6		7		8		9		10		11		12		13		14	
		C	O	C	O	C	O	C	O	C	O	C	O	C	O	C	O	C	O	C	O	C	O	C	O	C	O	C	O
Demand Management Options																													
DMO Guildford Consumption – High	0	8	0	0	0	0	0	0	8	0	8	0	0	-1	1	0	1	-1	1	-1	0	-1	1	0	0	-1	0	-1	0
DMO Guildford Leakage – High																													
DMO Guildford – Gov led	0	1	0	0	0	0	0	0	1	0	1	0	0	-1	1	0	1	-1	1	-1	0	-1	1	0	0	-1	0	-1	0
DMO Henley Consumption – High	0	8	0	0	0	0	0	0	8	0	8	0	0	-1	1	0	1	-1	1	-1	0	-1	1	0	0	-1	0	-1	0
DMO Henley Leakage – High																													
DMO Henley – Gov led	0	1	0	0	0	0	0	0	1	0	1	0	0	-1	1	0	1	-1	1	-1	0	-1	1	0	0	-1	0	-1	0
DMO KV Consumption – High	0	8	0	0	0	0	0	0	8	0	8	0	0	-1	1	0	1	-1	1	-1	0	-1	1	0	0	-1	0	-1	0
DMO KV Leakage – High																													
DMO KV – Gov led	0	1	0	0	0	0	0	0	1	0	1	0	0	-1	1	0	1	-1	1	-1	0	-1	1	0	0	-1	0	-1	0
DMO London Consumption – High	0	8	0	0	0	0	0	0	8	0	8	0	0	-1	1	0	1	-1	1	-1	0	-1	1	0	0	-1	0	-1	0
DMO London Leakage – High																													
DMO London – Gov led	0	1	0	0	0	0	0	0	1	0	1	0	0	-1	1	0	1	-1	1	-1	0	-1	1	0	0	-1	0	-1	0
DMO SWA Consumption – High	0	8	0	0	0	0	0	0	8	0	8	0	0	-1	1	0	1	-1	1	-1	0	-1	1	0	0	-1	0	-1	0
DMO SWA Leakage – High																													

Options ID	SEA Objectives and Assessment Questions																											
	Biodiversity		Soil		Water				Air		Climatic Factors				Landscape		Historic Environment		Population and Human Health		Material Assets							
	1		2		3		4		5		6		7		8		9		10		11		12		13		14	
	C	O	C	O	C	O	C	O	C	O	C	O	C	O	C	O	C	O	C	O	C	O	C	O	C	O	C	O
DMO SWA – Gov led	0	1	0	0	0	0	0	1	0	1	0	0	-1	1	0	1	-1	1	-1	0	-1	1	0	0	-1	0	-1	0
DMO SWOX Consumption – High	0	8	0	0	0	0	0	8	0	8	0	0	-1	1	0	1	-1	1	-1	0	-1	1	0	0	-1	0	-1	0
DMO SWOX Leakage – High																												
DMO SWOX – Gov led	0	1	0	0	0	0	0	1	0	1	0	0	-1	1	0	1	-1	1	-1	0	-1	1	0	0	-1	0	-1	0
Media Options																												
Media Campaigns - Guildford	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
Media Campaigns - Henley	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
Media Campaigns - Kennet Valley	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
Media Campaigns - London	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
Media Campaigns - SWA	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
Media Campaigns- SWOX	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
Temporary Use Bans																												
TUB – Guildford	0	1	0	1	0	0	0	1	0	1	0	0	0	0	0	1	0	-1	0	0	0	-1	0	-1	0	0	0	0
TUB – Henley	0	1	0	1	0	0	0	1	0	1	0	0	0	0	0	1	0	-1	0	0	0	-1	0	-1	0	0	0	0

Options ID		SEA Objectives and Assessment Questions																											
		Biodiversity		Soil		Water				Air		Climatic Factors				Landscape		Historic Environment		Population and Human Health		Material Assets							
		1		2		3		4		5		6		7		8		9		10		11		12		13		14	
		C	O	C	O	C	O	C	O	C	O	C	O	C	O	C	O	C	O	C	O	C	O	C	O	C	O	C	O
TUB - Kennet Valley	0	1	0	1	0	0	0	1	0	1	0	0	0	0	0	1	0	-1	0	0	0	-1	0	-1	0	0	0	0	0
TUB – London	0	1	0	1	0	0	0	1	0	1	0	0	0	0	0	1	0	-1	0	0	0	-1	0	-1	0	0	0	0	0
TUB – SWA	0	1	0	1	0	0	0	1	0	1	0	0	0	0	0	1	0	-1	0	0	0	-1	0	-1	0	0	0	0	0
TUB – SWOX	0	1	0	1	0	0	0	1	0	1	0	0	0	0	0	1	0	-1	0	0	0	-1	0	-1	0	0	0	0	0
Non-essential Use Bans																													
NEUB – Guildford	0	1	0	1	0	0	0	1	0	1	0	0	0	0	0	1	0	-1	0	0	0	-1	0	-1	0	0	0	0	0
NEUB – Henley	0	1	0	1	0	0	0	1	0	1	0	0	0	0	0	1	0	-1	0	0	0	-1	0	-1	0	0	0	0	0
NEUB – Kennet Valley	0	1	0	1	0	0	0	1	0	1	0	0	0	0	0	1	0	-1	0	0	0	-1	0	-1	0	0	0	0	0
NEUB – London	0	1	0	1	0	0	0	1	0	1	0	0	0	0	0	1	0	-1	0	0	0	-1	0	-1	0	0	0	0	0
NEUB – SWA	0	1	0	1	0	0	0	1	0	1	0	0	0	0	0	1	0	-1	0	0	0	-1	0	-1	0	0	0	0	0
NEUB – SWOX	0	1	0	1	0	0	0	1	0	1	0	0	0	0	0	1	0	-1	0	0	0	-1	0	-1	0	0	0	0	0
Drought Permit Options																													
Shalford Drought Permit	0	0	0	0	0	0	0	0	0	1	0	0	0	-1	0	-1	0	0	0	0	0	0	4	0	0	0	0	0	0
Sheeplands/Harpsden Drought Permit	0	0	0	0	0	0	0	0	0	1	0	0	0	-1	0	-1	0	0	0	0	0	0	4	0	0	0	0	0	0
Playhatch Drought Permit	0	0	0	0	0	0	0	0	0	1	0	-1	0	-1	0	-1	0	0	0	0	0	0	4	0	0	0	0	0	0
Gatehampton Drought Permit	0	0	0	0	0	0	0	0	0	1	0	-1	0	-1	0	-1	0	0	0	0	0	0	4	0	0	0	0	0	0
Catchment Options																													
Portfolio 1 (Standard)	-4	4/-4*	-1	1	0	1	-1	4	0	1	0	0	0	0	0	1	-1	1	-1	0	-1	1	-1	1	-1	1	-1	1	0

7.2 Best Value Plan Situation 4 SEA Summary

Objective 1: Biodiversity, Flora and Fauna - Protect and enhance biodiversity, priority species, vulnerable habitats and habitat connectivity (no loss and improve connectivity where possible)

Residual Construction +ve	Residual Construction -ve	Residual Operational +ve	Residual Operational -ve
Neutral	Minor	Moderate	Neutral

Plan Summary

Across the BVP there will be minor negative residual construction effects due to disturbance to species and habitats from construction activities, and moderate positive residual effects due to more water being kept in the environment as a result of the 'High' Environmental Destination (a decision to deliver long-term sustainability and environmental resilience) and demand management options.

Option Summary

Minor positive residual effects for operation were identified for the demand management options as they aim to reduce water demand, leaving more water in the environment.

Potential major positive residual operational effects were identified for Abingdon Reservoir due to the new reservoir habitat created as part of the option.

No major residual negative effects have been identified. Abingdon Reservoir identified potential moderate residual negative construction effects due to permanent loss of priority habitat, woodland and protected species and habitats for the reservoir footprint. The catchment management option scored moderate effects for biodiversity.

A number of options are close to or have potential pathways to Habitats Sites. Potential effects on Habitats Sites has been assessed through the HRA process. The following options have the potential for effects on Habitats Site due to construction related disturbance effects:

- South East Water to Guildford has the potential for construction related disturbance effects on the Thames Basin Heaths SPA and Thursley, Ash, Pitbright and Chobham SAC
- The Moulsoford GW option has the potential for construction related disturbance effects on Hartslock Wood SAC
- Oxford Canal to Duke's Cut has the potential for effects on Oxford Meadows SAC and Cannock Extension Canal SAC from construction related disturbance effects and potential for sedimentation and silt deposition downstream
- Abingdon to Farmoor pipeline has potential for effects on Cothill Fen SAC from construction related disturbance effects
- Duke's Cut to Farmoor has the potential to affect Oxford Meadows SAC from construction related disturbance effects
- The existing Kempton WTW site is adjacent to the South West London Waterbodies SPA and Ramsar. The New WTW at Kempton - 100MI/d – Construction option is proposed be 250m from the designated sites next to the current operational works.

Mitigation measures are recommended including timing of construction activities with the greatest risk of noise/visual disturbance to avoid the most sensitive times of the year for

wintering bird species (October to March inclusive) will be followed. The effects on site integrity have been assessed through the HRA and mitigation measures have been set out (see Section 8 and the rdWRMP24 HRA Report). The AAs for the options above concluded that no adverse effects on site integrity were anticipated if the mitigation measures are implemented.

A number of options are close to SSSIs, although there will be no direct habitat loss from these sites, there is potential for disturbance effects during construction. Most of the options are pipeline routes and therefore, no operation effects on SSSIs are anticipated. South East Water to Guildford is adjacent to Broadmoor to Bagshot Woods and Heaths SSSI (75% favourable, 23% unfavourable - recovering, 0.5% unfavourable -no change), which is designated for its heathland and woodland which support internationally important bird and nationally important dragonfly populations, Basingstoke Canal SSSI (17% favourable, 20% unfavourable - recovering, 35% unfavourable - no change, 28% unfavourable - declining), which is designated for its nationally important aquatic plants and invertebrates.

The existing Kempton WTW site is adjacent to Kempton Park Reservoirs SSSI (100% unfavourable - recovering) and Kempton LNR. Kempton Park Reservoir SSSI is designated for its wintering bird populations, particularly wading birds such as shoveler (*Anas clypeata*) and gadwall (*Anas strepera*). The New WTW at Kempton - 100MI/d – Construction option is proposed be 250m from the designated sites next to the current operational works. Mitigation to avoid noisy construction activities during the most sensitive times of the year for wintering bird species (October to March inclusive) is recommended. The pipeline associated with the New Medmenham Surface Water WTW option is adjacent to Widdenton Park Wood SSSI (100% favourable). Widdenton Park Wood SSSI is designated for its unusual example of mature ancient semi-natural oak-beech woodland with interesting and locally uncommon plant species. Mitigation measures during construction will include ensuring the construction corridor avoids the SSSI.

New Medmenham Surface Water Intake - 53 MI/d requires abstraction from River Thames. Rodbed Wood SSSI (100% favourable) and Temple Island Meadows SSSI (21% favourable, 79% unfavourable - recovering) are located approx. 1.5km along the River Thames. Rodbed Wood SSSI is an area of Thames-side willow and alder woodland fed by a ditch draining water from adjacent water meadows. Temple Island Meadows SSSI consists of a series of slightly improved, sheep grazed, wet meadows which have developed on typical argillic brown earths and pelo-calcareous gley soils over alluvium. Their location, adjacent to the River Thames, renders them subject to seasonal flooding and waterlogging. Abstraction level are unlikely to affect these sites but it is recommended that mitigation will aim to include monitoring river levels and the condition of the sites.

The Oxford Canal to Duke's Cut option is associated with the canal route and passes several SSSIs. Minor works along the canal will be undertaken and best practice mitigation will be implemented to reduce construction related disturbance effects. Abingdon Reservoir to Farmoor Reservoir pipeline is within 500m of Frilford Heath, Ponds and Fens (100.00% unfavourable - recovering) and Cothill Fen SSSI (65.22% favourable, 34.78% unfavourable - recovering). Frilford Heath, Ponds and Fens SSSI is designated for its vast flora diversity and the national and regional rarities in its insect communities. Cothill Fen SSSI supports outstanding examples of nationally rare calcareous fen and moss-rich mire communities together with associated

wetland habitats. Mitigation measures will include best practice construction to reduce effects associated with noise, light and dust pollution.

A number of options are likely to cause temporary loss of priority habitat, largely associated with pipeline construction. South East Water to Guildford will affect good quality semi-improved grassland, calcareous grassland, and deciduous woodland. Southfleet/Greenhithe will have effects on deciduous woodland. Kempton 100 is likely to cause permanent loss of priority habitat for the new WTW. However, the wider site is owned by Thames Water and offers opportunities for habitat creation and enhancement as set out in the rdWRMP24 BNG Strategy (see rdWRMP24 NC and BNG Report (Appendix AA)). Wood’s Farm Increase DO will affect deciduous woodland and good quality semi-improved grasslands. Abingdon to Farmoor Pipeline will affect deciduous woodland. Duke’s Cut to Farmoor may affect coastal and floodplain grazing marsh and lowland meadows. ASR Horton Kirby may affect coastal and floodplain grazing marsh and lowland meadows. Mitigation will include reinstatement of habitat to current or better condition following pipeline construction and habitat creation and enhancement as part of BNG delivery commitments.

There is an area of ancient woodland adjacent to the Wood’s Farm Increase DO option. Mitigation measures will include ensuring the works do not encroach on the ancient woodland and remain confined to the road. The Henley to SWOX (5Ml/d) option pipeline runs along road immediately adjacent to Ancient Woodland. Mitigation measures will include ensuring the construction works to do not encroach on the ancient woodland area. For both of these options, achieving this is considered feasible as part of construction activities.

Potential cumulative effects

Oxford Canal - Transfer from Duke's Cut to Farmoor and Oxford Canal - Duke's Cut (SWOX) - Construction are in proximity to Pixey and Yarnton Meads SSSI (GWDTE), and Port Meadow with Wolvercote Common & Green SSSI (GWDTE), Port Meadow with Wolvercote Common & Green SSSI (GWDTE) and Hook Meadow and The Trap Grounds SSSI (GWDTE), with overlapping construction periods. Potential for cumulative effects on designated sites from noise air and light pollution. With implementation of best practice construction techniques and a CTMP, cumulative effects are not anticipated.

Abingdon Reservoir to Farmoor Reservoir pipeline and New Reservoir - SESRO 150Mm3 - Construction- both have potential for indirect construction effects on Frilford Heath, Ponds & Fens (SSSI) (GWDTE) and Barrow Farm Fen (SSSI) (GWDTE), with potential for cumulative effects on the designated sites during construction resulting from light, noise and air pollution. With implementation of best practice construction techniques and a CTMP, cumulative effects are not anticipated.

The HRA cumulative effect assessment identified no cumulative effects on international designated sites.

Objective 2: Protect and enhance the functionality, quantity and quality of soils

Residual Construction +ve	Residual Construction -ve	Residual Operational +ve	Residual Operational -ve
Neutral	Moderate	Neutral	Neutral

Plan Summary

Across the BVP there will be moderate negative residual construction effects as most options will involve disruption to agricultural land, especially for laying of pipelines. Some agricultural land will be permanently lost but the majority will be reinstated above the pipelines.

Option Summary

The majority of options in the BVP scored neutral residual effects during construction and operation, attributed to best practice construction techniques including soil storage and reinstatement of soil to reduce loss of soil where possible.

Where options scored minor negative residual operational effects, this was predominantly due to the permanent loss of small areas of Grade 1 or Grade 2 agricultural land.

Potential moderate negative residual construction effects and potential minor positive residual operational effects were noted for Abingdon Reservoir. There will be a loss of Grade 2 and 3a agricultural land for the reservoir resulting in negative effects. Minor positive effects may occur due to potential to integrate arable farming on reservoir embankments.

Potential cumulative effects

New Reservoir - SESRO 150Mm³ - Construction and Groundwater Development - Southfleet & Greenhithe both intersect grade 2 ACL with potential for cumulative effects of permanent loss of grade 2 ACL soil. Best practice construction techniques including soil storage and reinstatement will be implemented to reduce loss of soil where possible.

Abingdon Reservoir to Farmoor Reservoir pipeline and New Reservoir - SESRO 150Mm³ - Construction, with overlapping construction periods, intersect the same historic landfill site, with potential for major cumulative effects of pollution resulting from the potential to disturb buried contaminants. Mitigation will be to avoid directly intersecting landfill sites, either by drilling under the site or routing pipeline around the landfill; therefore post-mitigation cumulative effects are not anticipated.

Minor positive cumulative effects have been identified for the BVP as a result of the catchment management portfolio and demand and drought management options. As noted the plan will also likely result in more water being kept in the environment, relevant in potential drought scenarios with potential beneficial effects on soil moisture retainment.

Objective 3: Increase resilience and reduce flood risk

Residual Construction +ve	Residual Construction -ve	Residual Operational +ve	Residual Operational -ve
Neutral	Minor	Neutral	Neutral

Plan Summary

Across the BVP there will be minor negative residual construction effects associated with works within flood risk areas.

Option Summary

Minor negative residual construction effects were concluded for the majority of the options in the BVP. This is as a result of the option locations within Flood Zones 2 or 3, which creates a flood risk. Options which resulted in neutral residual construction effects were not located within Flood Zones 2 or 3 and are not likely to contribute to increased flood risk.

A majority of the options scored neutral residual operational effects, as flood risk is not anticipated to increase once the options are operational.

Minor positive residual operational effects for Abingdon reservoir and Oxford Canal to Dukes Cut were identified, due to the proposed reservoir potentially reducing flood risk downstream and the potential for improvements to the canal to increase resilience to flood risk, respectively.

Potential cumulative effects

Abingdon Reservoir to Farmoor Reservoir pipeline and New Reservoir - SESRO 150Mm3 - Construction intersect the same area of flood zone 3 with overlapping construction periods, with potential for cumulative effects on flooding during construction. Flood risk mitigation and management will be applied during the construction phase, therefore cumulative effects resulting from construction are not anticipated.

There is the potential for cumulative effects from the loss of active floodplain, due to the implementation of the BVP situation 4. However, there is a national planning requirement for schemes to demonstrate no net loss of floodplain storage and no obstruction to flood flows. This is enforced during determination of a planning application. Therefore, subject to this requirement being enforced and no net loss of floodplain achieved through compensation). BVP options involving predominately or entirely below ground infrastructure are expected to have no operational effect on flood risk.

For objective 3 for the BVP Situation 4, no adverse cumulative effects remain post mitigation. Neutral cumulative effects are identified for the operation phase.

Objective 4: Protect and enhance the quality of the water environment and water resources

Residual Construction +ve	Residual Construction -ve	Residual Operational +ve	Residual Operational -ve
Neutral	Minor	Moderate	Minor

Plans Summary

Across the BVP there will be minor negative construction effects from potential pollution events, although best practice construction should largely mitigate this. There will be moderate residual operational effects from the 'High' Environmental Destination and demand management options resulting in more water being kept in the environment.

Option Summary

Minor positive residual operational effects were identified for the demand management options, as water remains in the environment.

The majority of options within the BVP scored either minor negative residual or neutral residual construction effects in relation to protecting and enhancing the quality of the water environment

and water resources. This is predominantly caused by the option located close to a main river with potential for pollution effects. Several of the options required WFD Level 2 assessment due to effects associated with abstractions and discharges which could change flows and water quality. The WFD Level 2 assessments concluded no deterioration or that deterioration would be unlikely but further studies were needed to confirm this.

A number of options have the potential to affect water quality and water flows through construction related pollution or abstraction and discharges. Effects on water bodies was assessed through the WFD process.

- The Transfer - SEW to Guildford - Conveyance Element option has the potential for effects on Basingstoke Canal, Farnborough Bagshot Beds, Chobham Bagshot Beds due to construction related effects. Groundwater Development
- Addington may have effects on Epsom North Downs Chalk groundwater body from abstraction. Groundwater Development
- Southfleet & Greenhithe may have effects on North Kent Medway Chalk and West Kent Darent Cray Chalk due to abstraction. Groundwater Development
- Datchet Existing Source DO Increase may have effects on Maidenhead Chalk from abstraction. New Medmenham Surface Water WTW may have effects on South-West Chilterns Chalk due to construction related effects. Groundwater Development
- Moulsoford Groundwater Source may have effects on Thames Wallingford to Caversham and Berkshire Downs Chalk due to construction related effects and abstraction. Groundwater Development
- Woods Farm Existing Source Increase DO may have effects on Thames Wallingford to Caversham and Berkshire Downs Chalk due to abstraction. Further studies are recommended to assess water quality and flow effects from the Oxford Canal - Duke's Cut (SWOX) - Construction option on a number of water bodies
- Henley to SWOX Transfer – 5 Ml/d may affect the Maidenhead Chalk and South-West Chilterns Chalk water body's due to construction related effects. Abingdon Reservoir to Farmoor Reservoir pipeline may affect the Thames (Evenlode to Thame) water body due to construction related effects and abstraction. Oxford Canal - Transfer from Duke's Cut to Farmoor may affect the Thames (Leach to Evenlode) and Oxford Canal Thrupp to Thames water body's due to abstraction and discharge. ASR Horton Kirby may affect the West Kent Darent and Cray Chalk water body due to abstraction.

Detailed mitigation for the above activities is outlined in the WFD Report - Appendix D and summarised in Section 8.1. Mitigation primarily relates to best practice construction methods to avoid pollution events and reduce the impacts on quality and flows associated with abstraction and/or dewatering.

Potential cumulative effects

The WFD cumulative effects assessment for the rdWRMP24 (based on BVP (Situation 4)) has identified 19 water bodies which are impacted by more than one BVP option. Of these water bodies, only one was assessed to have the potential for an increased risk of WFD deterioration due to the multiple options. This is water body GB40601G600900 Berkshire Downs Chalk, however it is anticipated that with appropriate mitigation cumulative effects will be mitigatable.

A key aim of the BVP is to achieve the environmental destination, which contributes to the WFD 'Good Ecological Status'. The high DMO options have potential to result in major beneficial

cumulative effects for protecting and enhancing the water environment and water resources during operation. These results are expected with the high implementation of the associated strategies, including metering, consumption reduction, and loss reduction techniques.

Objective 5: Deliver reliable and resilient water supplies

Residual Construction +ve	Residual Construction -ve	Residual Operational +ve	Residual Operational -ve
Neutral	Neutral	Major	Neutral

Plan Summary

Across the BVP there will be major positive effects on the resilience of water supplies to customers due to new sources of water being available, maximising capacity of existing infrastructure, and moving water around the network.

Option Summary

Major positive residual operational effects were identified for options delivering over 50MI/d benefit and moderate residual positive effects for options delivering over 25MI/d benefit within the BVP due to the delivery of new water supplies or improving water transfer across regions.

Potential cumulative effects

No construction phase cumulative effects are anticipated for this SEA objective. Major positive cumulative effects are anticipated on the resilience of water supplies across the plan.

Objective 6: Reduce and minimise air emissions

Residual Construction +ve	Residual Construction -ve	Residual Operational +ve	Residual Operational -ve
Neutral	Minor	Neutral	Neutral

Plan Summary

Across the BVP there will be minor negative residual construction effects from emissions to the atmosphere from construction activities.

Option Summary

The majority of options in the BVP scored minor negative residual construction effects and neutral residual operational effects for the air objective. This is attributed to the emissions generated during construction likely decreasing the air quality temporarily and the operation of the option unlikely to contribute to emissions. Having said this, some options identified minor negative residual operational effects due to the option involving ongoing equipment or pumping, which may contribute towards emissions. Best practice construction methods will be followed, and opportunities to reduce emissions from construction and operation activities further explored as options progress through more detailed design stages.

Potential cumulative effects

Effects are anticipated to be local and short-term in nature. Where options are intersecting or in proximity to the same Air Quality Management Area (AQMA) with overlapping construction periods it is anticipated that with best practice construction there would be no cumulative

effects on this SEA objective during the construction phase. Cumulative effects on air quality during operation are not anticipated.

Objective 7 Reduce embodied and operational carbon emissions

Residual Construction +ve	Residual Construction -ve	Residual Operational +ve	Residual Operational -ve
Neutral	Moderate	Neutral	Moderate

Plan Summary

Across the BVP there will moderate negative residual construction and operational effects due to embodied carbon of materials, emissions from construction and operation including carbon associated with electricity use.

Option Summary

All the options will generate carbon emissions from construction associated with embodied carbon emission from construction materials, construction related transport and on-site activities. Options such as Abingdon Reservoir and new treatment works such as Kempton are likely to generate larger carbon emissions. However, construction of long pipelines also generate emissions. Most options involve pumping stations or other electricity uses and will therefore generate carbon emissions during operation.

Potential cumulative effects

Each of the supply options requires built infrastructure to varying degrees. Emissions related to construction activities are local and short-term and are not anticipated to result in cumulative effects. However, whilst the options are spatially, and temporally diverse Embodied carbon associated with the construction of these options will be cumulative. Moderate cumulative effects have been identified.

The options may also have further cumulative adverse effects for carbon sequestration, especially in areas where removal of wetland habitat and deciduous woodland is required.

Objective 8 Reduce vulnerability to climate change risks and hazards

Residual Construction +ve	Residual Construction -ve	Residual Operational +ve	Residual Operational -ve
Neutral	Neutral	Moderate	Minor

Plan Summary

Across the BVP there will be moderate positive residual operational effects due to more water being left in the environment through demand management and the 'High' Environmental Destination. There will be minor negative operational effects from abstraction of water, especially during drought conditions.

Option Summary

All options in the BVP concluded neutral residual construction effects in relation to reducing vulnerability to climate change risks and hazards.

A small number of options recorded both minor negative and minor positive residual operational effects, due to the fact that groundwater abstraction maybe preferred to surface water abstraction in drought conditions, however this can still affect water table levels and therefore the vulnerability of the natural environment.

Potential cumulative effects

Moderate positive cumulative effects have been identified for the operational phase of the selected options due to the potential cumulative effects of the leakage reductions options, consumption reduction options and TUBs and NEUBs which will have major benefits for water environments as well as resilience of supply in a potential drought scenario.

Objective 9: Landscape Conserve, protect and enhance landscape, townscape and seascape character and visual amenity

Residual Construction +ve	Residual Construction -ve	Residual Operational +ve	Residual Operational -ve
Neutral	Minor	Minor	Minor

Plan Summary

Across the BVP there will be minor negative residual construction effects associated with visual intrusion from construction activities. There will be minor positive residual operational effects from new landscaping and habitat creation, and minor negative residual operational effects from new above ground infrastructure.

Option Summary

Each option will have a local and temporary effect on landscape and visual amenity through construction activities and traffic. Best practice construction mitigation measures can be applied to reduce this impact.

Abingdon Reservoir scored major negative residual construction and operation effects due to the visual intrusion of reservoir construction and the change in landscape character which may be visible from the North Wessex Downs AONB. The option also has minor positive benefits during operation associated with providing a new valued landscape.

A number of options in the BVP identified minor negative residual construction effects, as a direct result of temporary construction activities, or neutral residual construction effects, due to the options involving no or limited construction works.

Potential cumulative effects

Oxford Canal - Duke's Cut (SWOX) - Construction, Oxford Canal - Transfer from Duke's Cut to Farmoor and Abingdon Reservoir to Farmoor Reservoir pipeline have potential for temporary cumulative effects to visual amenity within the Upper Thames Clay Vales NCA during overlapping construction periods. Mitigation will include appropriate screening during construction and a Landscape and Ecological management plan (LEMP) for above ground infrastructure.

Groundwater Development - Moulsoford Groundwater Source, Groundwater Development - Woods Farm Existing Source Increase DO, New Medmenham Surface Water WTW, Henley to

SWOX Transfer – 2.4 MI/d and New Medmenham Surface Water Intake - 53 MI/d are within Chilterns NCA. Henley to SWOX Transfer – 2.4 MI/d, New Medmenham Surface Water WTW and New Medmenham Surface Water Intake - 53 MI/d are also within Chilterns ANOB. Given the distance between the options and minimal above ground infrastructure, cumulative effects are not anticipated.

Groundwater Development - Moulsoford Groundwater Source and Woods Farm Increase DO are within North Wessex Downs AONB. Given the distance between the options and minimal above ground infrastructure, cumulative effects are not anticipated.

Mitigation will include appropriate screening during construction and a Landscape and Ecological management plan (LEMP) for above ground infrastructure.

No cumulative effects are anticipated during the operation phase.

Objective 10: Conserve, protect and enhance the historic environment and heritage assets, including archaeological remains

Residual Construction +ve	Residual Construction -ve	Residual Operational +ve	Residual Operational -ve
Neutral	Minor	Neutral	Neutral

Plan Summary

Across the BVP there will be minor negative residual construction effects from construction activities affecting the setting of heritage assets.

Option Summary

Moderate negative residual construction effects were identified for Abingdon Reservoir attributed to the proposed reservoir boundary being located immediately adjacent to a listed building, also with potential for effects to the historic setting of the listed building.

The majority of options in the BVP scored minor negative residual operational effects in relation to historic environment, due to proximity to heritage assets or impact on heritage setting being able to be mitigated through best practice and heritage protection during construction works.

A number of options are within 500m of heritage assets including listed buildings, scheduled monuments and registered parks and gardens.

- The South East Water to Guildford option is within 500m of Henley Fort Scheduled Monument and may cause construction related disturbance effects on its setting. The Grade II Listed Building 'Engine house and boiler house with adjoining chimney at the Addington Well pumping station' is located and associated within the existing water infrastructure site. The construction work involved for the Groundwater Development Addington option would be planned so as to minimise potential effects to the heritage asset.
- Southfleet & Greenhithe is within 500m of the Springhead Roman Scheduled Monument. The existing Kempton WTW site includes three Grade II listed buildings and one scheduled monument. The new works for the New WTW at Kempton 100MI/d

Construction does not directly impact these assets and mitigation measures will include best practice construction to reduce effects on the setting of the heritage assets

- New Medmenham Surface Water Intake - 53 MI/d is within 500m of a Roman Villa at Mill End Scheduled Monument
- Grim's Ditch scheduled monument is adjacent to the Wood Farm Increase DO option. Mitigation measures will include best practice construction and construction corridor to avoid the scheduled monument
- The pipeline route for the Henley to SWOX (5MI/d) option runs along a road through Greys Court Registered Park and Garden. Mitigation measures will include ensuring the construction works stick to the road and do not encroach on the Registered Park and Garden.
- The pipeline associated with the ASR Horton Kirby option runs along the road adjacent to Franks Hall Registered Park and Garden. Mitigation measures will include ensuring the works corridors sticks to the road and does not encroach on the Registered Park and Garden.
- Three Scheduled Monuments are 250m from the ASR Horton Kirby option. Mitigation measures will include best practice construction to reduce effects of the setting of these assets. Project level heritage assessments will be undertaken where options are in close proximity to heritage assets.

Most of the options involve excavation works and therefore there is the potential to uncover archaeological remains. Thames Water will follow relevant guidance, legislation and internal standards to manage these.

Potential cumulative effects

Each option has the potential to affect the historic environment as a result of construction activities. However, in most cases, the options are spatially and temporally diverse. There is potential for cumulative effects resulting from construction of Abingdon Reservoir to Farmoor Reservoir pipeline and Abingdon Reservoir residual construction activities have the potential for cumulative effects to both the historic setting of the Scheduled monument: Sutton Wick settlement site and risk of impact to buried archaeological remains, if present. Best practice mitigation measures to be implemented during construction. In operation there are no hydrological effects anticipated and use of sympathetic building materials on surface structures will further help mitigate effects that may impact the setting of heritage assets. Best practice mitigation measures to be implemented during construction, therefore cumulative effects are not anticipated.

Objective 11: Maintain and enhance the health and wellbeing of the local community, including economic and social wellbeing

Residual Construction +ve	Residual Construction -ve	Residual Operational +ve	Residual Operational -ve
Neutral	Minor	Minor	Neutral

Plan Summary

Across the BVP there will be minor negative residual effects during construction due to disruption to community assets but these will be reinstated upon completion. There will be minor positive residual operational effects due to new recreational facilities and an improved environment through habitat creation.

Option Summary

A number of options in the BVP have identified minor negative residual construction effects because of anticipated disturbance to community facilities. The majority of these assets are along pipeline routes and include assets such as playing fields which will be reinstated on completion of the works where possible. However, Abingdon Reservoir involves the loss of allotments and sports facilities, therefore, moderate negative effects have been identified.

NEUB and TUB options concluded minor negative residual operational effects due to potential for restricted use of amenities and potential visual amenity impacts.

Major positive residual operational effects were concluded for Abingdon Reservoir due to the proposed reservoir creating facilities which may contribute to improved health and wellbeing from recreation.

Potential cumulative effects

There are potential cumulative effects on access to community facilities including residential areas and religious grounds resulting from overlapping construction phase of options within the BVP Situation 4. There is likely to be disturbance effects to local community during the construction phase from noise, light and air pollution. Options proposed as part of this plan also have the potential to affect health and wellbeing of local communities from reducing access to community facilities during construction activities. Best practice construction measures to be implemented including a construction traffic management plan (CTMP).

The Best Value Planning approach considered other factors alongside economic cost to seek to achieve an outcome that increases the overall net benefit to customers, the wider environment and overall society. Population and housing growth was a key driver in the development of the plan. The BVP situation 4 used the Forecast Housing Plan with Housing Need tested in the medium growth scenario.

Cumulative effects of the options within the plan including consumption and leakage reduction (high). Options will have major cumulative effects on increased resilience of water supply associated with the plan as a whole will result in benefits in terms of the health and wellbeing of customers.

Objective 12: Maintain and enhance tourism and recreation

Residual Construction +ve	Residual Construction -ve	Residual Operational +ve	Residual Operational -ve
Neutral	Minor	Minor	Neutral

Plan Summary

Across the BVP there will be minor negative residual construction effects from disruption and diversions across footpaths and cycleways affecting recreation. There will be minor positive residual operational effects from potential improvements to recreation through new facilities such as walks and habitat.

Option Summary

A number of options in the BVP have identified minor negative residual construction effects because of anticipated disturbance to recreational assets such as footpaths or cycleways. The majority of these assets are along pipeline routes which can be reinstated on completion of the works.

Major positive residual operational effects were concluded for Abingdon Reservoir, as community opportunities have been identified, such as coarse game fishing and angling, cycle hire, equestrian Centre and associated bridleways, artists' studio and sculptures, and increased footpath network.

The majority of options in the BVP scored neutral residual operational effects as no changes to tourism and recreation are expected upon operation.

Potential cumulative effects

There is potential for minor negative cumulative effects on access to recreational facilities during construction. All reasonable effort will be made to avoid temporary closure of public rights of way and in the event that these are required diversions will be provided instead. Public rights of way will be reinstated following construction completion. With applied mitigation residual cumulative effects are not anticipated.

During operation of SESRO, improved recreational value of the site associated with planned water sports facilities and an events centre amongst other improvements contribute to a moderate and major beneficial effect, however this is not anticipated to have cumulative effects with other options within the plan, therefore neutral cumulative effects have been identified for the operation phase.

Objective 13: Minimise resource use and waste production

Residual Construction +ve	Residual Construction -ve	Residual Operational +ve	Residual Operational -ve
Neutral	Moderate	Neutral	Minor

Plan Summary

Across the BVP there will be moderate negative residual construction effects from use of resources and waste generation, and minor negative residual operational effects from maintenance and repairs.

Option Summary

The majority of options in the BVP identified minor negative residual construction effects. This is predominately because of use of materials to construction the options, which will be sourced locally where possible. Opportunities beyond current best practise for waste minimisation and reuse and further use of recycled materials will be investigated during later design stages in line with our sustainability commitments.

Potential cumulative effects

Extensive new infrastructure will be required for the implementation of the options within the plan. Major negative cumulative effects have therefore been identified. Material resource use is

required for construction and limited opportunities for reuse or recycling of waste materials have been identified at present, however this could be investigated further during later design stages.

Objective 14: Avoid negative effects on built assets and infrastructure

Residual Construction +ve	Residual Construction -ve	Residual Operational +ve	Residual Operational -ve
Neutral	Minor	Neutral	Neutral

Plan Summary

Across the BVP there will be minor negative residual construction effects from disruption to road users due to diversion during construction.

Option Summary

The majority of options identified minor negative effects during construction from disruption to road users. It was assumed that for crossing of motorways, major roads, and railway lines direction drilling would be used to avoid closures and diversions.

A large number of options in the BVP identified neutral residual operational effects in relation to effects on built assets and infrastructure. This is as a result of built assets and infrastructure being reinstated upon option operation.

Potential cumulative effects

Many of the options cross railway lines and major roads and therefore there is likely to be disruption to built assets and infrastructure during the construction phase.

There is potential for in-combination effects on the B4017 and the A145 due to potential overlapping construction activities of Abingdon Reservoir to Farmoor Reservoir pipeline and New Reservoir - SESRO 150Mm3 - Construction.

Mitigation measures including a plan wide Traffic Management Plan could be implemented to minimise disruption and whilst the options are temporally diverse, this could lead to extended disruption over a long period of time. Residual minor negative effects remain post-mitigation.

7.3 BVP Summary and Comparison with alternative plans

BVP Situation 4 Summary

Environmental and social considerations have strongly influenced the development of the rdWRMP24 BVP. The SEA cumulative effects assessment for BVP Situation 4 identified cumulative positive effects for the SEA objectives on biodiversity, water quality and vulnerability to climate risks due to the inclusion in the BVP of a ‘High’ Environmental Destination, consumption reduction options, changes in levels of service to enhance water available for use (WAFU) (i.e. media campaigns, TUBs, NEUBs) and leakage reduction. The cumulative effects of these options will result in more water being kept within the natural environment. Positive cumulative effects were also identified for the SEA objective on delivering reliable and resilient water supply to customers through delivery of new water supply options, increased capacity and improving transfers across the region.

The SEA cumulative effects assessment for BVP Situation 4 identified cumulative negative effects for SEA objectives on soil due to cumulative loss of agricultural land, carbon due to construction and operational carbon emissions across the plan, and resource use due to the cumulative effects of materials and resource use and waste production across the plan. We will continue work to identify mitigation for these effects as we develop our options through to detailed design and delivery.

The SEA cumulative effects assessment identified several options with the potential for interactions with the same sensitive receptors. This was largely due to construction effects such as disturbance from noise, air and light pollution from different options where the construction periods overlapped. These sensitive receptors included LNRs, SSSI, heritage assets and community assets. However, it was concluded that with implementation of best practice construction techniques and a Construction Transport Management Plan, cumulative effects are not anticipated.

BVP Situation 1 and 8

BVP Situations 1 and 8 were also assessed, as they were considered to be representative of the range of ways in which the eight other pathways for the BVP differ to Situation 4. These Situations encompass all of the options selected across the nine BVP pathways.

The outcomes of the SEA cumulative effects assessment for BVP Situations 1 and 8 were very similar to those for BVP Situation 4. Situation 8 has fewer supply side options and therefore, the magnitude of cumulative effects is smaller. Situation 1 includes more supply side options than BVP Situation 4 and therefore, the magnitude of cumulative effects is larger.

Situation 1 included the following forecast drivers: high growth, high climate change and high environmental destination and as such contains additional options to meet this increased need that have been identified to have cumulative positive effects on the objectives: Biodiversity, Water, Climate Factors and Population and Human Health.

Situation 1 contains 11 additional options to Situation 4 including Beckton Desalination, Deephams reuse, and a number of groundwater and ASR options. Therefore, across the Situation there will be will more carbon emissions, resource use, and disruption effects for biodiversity, heritage and communities.

Situation 8 included the following forecast drivers: Low population growth, medium climate change and medium environmental destination, i.e. a lower overall need than Situation 4. As such Situation 8 contains fewer supply side options and also does not contain the catchment management option. There will be lower overall potential cumulative positive effects on the objectives for Biodiversity, Water, Climate Factors and Population and Human Health. However, there will also be lower overall cumulative negative effects, due to the reduction in the number of supply side options selected. Situation 8 does not include any options not already selected within Situation 4.

Comparison of BVP and Alternative Plans

Table 7-3 presents the comparison between the BVP, LCP and BESP (Situation 4) split into construction (C) and operational (O) effects. The effects across the plan are very similar because the options selected are similar and the environmental destination selected is the same

and is a strong driver, therefore, the overall scoring across the plans is the same. However, there are a few nuances within the scoring as outlined below.

Compared to the LCP, the BVP contains two additional Drought Permit options, as well as Henley to SWOX and Didcot raw water purchase, whilst the LCP contains two additional groundwater options, one AR option and Cheam to Merton transfer. Given the nature of these options and minor residual effects associated with them the differences are not likely to affect scores between the two plans significantly.

Compared to the BESP, the BVP contains Kempton 100, New River Head Pump, Abingdon 150 (instead of 75) and Didcot Raw Water Purchase, whilst the BESP contains Abingdon 75 (instead of 150), Beckton Desalination 100, two groundwater options, one AR option and Cheam to Merton transfer. The majority of these options have minor residual effects and the differences are not likely to significantly affect scores between the two plans. The BVP contains Kempton 100 which is a new WTW and the BESP contains Beckton desalination. However, both of these options will require large material and energy use and on their own do not change the scoring across the plans.

Table 7-3: Comparison of BVP and Alternative Plans

SEA Objective	BVP		LCP		BESP	
	C	O	C	O	C	O
1. Biodiversity						
2. Soils						
3. Flood risk						
4. Water quality						
5. Water supply						
6. Air quality						
7. Carbon emissions						
8. Climate change						
9. Landscape						
10. Historic environment						
11. Health and wellbeing						
12. Tourism and recreation						
13. Resource use and waste						
14. Built assets and infrastructure						

7.4 Cumulative Effects with Other Plans, Programmes and Projects

Links to other Plans, Programmes at the Project Level

The Thames rdWRMP24 and its options have been assessed at a high strategic level. The options that form the rdWRMP24 (the Best Value Plan) will be subject to the formal planning process when implemented and may require an Environmental Impact Assessment under the Town and Country Planning (Environmental Impact Assessment) Regulations 2017 (as amended) or under the Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 if the project is a Nationally Significant Infrastructure Project (NSIP) requiring development consent under the Planning Act 2008. Requirements for an environmental impact assessment will be determined on an option-by-option basis. As part of this process more detailed option-specific mitigation measures will be developed.

The large supply options proposed under the adaptive strategy (e.g., new reservoirs and desalination plants) may be classified as 'Nationally Significant Infrastructure' and would therefore be required to go through the Development Consent Order planning route. As mentioned previously the strategy has been identified to enable 'pre-planning' activities for these options so that they are available for delivery if they are selected in Thames Water's WRMP24.

The rdWRMP24 supports several local, regional, and national plans and programmes. It will have a direct link to water resources and water supply plans and policies, for example in Local Plans. The development of the rdWRMP24 has taken future population growth into account and as such will support Local Plan policies on housing and development. The rdWRMP24 will also have indirect links to plans that relate to health and well-being, housing, and the environment.

The rdWRMP24 will also have direct links to other Thames Water plans such as the Drought Management Plan and other water companies plans. The rdWRMP24 will interact with and support the Thames Water Drought Plan. The Drought Plan looks at demand-side management actions and supply-side management actions for ensuring water supply during drought conditions, set out in Section 4. These options have been included in the rdWRMP24 and within this SEA.

Links are possible with other water companies plans and strategies, particularly where water trading and transfers cross water company boundaries, for example through the SROs. The coordination of both mitigation and monitoring activities will need to be ensured where multiple water companies are responsible for the delivery of a particular option or scheme.

Role of WRSE

The WRSE regional plans has undertaken a cumulative effects assessment, specifically covering the intra-plan cumulative effects between the regional plan schemes and inter-plan cumulative effects with other regional plans and projects. To meet legislative requirements, a cumulative inter-plan effects assessment, specific to Thames rdWRMP24, has also been undertaken, the results for which are also included within this section.

The cumulative inter-plan effects for the HRA and WFD have been presented in Appendix C and Appendix D of the WRMP report, respectively.

7.5 Thames Water's Drought Plan

Thames Water's Drought Plan 2022 (covering the period to 2027) sets out the range of demand management and supply augmentation measures that the company may need to implement during drought conditions to maintain essential water supplies to its customers. The measures include water use restrictions (Temporary Use Bans and Drought Orders to further restrict non-essential water use) as well as Drought Permit or Drought Order options to temporarily authorise amendments to abstraction licence conditions to enable more water to be abstracted during drought from water sources.

A number of these have been assessed as part of the rdWRMP24 environmental assessments as the rdWRMP24 and the Drought Plan 2022 are fundamentally linked, with the measures contained in each plan acting in-combination to provide a resilient water supply to customers in the Thames Water region and safeguard the provision of essential water supplies in drought conditions.

In particular, the rdWRMP24 includes schemes to provide greater resilience to severe drought conditions by ensuring that, despite significant growth in demand for water, there are sufficient water supplies reliably available to sustain essential water supplies during a severe drought that may only occur on average once in every 500 years. The supply schemes are complemented by a very substantial programme of demand management measures to reduce the scale of future growth in demand.

The demand management measures in the Drought Plan 2022 will have beneficial effects on the water environment in-combination with the extensive demand management programmes included in the rdWRMP24 by reducing the pressure on water resources in periods of prolonged dry weather when river flows, and groundwater levels are well below normal. Negative effects are also identified during the implementation of the drought management measures.

In terms of geographic location, cumulative effects may occur in catchments where the drought management plans are put in place, particularly if this occurs at a time before adequate supply-side options have been introduced. Drought Plans are required to be updated every five years by water companies. The cumulative effects assessments will be updated over time to reflect any changes to the Drought Plans.

7.6 Neighbouring water companies' 2024 WRMPs and Drought Plans

The WRSE regional plan has undertaken a cumulative effects assessment, specifically covering the inter-plan cumulative effects between the regional plan schemes. The results of the regional cumulative effects assessment, including effects specific to the Thames rdWRMP24, are available in the WRSE Revised Draft Regional Plan: Strategic Environmental Assessment Environmental Report.

The Grand Union Canal SRO in the Affinity rdWRMP24 uses parts of the same canal network at the Thames option, Oxford Canal - Duke's Cut (SWOX) - Construction. The minor canal works proposed will be beneficial for both options. Effects on water quality and adjacent Habitats Sites are likely to be able to be mitigated following the further studies recommended for the Oxford Canal to Duke's Cut option in the WFD Report.

There is potential for construction related effects where options are in close proximity to each other. However, the majority of selected options are not geographically close to Thames or do not overlap in terms of construction periods.

The Beckton Desalination option is selected in the BVP Situation 1. Other water company desalination options are selected in the BVP along the Kent Coast. Of particular note is the Southern Water Thames Estuary Desalination option. The modelling undertaken for Beckton Desalination looked at salinity and temperature effects on water quality from the desalination option in-combination with Deephams Reuse and Beckton Reuse. The Thames Estuary desalination option is relatively small in terms of abstraction and discharge compared to these options and therefore, in-combination effects on water quality and the Thames Estuary Habitats Sites are unlikely.

7.7 River Basin Management Plans

The rdWRMP24 may have cumulative effects with the Thames River Basin Management Plan (RBMP) and the Severn RBMP. The RBMPs acknowledge that, to support economic growth and development, significant or large-scale infrastructure projects will occasionally take place within the river basin district.

In accordance with the RBMPs, the rdWRMP24 includes measures to maintain a supply-demand balance while addressing the need to deliver sustainable abstraction from water bodies. The rdWRMP24 includes measures to maximise the use of existing water resources in a sustainable manner and to develop a major water reuse scheme to reduce the need for additional abstraction from freshwater resources in the Thames basin.

Overall, the SEA has concluded there may be cumulative minor adverse effects with the RBMPs due to the need to increase the overall volume of water being abstracted from the Thames and Severn basins to meet future demand growth for water, however following further investigation, design development and implementation of any resultant targeted mitigation, it is anticipated that the WFD compliance risk would be reduced to minor (impact score 1) and would be WFD compliant. The rdWRMP24 also includes a very substantial programme of demand management activities that have been assessed in the SEA as having cumulative major beneficial effects with the Thames RBMP measures targeted at implementing and encouraging water efficiency measures.

Additionally, the rdWRMP24 includes commitments by Thames Water to carry out further investigations in consultation with the Environment Agency of some existing water sources to assess whether abstraction licence conditions should be modified to ensure a long-term sustainable water environment.

7.8 Local development and land use plans

The Thames rdWRMP24 cumulative inter-plan effects assessment for the SEA has considered the following list of developments located within the Thames Water operating area:

- Large existing and emerging Local Plan allocations e.g. 500 or more dwellings
- Projects on the Planning Inspectorate's Programme of Projects
- Hybrid Bills e.g. HS2 Phase One
- Transport and Works Act Orders for large-scale transport infrastructure
- Minerals and waste applications, including for landfill and energy from waste

- Major planning applications made under the Town and Country Planning Act (1990)

A full list of the development and plans considered is presented in Annex G.

Table 7-4: BVP In-combination Effects with other Developments and Land Use Plans

SEA Topic	SEA Objective	Potential for Cumulative Effects
Biodiversity, flora and fauna	1 Protect and enhance biodiversity, priority species, vulnerable habitats and habitat connectivity (no loss and improve connectivity where possible)	<p><u>Special Protection Areas and Special Areas of Conservation</u></p> <p>No potential cumulative effects with other developments and Local Plans were identified in the HRA.</p> <p><u>Other designated sites</u></p> <p>There is potential for cumulative construction effects on the following receptors if the options and developments are constructed at the same time:</p> <ul style="list-style-type: none"> • Wytham Woods SSSI, Pixey and Yarnton Meads SSSI, Port Meadow with Wolvercote Common & Green SSSI may be affected by BVP options Oxford Canal - Transfer from Duke's Cut to Farmoor and Oxford Canal - Duke's Cut (SWOX) - Construction, as well as cumulative plans/projects Site Allocation EW1: Oxfordshire Cotswolds Garden Village, Site Allocation EW2: West Eynsham Strategic Development Area and Oxford Station Phase 2 Improvements TWAO. • Bushey Park and Home Park SSSI, Syon Park SSSI, Richmond Park SSSI and NNR, Isleworth Ait LNR, Hams Lands LNR and Ham Common LNR may be affected by BVP options Teddington Direct River Abstraction (Indirect Water Recycling) 75 MLD - Construction, Transfer of Treated Effluent from Mogden to Teddington 75Ml/d Direct River Abstraction - Teddington to Thames Lee Tunnel Shaft 75 MLD; as well as Waste Allocation 342: Twickenham Depot and the River Thames Scheme DCO. <p>Best practice construction practices will help to reduce effects from noise, dust and light disturbance, therefore, effects are considered minor.</p> <p><u>Ancient Woodland</u></p> <p>Ancient Woodlands Manor Copse, Dean Bottom and Strawberry Grove may be indirectly affected by construction related disturbance effects from South</p>

SEA Topic	SEA Objective	Potential for Cumulative Effects
		<p>East Water to Guildford and Local Plan Allocation A26 Blackwell Farm, Hogs Back, Guildford, if they are constructed at the same time.</p> <p>As these are indirect impacts during construction it is expected that construction best practice mitigation would manage disturbance to a level where there is no combined effect. Thames Water has made a voluntary commitment to achieve 10% BNG for their AMP8 capital delivery projects, even if a scheme is permitted development and there is therefore no planning requirement to do so. This has the potential for cumulative beneficial effects as, combined with other developer's BNG proposals, it could allow an integrated approach creating nature recovery networks and habitat connectivity.</p>
Soil	2. Protect and enhance the functionality, quantity and quality of soils	<p>There is potential for construction to disturb contaminants present within authorised or historic landfills where BVP options intersect the same landfill sites as other plans/projects. At this stage, no authorised or historic landfills have been identified that are affected by one or more BVP options and other plans/projects. If such impacts are identified at a later date, while there is potential for this to be mitigated through design.</p> <p>The BVP options and other development are likely to cause a general reduction in agricultural land across the region. The majority of BVP options involve pipelines and agricultural land will be reinstated upon completion of construction.</p>
Water	3 Increase resilience and reduce flood risk	<p>Areas that may be susceptible to inter-plan cumulative effects include:</p> <ul style="list-style-type: none"> • River Thames as a result of the BVP options Teddington Direct River Abstraction (Indirect Water Recycling) 75 MLD - Construction, Transfer of Treated Effluent from Mogden to Teddington 75Ml/d, Direct River Abstraction - Teddington to Thames Lee Tunnel Shaft 75 MLD; as well as Waste Allocation 342: Twickenham Depot and the River Thames Scheme DCO. • River Evenlode as a result of the Dukes Cut to Farmoor, Oxford Canal - Duke's Cut (SWOX) – Construction, Site Allocation EW1: Oxfordshire Cotswolds Garden Village and Site Allocation EW2: West Eynsham Strategic Development Area. • River Cherwell as a result of the Oxford Canal - Duke's Cut (SWOX) - Construction, Site Allocation 4: Bankside Phase 2, Site Allocation

SEA Topic	SEA Objective	Potential for Cumulative Effects
		<p>17: South of Salt Way – East, Site Allocation 2: Hardwick Farm.</p> <p>There is therefore the potential for cumulative effects from the loss of active floodplain, due to the implementation of the BVP alongside other plans and projects. However, there is a national planning requirement for schemes to demonstrate no net loss of floodplain storage and no obstruction to flood flows. This is enforced during determination of a planning application. Therefore, subject to this requirement being enforced there should be no net loss of floodplain (e.g. through compensation). BVP options involving predominately or entirely below ground infrastructure are expected to have no operational effect on flood risk.</p>
Water	4. Protect and enhance the quality of the water environment and water resources	The WFD assessment includes a full cumulative effects assessment. This identified one water body impacted by more than one BVP option and one or more plans/projects, which has potential to lead to WFD deterioration. This water body is the Chiltern Chalk Scarp (GB40601G604100). However, it is likely that following further investigation no in-combination effects are anticipated.
Water	5 Deliver reliable and resilient water supplies	Shifts in behavioural changes along with efficiency savings will allow the BVP options to maintain a supply demand balance during the plan period, through increasing the volume of water resource available. This will increase resilience of water supplies. This has the potential for cumulative effects with developments taking place within the area as it will increase their water efficiency and resilience to water supplies, particularly for local plan housing allocation plans.
Air	6. Reduce and minimise air emissions	Most of Greater London is covered by Air Quality Management Areas (AQMAs). Inter-plan cumulative effects may arise on the Richmond AQMA if the construction phases of the following schemes overlap: BVP options Teddington Direct River Abstraction (Indirect Water Recycling) 75 MLD - Construction, Transfer of Treated Effluent from Mogden to Teddington 75Ml/d, Direct River Abstraction - Teddington to Thames Lee Tunnel Shaft 75 MLD; as well as Waste Allocation 342: Twickenham Depot and the River Thames Scheme DCO. However, provided appropriate air quality and dust mitigation is implemented during the construction phase, no cumulative effects are anticipated.
Climatic Factors	7. Reduce embodied and operational carbon emissions	Areas such as London, Oxford and Banbury have multiple developments planned within the same area as the supply-side options. This could have the

SEA Topic	SEA Objective	Potential for Cumulative Effects
		<p>potential to have a cumulative effect on carbon emissions within the Thames Water Region.</p> <p>All developments and sectors contribute to carbon emissions and use the UK's intended flight path to Net Zero as a basis for the overall consideration here, but recognising that larger future development schemes such as the BVP options and other plans/projects pose larger specific additions of embodied carbon and operational energy needs.</p>
Climatic Factors	8. Reduce vulnerability to climate change risks and hazards	The BVP options are intended to retain more water within the environment compared to the existing situation. This improves the resilience of the natural system. Additional plans/projects have the potential to reduce the benefits realised to climate mitigation and resilience from the BVP options and therefore the overall positive effect may be reduced in scale.
Landscape	9. Conserve, protect and enhance landscape, townscape and seascape character and visual amenity	<p>The Surrey Hills AONB has potential to be indirectly affected by South East Water to Guildford; Local Plan Allocation A31 Land to the south and east of Ash and Tongham; and Local Plan Allocation A26 Blackwell Farm, Hogs Back, Guildford.</p> <p>However, there will be an expectation during determination of a planning application for impacts on AONBs to be mitigated. BVP option South East Water to Guildford is anticipated to comprise predominately below ground infrastructure, therefore expected to have no operational effect on the AONB.</p>
Historic Environment	10. Conserve, protect and enhance the historic environment and heritage assets, including archaeological remains	<p>There is potential for adverse cumulative effects on buried archaeology where BVP options and other plans/projects are in close proximity. At this stage, no buried archaeology assets have been identified that are affected by one or more BVP options and other plans/projects. If such impacts are identified at a later date, there is potential for this to be mitigated through design and investigations in accordance with legislation and best practice.</p> <p>There is potential for adverse cumulative effects on the presence and/or setting of built heritage assets (e.g. Listed Buildings) where BVP options and other plans/projects are in close proximity. The impacts would primarily be temporary during construction, particularly where BVP options would comprise permanent below ground infrastructure, and would be mitigated by construction best practice.</p>
Population and Human Health	11. Maintain and enhance the health and wellbeing of the	Construction related effects could impact the health and wellbeing of the local community including air/dust, noise and water pollution. It is expected that

SEA Topic	SEA Objective	Potential for Cumulative Effects
	local community, including economic and social wellbeing	<p>best practice measures implemented during the construction phase would mitigate this risk.</p> <p>The BVP options are intended to improve water supply and resilience for future developments within the region.</p>
Population and Human Health	12. Maintain and enhance tourism and recreation	In the operational phase, there is potential for positive cumulative effects, particularly if the Abingdon Reservoir provides recreational benefits alongside other plans/projects within the area, but this would be subject to further design and engagement to realise any benefits.
Material Assets	13. Minimise resource use and waste production	Areas such as London, Oxford and Banbury have multiple developments planned within the same area as the supply-side options. This could have the potential for cumulative effects on resource use and waste production, as the requirements for construction would be increased substantially.
Material Assets	14. Avoid negative effects on built assets and infrastructure	<p><u>Roads</u> There are a number of roads through the study area. Development near to roads would require approval by the local highways authority or National Highways and it is assumed that through this process any significant cumulative effects on the operation of the road network would be avoided.</p> <p><u>Railway</u> There are a number of railway lines through the study area. The Chiltern Main Line may be affected by both the Oxford Canal to Dukes Cut (SWOX) and Site Allocation 1: Banbury Canalside. The Great Western Main Line may be affected by both Abingdon Reservoir and Site Allocation STRAT3: Didcot Garden Town. Development near to railway assets would require approval by Network Rail and it is assumed that through this process any significant cumulative effects on the operation of the railway would be avoided.</p> <p><u>National Cycle Routes</u> There are a number of National Cycle Routes through the study area. It is assumed that any impacts to National Cycle Routes would be temporary and that such temporary closures would need to be agreed with the local council. It is assumed that through this process that any significant cumulative effects would be avoided.</p>

8 Mitigation Measures, Enhancement Opportunities and Monitoring Proposals

Mitigation measures have been suggested as part of the SEA options assessment process, these include site specific measures and general best practice measures. These measures have been collated and the option specific mitigation measures are presented in Table 8.1 along with proposals for further studies and proposed monitoring. General mitigation measures, enhancement opportunities and monitoring structured by SEA objective are presented in Section 8.2 to 8.4

8.1 Detailed Mitigation and Monitoring for the BVP

A detailed mitigation, further studies and monitoring plan for the options included within the BVP are presented in Table 8-1. The individual SEA matrices, HRA, WFD, INNS and NC/BNG have been reviewed collate option specific mitigation measures, further studies and monitoring required for these options. Mitigation and further studies for Gate 3 for SROs are summarised in Section 5.7 and detailed in the Gate 2 reports.

Where possible mitigation measures have been incorporated into the options development process. This has included pipeline re-routing and directional drilling to avoid significant effects on designated sites and heritage assets. Incorporation of these measures at this early strategic stage will help deliver a WRMP that benefits the environment and reduces the risk of significant negative effects and cost-prohibitive mitigation measures further down the line during detailed design of specific options.

Thames Water is committed to delivering the mitigation measures identified by the SEA, HRA, WFD, INNS, natural capital and BNG assessments at timepoints appropriate to the timing of option selection within the plan. The outcomes of these environmental assessments will help inform the option-level assessments required during later design stages (e.g. Environmental Impact Assessment).

Table 8-1: Detailed mitigation and monitoring proposals for BVP options

Option	Mitigation measures	Further Studies and Monitoring
<p>SouthEast Water to Guildford</p>	<p>The option is adjacent to Broadmoor to Bagshot Woods and Heaths SSSI (75% favourable, 23% unfavourable - recovering, 0.5% unfavourable -no change) (designated for its heathland and woodland which support internationally important bird and nationally important dragonfly populations. Under low risk pressure due to feature condition) and Basingstoke Canal SSSI (17% favourable, 20% unfavourable - recovering, 35% unfavourable - no change, 28% unfavourable - declining) (designated for its nationally important aquatic plants and invertebrates and under low risk pressure due to feature condition). Mitigation proposed:</p> <ul style="list-style-type: none"> • Best practice construction to reduce impacts on SSSIs during construction. • Directional drilling under Basingstoke Canal SSSI. • Works outside the bird breeding season if possible. <p>Within 500m of Henley Fort Scheduled Monument. Mitigation proposed:</p> <ul style="list-style-type: none"> • Best practice construction to reduce effects on setting of scheduled monument <p>Option has potential direct impacts on good quality semi-improved grassland, calcareous grassland, and deciduous woodland Priority Habitat associated with construction of the pipeline. Mitigation will include reinstatement of habitat to the current or better condition following pipeline construction.</p> <p>HRA mitigation for Thames Basin Heaths SPA and Thursley, Ash, Pitbright and Chobham SAC:</p> <ul style="list-style-type: none"> • Standard best practice construction mitigation as detailed in the HRA Report • The project-level HRA will be used to inform project design; • Ahead of works, surveys must be undertaken to gather information on specific habitats within the SPA, and functionally linked land in the vicinity, that is use by bird species with the intention to inform the best pipeline route to avoid areas mostly used by birds and ensure minimal habitat fragmentation (already a pressure on the site); 	<p>To refine the mitigation measures at the project stage, further studies are required to better understand how the qualifying species use the functionally linked habitats. Therefore, bird and habitat suitability surveys are required. Surveys will inform the CEMP which will include all of the proposed mitigation measures and any further measures identified at the project stage, at which point mitigation will be refined.</p> <p>Monitoring surveys for qualifying bird species and supporting habitats will be required during and post-construction to assess the effectiveness of proposed mitigation and allow adaptations to construction methodology and refinement of mitigation measures to be made if necessary. The scope of the monitoring surveys will be refined at the project stage and informed by the results of the above-mentioned studies.</p> <p>Where habitat loss and/or damage occurs, despite measures to avoid or minimise this, the reinstatement of habitats, to be enhanced where feasible, must be carried out once the works are concluded.</p>

Option	Mitigation measures	Further Studies and Monitoring
	<ul style="list-style-type: none"> • Micro siting at the project design stage will maximise the distance separating the SPA and any asset within the relevant SSSI Impact Risk Zone; • Where the project-level HRA identifies significant effects, the project design will prioritise the best available construction methods for preventing or minimising environmental impacts; • The project's CEMP will detail the mitigation measures necessary to safeguard the SPA in accordance with the Natural England's targets set out in 'Supplementary advice on conserving and restoring site features. Such safeguards will be secured by a pre-commencement planning condition and adaptive management measures within the CEMP; • Potentially damaging activities (i.e. operations requiring Natural England consent) will not take place in or near the SPA unless a habitat protection and restoration plan is secured by a pre-commencement planning condition; • Potentially disturbing activities identified in the CEMP will not take place in the relevant SSSI Impact Risk Zone during breeding period (February to September inclusive). Early consultation with Natural England will be undertaken to discuss timescales. <p>WFD mitigation measures for Basingstoke Canal:</p> <ul style="list-style-type: none"> • Dewatering for the construction to be discharged into the canal to help maintain flow/water level. <p>WFD mitigation measures for Farnborough Bagshot Beds:</p> <ul style="list-style-type: none"> • Use of clay stanks in pipeline route where groundwater potentially encountered • Dewatering discharge to groundwater or surface water to help maintain flows. • Shafts to be sealed to ensure minimal groundwater egress after construction. <p>WFD mitigation for Chobham Bagshot Beds:</p> <ul style="list-style-type: none"> • Use of clay stanks in pipeline route where groundwater potentially encountered 	

Option	Mitigation measures	Further Studies and Monitoring
	<ul style="list-style-type: none"> • Dewatering discharge to groundwater or surface water to help maintain flows. • Shafts to be sealed to ensure minimal groundwater egress after construction. 	
Groundwater Development - Recommission Mortimer Disused Source	No specific mitigation identified apart from best practice construction methods.	None identified.
Groundwater Development - Addington	<p>The Grade II Listed Building 'Engine house and boiler house with adjoining chimney at the Addington Well pumping station' is located and associated within the existing water infrastructure site. The construction work involved would be planned so as to minimise potential effects to the heritage asset.</p> <p>There is the potential for changes in level in a small pond north of the WTW, however the impacts can only be understood during pumping tests on the new borehole. It is proposed that the pond should be monitoring and the impacts assessed during test pumping.</p> <p>WFD mitigation for Epsom North Downs Chalk groundwater body maybe needed following the further studies outlined.</p>	<p>Further investigations are required to better understand the risk for the water body and may include:</p> <ul style="list-style-type: none"> • Hydrogeological assessment of the impacts of increased groundwater abstraction on water balance and flows to surface water courses, taking into account the abstraction reductions in this waterbody due to the environmental destination. • Monitoring requirements needed at the pre-application stage to address potential water quality concerns. • Further information about option, including details on abstraction conditions. <p>Project level heritage assessment to be undertaken.</p>
Groundwater Development - Southfleet & Greenhithe	<p>The option has potential direct effects on deciduous woodland and Priority Habitat during construction. Mitigation will include reinstatement of habitat to the current or better condition following pipeline construction.</p> <p>The option is located within 500m of the Springhead Roman Scheduled Monument. Mitigation will include best practice construction to reduce effects on the setting of the heritage asset.</p> <p>WFD mitigation measure for North Kent Medway Chalk:</p> <ul style="list-style-type: none"> • Mitigation measures include scenario modelling, restricting upstream use, augmentation/ compensation flow in surface 	<p>Further investigations are required to confirm the WFD assessment and could include:</p> <ul style="list-style-type: none"> • Hydrogeological assessment of the impacts of increased groundwater abstraction on water balance and flows to surface water courses, taking into account the likely changes in abstraction at the quarry and any abstraction reductions in these waterbodies due to the environmental destination. • Further details on the option, including details on scheme operation <p>Monitoring of priority habitats and species reinstatement</p>

Option	Mitigation measures	Further Studies and Monitoring
	<p>watercourses and licence capping through use of HOF restrictions, if deemed appropriate after further investigation.</p> <p>WFD mitigation measures for West Kent Darent and Cray Chalk:</p> <ul style="list-style-type: none"> Recommended next steps and mitigation measures include scenario modelling, restricting upstream use, augmentation/compensation flow in surface watercourses and licence capping through use of HOF restrictions, if deemed appropriate after further investigation. 	
Available Treatment Capacity at Coppermills WTW	No specific mitigation identified apart from best practice construction methods.	None identified
Available Treatment Capacity at West London WTWs	No specific mitigation identified apart from best practice construction methods.	None identified
New WTW at Kempton - 100MI/d - Construction	<p>The wider option is adjacent to Kempton Park Reservoirs SSSI (100% unfavourable - recovering) and Kempton Nature Reserves LNR, and the South West London Waterbodies SPA / Ramsar, as identified within the HRA ToLS. Kempton Park Reservoir SSSI is designated for its wintering bird populations, particularly wading birds such as shoveler (<i>Anas clypeata</i>) and gadwall (<i>Anas strepera</i>). There are several potential locations for the WTW within the existing site. The 100MI/d option is proposed be 250m from the designated sites next to the current operational works. Mitigation should ensure the design keeps to this area rather than other areas closer the designated sites. Depending on the location of the treatment works, there is potential for loss of deciduous woodland Priority Habitat. Mitigation will include reinstatement of habitat to the current or better condition following pipeline construction.</p> <p>The existing Kempton site includes three Grade II listed buildings and one scheduled monument. The new works do not directly impact these assets and mitigation measures will include best practice construction to reduce effects on the setting of the heritage assets. HRA mitigation for South West London Waterbodies SPA and Ramsar site:</p>	<p>It is recommended that further studies should be conducted to identify flight patterns of the wintering birds that use the designated site (and associated functional habitat), and an assessment should be conducted in response to project activities. Noise assessment to be completed during the detailed design and planning/permit applications and associated HRA, prior to commencement of works to ensure mitigation measures will be effective (if not, seasonal avoidance to be used).</p> <p>Project level heritage assessment to be undertaken.</p> <p>Monitoring of priority habitats and species reinstatement</p>

Option	Mitigation measures	Further Studies and Monitoring
	timing of construction activities with the greatest risk of noise/visual disturbance should be planned to avoid the most sensitive times of the year for wintering bird species (October to March inclusive).	
Replace New River Head Pump - TWRM	No specific mitigation identified apart from best practice construction methods.	None identified
Groundwater Development - Datchet Existing Source DO Increase	WFD mitigation for Maidenhead Chalk: <ul style="list-style-type: none"> • Mitigation could include restricting to upstream use, augmentation/ compensation flow in surface watercourses and licence capping through use of HOF restrictions, if deemed appropriate after further investigation. 	Further investigations are required to better understand the risks to water body status. This option includes for installation of observation boreholes and the requirement for a low flow study to understand the implications of the abstraction. Further information on how the option will be operated (abstraction conditions) will also be required. This investigation would help in the identification of further mitigation measures, if required.
New Medmenham Surface Water WTW	Proposed pipeline is adjacent to Widdenton Park Wood SSSI (100% favourable). Widdenton Park Wood SSSI is designated for its unusual example of mature ancient semi-natural oak-beech woodland with interesting and locally uncommon plant species. Mitigation measures during construction will include ensuring the construction corridor avoids the SSSI. WFD mitigation for South-West Chilterns Chalk: <ul style="list-style-type: none"> • Further investigation into impact on groundwater levels of dewatering for construction and consideration of requirement to return water to the ground (through recharge trenches) to help minimise the impact of construction, if required. • Use of clay stanks in pipeline route where groundwater potentially encountered. • Where possible, ensure shafts for horizontal directional drilling (HDD) launch and reception are located outside/further from the SSSI. • Shafts to be sealed to ensure minimal groundwater egress after construction. 	Further investigation will be carried out to confirm the WFD assessment, including assessment of the groundwater level changes due to construction dewatering and potential implications on the GWDTE and on local watercourses. This investigation can also help identification of further mitigation measures, such as consideration of requirements to return water to the ground (through recharge trenches) to help minimise the impact of construction.
New Medmenham Surface Water Intake - 53 Ml/d	Option requires abstraction from River Thames. Rodbed Wood SSSI (100% favourable) and Temple Island Meadows SSSI (21% favourable, 79% unfavourable - recovering) are located approx. 1.5km along the River Thames. Rodbed Wood SSSI is an area of	Monitor river levels in the Thames and condition of designated sites downstream. Project level heritage assessment to be undertaken.

Option	Mitigation measures	Further Studies and Monitoring
	<p>Thames-side willow and alder woodland fed by a ditch draining water from adjacent water meadows. Temple Island Meadows SSSI consists of a series of slightly improved, sheep grazed, wet meadows which have developed on typical argillic brown earths and pelo-calcareous gley soils over alluvium. Their location, adjacent to the River Thames, renders them subject to seasonal flooding and waterlogging.</p> <p>Abstraction level are unlikely to affect these sites but it is recommended that mitigation includes monitoring river levels and the condition of the sites.</p> <p>The pipeline is within 500m of a Roman Villa at Mill End Scheduled Monument. Mitigation measures will include best practice construction to reduce effects on the setting of the heritage asset.</p>	
<p>Groundwater Development - Moulsoford Groundwater Source</p>	<p>HRA mitigation for Hartslock Wood SAC:</p> <ul style="list-style-type: none"> • Standard best practice procedures during construction as set out in the HRA Report • The project's CEMP will detail the mitigation measures necessary to safeguard the SAC in accordance with the Natural England's targets set out in 'Supplementary advice on conserving and restoring site features'; • Potentially damaging activities (i.e. operations requiring Natural England consent) will not take place in or near the SAC unless a habitat protection and restoration plan is secured by a pre-commencement planning condition; • Surveys will inform the CEMP which will include all of the above proposed mitigation measures and any further measures identified at the project stage. <p>WFD mitigation for Thames Wallingford to Caversham:</p> <ul style="list-style-type: none"> • Industry best practice for pollution prevention. • Add licence condition for upstream use. <p>WFD mitigation for Berkshire Downs Chalk:</p> <ul style="list-style-type: none"> • Industry best practice for pollution prevention. 	<p>Monitoring surveys for qualifying habitats will be required during and post-construction to assess the effectiveness of proposed mitigation and allow adaptations to construction methodology and refinement of mitigation measures to be made if necessary. The scope of the monitoring surveys will be refined at the project stage and informed by the results of the studies.</p> <p>Where habitat loss and/or damage occurs, despite measures to avoid or minimise this, the reinstatement of habitats, to be enhanced where feasible, must be carried out once the works are concluded.</p>
<p>Groundwater Development - Woods Farm Existing Source Increase DO</p>	<p>Ancient woodland area adjacent to works corridor. Mitigation measures will include ensuring the works do not encroach on the ancient woodland and stick to the road.</p>	<p>A project level heritage assessment will be undertaken. Further investigations are required to better understand the risks of this option and could include:</p>

Option	Mitigation measures	Further Studies and Monitoring
	<p>The pipeline intersects priority habitats including deciduous woodland and good quality semi-improved grasslands. Mitigation will include reinstatement of habitat to the current or better condition following pipeline construction.</p> <p>Grim's Ditch scheduled monument is adjacent to the option. Mitigation measures will include best practice construction and construction corridor to avoid the scheduled monument.</p> <p>WFD mitigation for Thames Wallingford to Caversham:</p> <ul style="list-style-type: none"> • Add licence condition for upstream use. <p>WFD mitigation for Berkshire Downs Chalk:</p> <ul style="list-style-type: none"> • Add licence condition for upstream use. • Alternative mitigation measures could include augmentation/compensation flow in surface watercourses and licence capping through use of HOF restrictions, if deemed appropriate after further investigation. 	<ul style="list-style-type: none"> • A hydrogeological assessment to understand the implications of increased groundwater abstraction on river flow for both water bodies, taking into account any abstraction reductions from the Environmental Destination. It should also be noted that this option has been included in AMP8 of the WINEP, where it will likely be further developed through subsequent feasibility investigations. • The potential for upstream use will be investigated to ensure its sustainability. If upstream use is confirmed as feasible, this restriction would be added to the licence. Since this water would then be returned into this watercourse (from the upstream STW), there would be no net reduction in flow, removing the potential for deterioration of the surface water body. For the Berkshire Downs Chalk groundwater body, a review of the network to document the upstream use of the water as part of the AMP8 WINEP investigation is proposed. <p>Monitoring of priority habitats and species reinstatement</p>
<p>Oxford Canal - Duke's Cut (SWOX) - Construction</p>	<p>The option is associated with the canal route and passes several SSSIs and heritage assets. Minor works along the canal will be undertaken and best practice mitigation will be implemented to reduce construction related disturbance effects.</p> <p>HRA mitigation for Oxford Meadows SAC and Cannock Extension Canal SAC:</p> <ul style="list-style-type: none"> • CIRIA C741 Environmental good practice on site guide • Environment Agency's PPGs (PPG1: General Guide to Prevention of Pollution; PPG6: Pollution prevention guidance for working at construction and demolition sites). • Biosecurity measures to ensure appropriate removal and/or management control of INNS at source. • Specific mitigation to reduce increased sedimentation and silt deposition downstream include: 	<p>Monitoring of pollutants immediately downstream of the restoration and improvement areas, to adapt mitigation measures as needed, is required to ensure that significant levels of contaminants are not being transferred into the Oxford Canal.</p> <p>Specific monitoring of qualifying features within the Habitats Sites to inform mitigation measures during the construction phase is also required, due to the proximity between the sites and the option, as well as the presence of functionally linked habitats (waterbodies such as streams and ponds).</p> <p>WFD proposed further studies are recommended:</p> <ul style="list-style-type: none"> • water quality monitoring • water quality analysis • hydrological studies

Option	Mitigation measures	Further Studies and Monitoring
	<ul style="list-style-type: none"> ○ Planning site layout so that machinery and dust causing activities are located away from the site, as far as is possible. ○ Planning silt screening around the area of works to limit the movement and redeposition of material. ○ Ensure vehicles entering and leaving sites are securely covered to prevent escape of materials during transport. 	<ul style="list-style-type: none"> ● hydroecology investigations
Henley to SWOX transfer– 5 MI/d	<p>The pipeline will run along road immediately adjacent to Ancient Woodland. Mitigation measures will include ensuring the construction works to do not encroach on the ancient woodland area.</p> <p>The pipeline route runs along a road through Greys Court Registered Park and Garden. Mitigation measures will include ensuring the construction works stick to the road and do not encroach on the Registered Park and Garden.</p> <p>WFD mitigation for Maidenhead Chalk and South-West Chilterns Chalk:</p> <ul style="list-style-type: none"> ● Dewatering discharge to surface water or groundwater to minimise impact of dewatering during construction. 	<p>Further investigation will be carried out to confirm the WFD assessment, including assessment of the groundwater level changes due to construction dewatering. This investigation can also help identification of further mitigation measures, such as consideration of requirements to return water to the ground (through recharge trenches) to help minimise the impact of construction.</p> <p>A project level heritage assessment will be undertaken.</p>
Abingdon Reservoir to Farmoor Reservoir pipeline	<p>The option is within 500m of Frilford Heath, Ponds and Fens (100.00% unfavourable - recovering) and Cothill Fen SSSI (65.22% favourable, 34.78% unfavourable - recovering). Frilford Heath, Ponds and Fens SSSI is designated for its vast flora diversity and the national and regional rarities in its insect communities. Cothill Fen SSSI supports outstanding examples of nationally rare calcareous fen and moss-rich mire communities together with associated wetland habitats.</p> <p>Mitigation measures will include best practice construction to reduce effects associated with noise, light and dust pollution.</p> <p>The pipeline intersects priority habitats including deciduous woodland. Mitigation will include reinstatement of habitat to the current or better condition following pipeline construction.</p> <p>HRA mitigation for Cothill Fen SAC:</p> <ul style="list-style-type: none"> ● CIRIA C741 Environmental good practice on site guide 	<p>Habitat surveys are to be conducted ahead of construction to inform the pipeline route in areas where protected habitats may be affected. Surveys will inform the CEMP which will include all the proposed mitigation measures and any further measures identified at the project stage. Once the construction is complete habitats will be reinstated.</p> <p>Monitoring surveys for qualifying habitats will be required during and post-construction to assess the effectiveness of proposed mitigation and allow adaptations to construction methodology and refinement of mitigation measures to be made if necessary. The scope of the monitoring surveys will be refined at the project stage and informed by the results of the above-mentioned surveys.</p>

Option	Mitigation measures	Further Studies and Monitoring
	<ul style="list-style-type: none"> • Environment Agency's PPGs (PPG1: General Guide to Prevention of Pollution; PPG6: Pollution prevention guidance for working at construction and demolition sites), 'Guidance Notes for the Reduction of Obtrusive Light'. • Biosecurity measures to ensure appropriate removal and/or management control of INNS (terrestrial) at source. • At this stage it is not clear how close vehicle movements or supporting area for the construction work will be undertaken. Such activity should be as far from the site as possible given the recognised risk of soil/roots compaction and dust. • Specific mitigation for night works and artificial lighting will incorporate lighting hoods to minimise the light spill. • Development of a CEMP which will include all the above proposed mitigation measures and any further measures identified as required at the project stage, at which point the mitigation will be refined. <p>INNS mitigation may include a WTW at Abingdon Reservoir. Additional space and capacity could be found within the planned site to contain any process required for mitigation. This will be explored further through SESRO Gate 3.</p> <p>WFD mitigation for Thames (Evenlode to Thame)</p> <ul style="list-style-type: none"> • Provision for de-chlorination of pipeline water when draining down pipeline before discharge to watercourse. • Fish and eel screening at new intake. • This option will be used in conjunction with other SRO (SESRO) and additional abstraction is likely to only occur during wetter periods or when river flow support is provided by the SESRO SRO. 	<p>Further investigation will be undertaken to confirm the WFD assessment and could include modelling of the impact of flow changes on habitats, sedimentation and biology as a result of new abstraction when considered in combination with SESRO. This investigation can also help identification of further mitigation measures through hydrological and other studies.</p> <p>Monitoring of priority habitats and species reinstatement</p>
Oxford Canal - Transfer from Duke's Cut to Farmoor	<p>The pipeline intersects priority habitats including coastal and floodplain grazing marsh and lowland meadows. Mitigation will include reinstatement of habitat to the current or better condition following pipeline construction.</p> <p>HRA mitigation for Oxford Meadows SAC:</p> <ul style="list-style-type: none"> • CIRIA C741 Environmental good practice on site guide 	<p>Monitoring of pollutants immediately downstream of the proposed works, to adapt mitigation measures as needed, is required to ensure that significant levels of contaminants are not being transferred into the Habitats Site.</p> <p>Specific monitoring of qualifying features within the Habitats Site to inform mitigation measures during the construction</p>

Option	Mitigation measures	Further Studies and Monitoring
	<ul style="list-style-type: none"> • Environment Agency's PPGs (PPG1: General Guide to Prevention of Pollution; PPG6: Pollution prevention guidance for working at construction and demolition sites). • Best practice such as BS 5228-1:2009+A1:2014 (The British Standards Institute, 2008) to avoid significant effects due to noise. • Best practice such as 'Guidance Notes for the Reduction of Obtrusive Light' (Institute of Lighting Professionals, 2011) to avoid significant effects due to increased light (if works are programmed at night). • Biosecurity measures to ensure appropriate removal and/or management control of INNS at source. <p>Development of a CEMP which will include all the above proposed mitigation measures and any further measures identified at the project stage, at which point the mitigation measures will be refined.</p> <p>WFD mitigation measures for Thames (Leach to Evenlode) water body:</p> <ul style="list-style-type: none"> • Adjustment of discharge conditions to minimise impact on biology, hydromorphology and water quality. <p>WFD mitigation measures for Oxford Canal Thrupp to Thames:</p> <ul style="list-style-type: none"> • Adjustment of abstraction conditions to minimise impact on biology and water quality. • Fish/eel screens on intake structure 	<p>phase is also required, due to the proximity between the sites and the option, as well as the presence of functionally linked habitats (waterbodies such as streams and ponds). Monitoring of priority habitats and species reinstatement</p> <p>Further investigations are required to better understand the risks to water body status and these assessments could include:</p> <ul style="list-style-type: none"> • Water quality review. This could potentially lead to requirement for additional water quality monitoring to understand water quality baseline and how the option could affect it. This will allow appropriate mitigation to be included where possible. • Review of baseline ecological WFD data. This could potentially to requirement for additional ecology monitoring to understand ecology baseline and how it could be affected by the option. This will allow appropriate mitigation to be included where possible. • Further information on the construction and operation of the option. • Hydroecology study to understand changes in water level from new abstraction, including impacts on biology and water quality. This investigation could also help identification of further mitigation measures. • Further information about how the option will be operated.
<p>Manager Aquifer Recharge - Horton Kirby ASR</p>	<p>The pipeline intersects priority habitats including coastal and floodplain grazing marsh and lowland meadows. Mitigation will include reinstatement of habitat to the current or better condition following pipeline construction.</p> <p>The pipeline runs along the road adjacent to Franks Hall Registered Park and Garden. Mitigation measures will include ensuring the works</p>	<p>Further investigation is required to better understand the risks to water body status taking into account the quarry activities and environmental destination changes. These investigations may include a hydrogeological study to establish if this option will negatively impact groundwater flow and levels, as well as associated surface water flow. This investigation can also help identification of further</p>

Option	Mitigation measures	Further Studies and Monitoring
	<p>corridors sticks to the road and does not encroach on the Registered Park and Garden.</p> <p>Three Scheduled Monuments are 250m from the option. Mitigation measures will include best practice construction to reduce effects of the setting of these assets.</p> <p>WFD mitigation measures for West Kent Darent and Cray Chalk:</p> <ul style="list-style-type: none"> • Suggested mitigation include restricting upstream use, augmentation/ compensation flow in surface watercourses and licence capping through use of HOF restrictions for abstraction from Chalk to recharge ASR, if deemed appropriate after further investigation 	<p>mitigation measures, such as licence restrictions on abstraction.</p> <p>Monitoring of priority habitats and species reinstatement</p>
Didcot Power Station Licence Trading	None identified	None identified

8.2 General Mitigation Measures

Table 8-2 provides a summary of mitigation measures over and above the application of standard good practice or best construction practices. The bullet point list below outlines which construction best practice measures are considered across all options. The purpose of these is to minimise the effects of construction activity on people, recreation, and the environment:

- General: A Construction Environmental Management Plan (CEMP) will be produced for each development, detailing the general and specific mitigation measures required to avoid and/or minimise impacts. The CEMP will detail the control measures, thresholds, and necessary feedback mechanisms.
- General: construction compounds will be located to avoid the need for the removal of trees, hedgerows, or other important vegetation, where possible.
- Air: best practice construction methods for dust suppression, and measures to reduce construction related transport emissions and emissions from plant machinery. Measures to be outlined in a CEMP such as bulk deliveries, transport by rail if feasible, turning off idling equipment and engines, using alternatives to diesel generators.
- Biodiversity: during construction, appropriate biosecurity mitigation measures will be put in place to avoid the spread of any INNS that may be present in the construction areas. Invasive species on site are to be identified and removed or treated in advance of construction works, in line with national INNS protocols and guidance. Tunnel commissioning will be undertaken with treated water.
- Biodiversity: habitat and protected species surveys will be undertaken for each development to determine whether further site and species/habitat specific mitigation measures are required.
- Biodiversity: where trees need removal, or works are in proximity, an Arboricultural Implications Assessment will be completed to minimise impacts and identify root protection zones that should be observed.
- Health and wellbeing: trenchless pipeline construction techniques will be used where appropriate to mitigate impacts on health and wellbeing.
- Health and wellbeing: operational noise impacts should be effectively mitigated using noise insulation and enclosing such plant within buildings as part of their design.
- Recreation and access: during construction all, reasonable effort will be made to avoid temporary closure of public rights of way and if these are required diversions will be provided instead. Public rights of way will be reinstated following construction completion. Careful siting and use of screening where work locations are in proximity to public rights of way will be undertaken.
- Soils: reinstatement of land to the same or better-quality following pipeline construction.
- Material assets: excavated material will be reused on site.
- Archaeology: archaeological desk-based studies, written schemes of investigation and watching briefs will be required where options are near heritage sites or where there is the potential for archaeological finds to be uncovered as part of excavation works.
- Heritage assets: protect heritage assets during construction through use of screening and siting construction compounds away from heritage assets.
- Water: potential construction impacts on surface and groundwater quality will be minimised using pipejacking, and any chemical /oil storage will be fully bunded to prevent accidental pollution.
- Water: drainage water from operational sites will be disposed of appropriately to avoid pollution (e.g., road drainage).

- Water: adherence to Environment Agency Pollution Prevention Guidance (although now formally withdrawn it is a useful source of information).

The mitigation measures proposed may have multiple benefits including for climate change. Measures to create or enhance biodiversity will have positive effects for climate change from carbon sequestration, cooling effects and air pollutant removal. It will also provide additional habitat for species vulnerable to climate effects.

Table 8-2: Proposed General Mitigation Measures

SEA Topic	Proposed General Mitigation
<p>Biodiversity, flora, and fauna</p>	<p>Best practice methods are to be implemented during construction to minimise disturbance effects, prevent the spread of INNS, and habitat loss. This includes refining pipeline alignment or using trenchless techniques to avoid woodland habitat, particularly Ancient Woodland and Biodiversity Action Plan (BAP) Priority Habitat. To ensure that the operation does not lead to a transfer of invasive species, appropriate filtration species must be in place. Treatment at the upgraded Water Treatment Works (WTW) would prevent any non-native species being transferred further. However, there still may be residual risk. Pollution prevention measures are to be implemented, including the use of directional drilling or other trenchless techniques where the pipeline crosses watercourses. In the short-term there is potential for effects. With mitigation, no effects are predicted as a result of construction. Route re-alignment is recommended if it is possible to avoid direct impacts with the Sites of Special Scientific Interest (SSSI), Ramsar, Special Area of Conservation (SAC), Special Protection Area (SPA) and Marine Protected Areas (MPA), or to avoid the most high-value habitats.</p> <p>Abstraction from rivers will be taken at appropriate times to mitigate against effects on water-dependent designated sites. Ecology surveys will be required at further design stages to determine the effects and mitigation that will be required. It is assumed that the recommended mitigation will be implemented, therefore residual operational effects will be lessened, although this would not negate the need for a potential appropriate assessment.</p> <p>Habitat will be reinstated upon completion, and compensatory habitat is to be considered to replace damaged or lost habitat. A new reservoir has significant opportunities for benefits to ecology. Operational residual impacts are also lessened assuming the implementation of this adequate mitigation.</p>
<p>Soil</p>	<p>Best practice construction techniques are to be implemented to prevent the disturbance of contaminated material.</p> <p>Damage to agricultural land will be lessened through design, to reduce the option footprint and the construction working area. This will restrict the amount of land permanently taken or temporarily disturbed.</p>

SEA Topic	Proposed General Mitigation
	<p>The ground will be reinstated, meaning that long-term residual effects on agricultural soils because of pipeline construction are unlikely.</p> <p>The new reservoir, PSs, desalination plant, and effluent reuse plant will all result in a permanent loss and subsequently residual effects are identified.</p> <p>Permanent loss should be on non-BMV (best and most versatile) land where possible, and only on BMV land where there are no other alternatives. The reinstatement or reprovision of land will be required post-construction.</p>
Water	<p>Best practice measures will be implemented to reduce the impact on flooding during the construction phase, however the risk remains during construction, meaning short-term flood risk effects may remain.</p> <p>A Flood Risk Assessment (FRA) is to be undertaken and above-ground infrastructure will be designed to be flood resilient. Floodplain compensation may be required.</p> <p>Pollution prevention measures are to be implemented, including the use of directional drilling or other trenchless techniques where the pipeline crosses watercourses. With mitigation, residual construction effects are considered negligible. Operational impacts will remain on river flow from abstraction and potential transfer of INNS, but residual impacts are lessened assuming implementation of adequate mitigation.</p> <p>The monitoring of river flows is required to determine when surface water can be abstracted. Groundwater levels will also be monitored to minimise the effect of them.</p> <p>Further assessment of the effects under the WFD would be required for those waterbodies detrimentally affected. If there is a likelihood of deterioration to, or prevention of future improvement to the ecological status of the waterbodies, evidence would be required to demonstrate that there are no reasonable alternative options that would avoid these effects. If no alternative options are available, consideration would need to be given to the presence of reasons of overriding public interest, and mitigation measures would need to be secured.</p>
Air	<p>Best practice mitigation measures are to be implemented during construction; however short-term air quality effects may remain.</p>
Climatic Factors	<p>The use of renewables for the energy supply during construction and operation will be investigated, as well as the use of materials with lower embodied carbon. A carbon footprint study could help identify areas for carbon savings or alternative materials. As the electricity grid is decarbonised, greener energy will become available. Although carbon</p>

SEA Topic	Proposed General Mitigation
	<p>emissions could be reduced through mitigation, negative effects in the short and medium-term will likely remain.</p> <p>The sustainable use of water should be ensured to reduce the vulnerability of the local environment.</p>
Landscape	<p>Best practice measures are to be implemented to minimise effects during construction, although temporary effects during construction may remain.</p> <p>Land affected by transfer pipelines will be reinstated upon completion, meaning that, with appropriate mitigation, no residual effects are likely to remain during operation.</p> <p>Measures will be incorporated to reduce landscape and visual impact of the reservoir and embankment, for example the planting of trees to screen and reduce the height of any embankment. However, although design features will likely improve the aesthetics, the landscape will remain changed.</p> <p>If possible, re-routing the pipeline would minimise the damage and disruption to woodland, including Ancient Woodland. The utilisation of directional drilling or other trenchless techniques would reduce construction effects.</p>
Historic Environment	<p>Best practice measures are to be implemented to minimise setting effects for other heritage assets during construction.</p> <p>Measures will be incorporated to reduce setting impact of the reservoir and embankment, for example the planting of trees to screen and reduce the height of any embankment. However, although design features will likely reduce the setting impact, there may be residual effects.</p> <p>The preferred mitigation for the Registered Park and Garden (RPG) and conservation area is to re-route the pipeline; however, if this is not possible then careful construction and reinstatement to its original condition with no detrimental effect on the character, appearance, or design of the RPG or conservation area should be implemented.</p> <p>Opportunities will be explored for enhancement of heritage assets and their setting and public benefits through options design.</p> <p>Further work is likely to be required to determine the significance of effect, depending on the presence or absence of buried archaeology. Residual effects may remain due to the potential loss of archaeological remains.</p>

SEA Topic	Proposed General Mitigation
Population and Human Health	<p>Best practice mitigation measures, for example noise management, are to be implemented to minimise disturbance during construction. However, temporary effects are likely to still occur during construction.</p> <p>There could be potential to enhance the cycleways as part of the works, for example during re-instatement.</p> <p>Operational benefits could be enhanced by incorporating education and information resources within the reservoir design, for example in trails and information boards. They could also be enhanced by incorporating recreational activities into the reservoir design, such as fishing, sailing, and canoeing</p> <p>The direct land take of recreational sites will be avoided where possible, and land is to be reinstated. However, temporary effects are likely to still occur during construction.</p>
Material Assets	<p>Opportunities will be sought after to implement sustainable design measures (design to reduce footprint, selection of materials) and reuse excavated material to reduce the impact. However, it is likely that negative effects will remain.</p> <p>Best practice measures, including a Traffic Management Plan, are to be implemented to minimise disturbance during construction. However, temporary effects are likely to still occur.</p>

8.3 Enhancement Opportunities

The SEA identified numerous enhancement measures across the option assessments, these included:

- Enhance public rights of way networks.
- Incorporate education and information resources in option design to enhance operational benefits.
- Enhance the reservoirs through incorporating recreational activities into the design process.
- Development of tourism and recreational assets on site, this also has potential to add economic value to the area.
- Opportunities to create new habitats alongside the reservoir.
- Opportunities to improve existing habitats during post-construction remediation. Options are suitable for planting high value habitats.
- Opportunities to use sustainable materials and implement sustainable design measures.

A number of BNG enhancement opportunities have been identified through the option appraisal process, Table 8-2 outlines those identified. A BNG Strategy specific to the rdWRMP24 has also been developed and it presented in the rdWRMP24 Natural Capital and BNG Report. The strategy sets out the BNG requirements for the plan and how this could be delivered.

Table 8-3: Summary of potential enhancement opportunities

Option element	Enhancement opportunity
All option elements	Creation of higher value habitat within grassland, arable and pasture natural capital assets onsite to achieve an increase in Biodiversity Units (BU) and provide a 10%+ uplift in BNG.
	Habitat creation work within the adjacent priority habitats. Options fall within or are in the vicinity of habitat network zones: <ul style="list-style-type: none"> • Habitat restoration-creation • Restorable habitat • Fragmentation action zone • Network enhancement zones 1 and 2 • Expansion zone These areas identify specific locations for a range of actions to help improve the ecological resilience for each of the habitats / habitat networks. The options should look to identify habitat network zones and priority habitats within the near vicinity and look to improve / create / restore habitats which would help to work towards increasing BU and work towards a 10% uplift in BNG.
	Increase the quality / quantity of freshwater assets, including lakes, ponds located in designated SSSIs, pending detailed assessment of local conditions and available space.
	Options to identify suitable areas off-site for the creation, enhancement and/or restoration in order to develop off-site net gains, and provide 10%+ uplift in BNG.
	Identify areas of local peatland restoration.
Option elements located along the canals	Possibly create man-made floating wetland islands, enabling plants and microbes to form and attract wildlife both above and below the water's surface and create biochemical and physical processes to improve things such as water quality.
Wastewater treatment works, abstraction and treatment works, and other option elements that contain above ground infrastructure	Seeding of grassland within footprints of the above ground infrastructure, where possible.

8.4 Monitoring Proposals

Monitoring the negative effects of implementing the rdWRMP24 is an essential ongoing element of the SEA process. Monitoring helps ensure that the identified SEA objectives are being achieved and allows for early identification of unforeseen adverse effects and thus appropriate remedial action can be taken. Monitoring will be an important requirement to measure performance and ensure the rdWRMP24 is being successfully implemented.

The SEA Regulations expect that monitoring should focus on the significant negative effects identified through the assessment. The UK Water Industry Research (UKWIR) guidance recommends that existing arrangements for monitoring should be used where possible to avoid duplication of effort.

Negative effects or uncertainty identified during the SEA process focused on effects on ecology, carbon emissions, landscape, and the historic environment. Option specific monitoring is presented in Table 8-1. Table 8-4 below presents the general SEA monitoring proposals for the rdWRMP24 structured by the SEA objectives. The monitoring proposals put forward as part of WRMP19 have been reviewed and carried through into rdWRMP24 where relevant for continuity. Additional indicators have been included where new risks have been identified as part of rdWRMP24 and the indicators have been adapted to those developed as part of the SEA Framework in Table 8-4. Indicators have also been chosen to record the potential benefits that the rdWRMP24 achieves, for example recreational assets created or waste recycled/reused.

Table 8-4: General Monitoring proposals

SEA Objective	Indicator	Timescale
Protect and enhance biodiversity, priority species, vulnerable habitats and habitat connectivity (no loss and improve connectivity where possible).	Condition of statutory and non-statutory ecological sites. Sites of Special Scientific Interest (SSSI) monitoring.	Every five years
	Area of blue and green infrastructure created % of habitat creation or existing habitat enhancement.	Every five years
	% of Invasive and Non-Native Species (INNS) risks mitigated.	During construction
	Ecological status of water bodies.	Annually
	Condition of priority species and habitats surrounding option locations	Every five years
To protect and enhance the functionality and quality of soils, including the protection of high-grade agricultural land, and geodiversity.	Area of agricultural land (by grade) lost to and restored by WRMP options.	Every five years
Increase resilience and reduce flood risk.	% of flood risks noted in Flood Risk Assessment (FRA) for projects mitigated.	During construction
Protect and enhance the quality of the water environment and water resources.	Chemical status of water bodies. Changes in WFD condition status (both positive and negative) of surface and groundwater bodies.	Annually
	Number of geological sites affected Groundwater quality testing.	Annually
	Achievements against WFD objectives.	Annually
Deliver reliable and resilient water supplies.	Number of supply disruptions per annum	Annually

SEA Objective	Indicator	Timescale
	% of people with supply demand deficits for each WRMP.	Annually
To reduce and minimise air emissions during construction and operation.	Local air quality monitoring.	During construction
To minimise/reduce embodied and operational carbon emissions.	Reduction of greenhouse gas emissions per MI/d. Energy use from new operations and change in energy use per MI/d. % Energy supplied by renewable sources. Reduction of operational and capital carbon emissions. Number of options that utilise existing infrastructure. Volume of waste generated. Waste disposal method by %.	Annually
Reduce vulnerability to climate change risks and hazards.	% of climate risks mitigated.	Every five years
To conserve, protect and enhance landscape and townscape character and visual amenity.	Number of WRMP options including additional landscaping. Changes to baseline, construction and operational landscape conditions of sensitive landscapes (and townscapes where applicable).	Every five years
Conserve, protect and enhance the historic environment and heritage assets, including archaeological remains	Condition of heritage assets identified in Section 8.1, including any at risk. Number of heritage assets enhanced by options. Condition of buried archaeology monitored through Watching Briefs, where required, during the construction phase.	Every five years
To maintain and enhance the health and wellbeing of the local community, including economic and social wellbeing.	Number of complaints and customer satisfaction through surveys and reporting through Thames Water's annual performance processes. Level of disruption due to construction and operational works (where relevant) through environmental management plans, such as the CEMP.	During construction and operational phases
	Number of Public Rights of Way (ProW) closures or diversions. Number, type, and area of community assets created. Km of new footpath/cycleway created.	During construction phases Every five years

SEA Objective	Indicator	Timescale
Maintain and enhance tourism and recreation.	Number of tourism assets created. Surveys of recreational and other amenities likely to be affected (both positive and negatively), including assessment of the success of agreed mitigation measures.	Every five years
Minimise resource use and waste production.	% of A-Rated, recycled, reused material used in infrastructure options. Number of options that utilise existing infrastructure. Volume of waste generated. Waste disposal method by %.	Annually
Avoid negative effects on built assets and infrastructure.	Number of complaints. Number of road closures or diversions.	During construction

9 Conclusion and Next Steps

9.1 Conclusion

Environmental and social considerations have strongly influenced the development of the rdWRMP24. The SEA cumulative effects assessment for BVP Situation 4 identified cumulative positive effects for the SEA objectives on biodiversity, water quality and vulnerability to climate risks due to the inclusion in the BVP of a 'High' Environmental Destination, consumption reduction options, changes in levels of service to enhance water available for use (WAFU) (i.e. media campaigns, TUBs, NEUBs) and leakage reduction. The cumulative effects of these options will result in more water being kept within the natural environment. Positive cumulative effects were also identified for the SEA objective on delivering reliable and resilient water supply to customers through delivery of new water supply options, increased capacity and improving transfers across the region.

The SEA cumulative effects assessment for BVP Situation 4 identified cumulative negative effects for SEA objectives on soil due to cumulative loss of agricultural land, carbon due to construction and operational carbon emissions across the plan, and resource use due to the cumulative effects of materials and resource use and waste production across the plan. We will continue work to identify mitigation for these effects as we develop our options through to detailed design and delivery.

The SEA cumulative effects assessment identified several options with the potential for interactions with the same sensitive receptors. This was largely due to construction effects such as disturbance from noise, air and light pollution from different options where the construction periods overlapped. These sensitive receptors included LNRs, SSSI, heritage assets and community assets. However, it was concluded that with implementation of best practice construction techniques and a Construction Transport Management Plan, cumulative effects are not anticipated.

In addition to rdWRMP24, Local Plan allocations, other major planning applications and projects along with other water company WRMP options could lead to the potential for in-combination effects to some receptors. The WFD in-combination effects assessment identified 14 water bodies where multiple options and other plans occur. The in-combination effect assessment indicated that only one of these water bodies (GB40601G604100: Chiltern Chalk Scarp) is at risk of further WFD deterioration due to the combination of options and planning projects, however following further investigation, design development and implementation of any resultant targeted mitigation, it is anticipated that the WFD compliance risk would be reduced to minor (impact score 1) and would be WFD compliant.

Further information on the implications of HS2 phase 1 on the waterbody would be required to quantify the in-combination effects on this water body. The HRA concluded that no in-combination effects on Habitats Sites are likely with other plans and programmes. The SEA identified potential negative cumulative effects on sensitive receptors relating to construction; in particular for objectives on Biodiversity, Soil, Landscape and Historic environment; all identified effects can likely be mitigated with best practice construction mitigation and the developments themselves will go through a design and planning process to develop their own mitigation.

9.2 Next Steps

Following adoption of the rdWRMP24, a Post-Adoption Statement will be produced which confirms how the SEA process has influenced the development of WRMP24, how any additional comments were taken into consideration and how the WRMP24 will be monitored. This summary will provide enough information to make it clear how the WRMP24 was influenced as a result of the SEA process and consultation.

Initial monitoring proposals have been developed as part of the SEA process and presented in Table 8-1 and Table 8-4. They will be reviewed and finalised in the Post-Adoption Statement and included in Thames Water's implementation of WRMP24. It is likely that monitoring of the WRMP24 will be incorporated with wider monitoring processes.

Annexes

- A. SEA Process Tasks
- B. Scoping Report Consultation Log
- C. Policies, Plans and Programmes Review
- D. Baseline Review and Baseline Maps
 - D.1 Introduction
 - D.2 Baseline information
 - D.3 Baseline Maps
- E. Assessment Scoring Criteria
- F. SEA Option Assessments (Options New to WRMP24)
- G. SEA Options Assessments (WRMP19 Options)
- H. WRMP19 Mitigation Register

Annex A: SEA Process Tasks

Table A.1: Description of SEA Stages and Tasks

SEA Stage	SEA Task	Task Purpose
Stage A Setting the context and objectives, establishing the baseline and deciding on the scope	A1: Identifying other relevant plans, programmes, and environmental protection objectives	To establish how the plan or programme is affected by outside factors, to suggest ideas for how any constraints can be addressed, and to help to identify SEA objectives
	A2: Collecting baseline information	To provide an evidence base for environmental problems, prediction of effects, and monitoring; to help in the development of SEA objectives
	A3: Identifying environmental problems	To help focus the SEA and streamline the subsequent stages, including baseline information analysis, setting of the SEA objectives, prediction of effects and monitoring
	A4: Developing SEA objectives	To provide a means by which the environmental performance of the plan or programme and alternatives can be assessed
	A5: Consulting on the scope of SEA	To ensure that the SEA covers the likely significant environmental effects of the plan or programme. This is a statutory five-week consultation period, as a minimum)
Stage B Developing and refining alternatives and assessing effects	B1: Testing the plan or programme objectives against the SEA objectives	To identify potential synergies or inconsistencies between the objectives of the plan or programme and the SEA objectives and help in developing alternatives
	B2: Developing strategic alternatives	To develop and refine strategic alternatives
	B3: Predicting the effects of the draft plan or programme, including alternatives	To predict the significant environmental effects of the plan or programme and alternatives
	B4: Evaluating the effects of the draft plan or programme, including alternatives	To evaluate the predicted effects of the plan or programme and its alternatives and assist in the refinement of the plan or programme
	B5: Considering ways of mitigating adverse effects	To ensure that adverse effects are identified and potential mitigation measures are considered

	B6: Proposing measures to monitor the environmental effects of plan or programme implementation	To details the means by which the environmental performance for the plan or programme can be assessed
Stage C Preparing the Environmental Report	C1: Preparing the Environmental Report	To present the predicted environmental effects of the plan or programme, including alternatives, in a form suitable for public consultation and use by decision-makers
Stage D Consulting on the draft plan or programme and the Environmental Report	D1: Consulting on the draft plan or programme and Environmental Report	To give the public and the Consultation Bodies an opportunity to express their opinions on the findings of the Environmental Report and to use it as a reference point in commenting on the plan or programme. There is no set time period for consultation. The SEA Directive states that the Consultation Bodies and the public <i>'shall be given an early and effective opportunity within appropriate time frames to express their opinion on the draft plan or programme and the accompanying environmental report before the adoption of the plan or programme or its submission to the legislative procedure'</i> . The Environmental Report will be consulted upon alongside the draft WRMP
	D2: Assessing significant changes	To gather more information through the opinions and concerns of the public To ensure that the environmental implications of any significant changes to the draft plan or programme at this stage are assessed and taken into account
	D3: Decision making and providing information	To provide information on how the Environmental Report and consultees' opinions were taken into account in deciding the final form of the plan or programme to be adopted
Stage E Monitoring implementation of the plans or programme	E1: Developing aims and methods for monitoring	To track the environmental effects of the plan or programme to show whether they are as predicted; to help identify adverse effects
	E2: Responding to adverse effects	To prepare for appropriate responses where adverse effects are identified

Annex B: Consultation Logs – Scoping and Environmental Report

Please see WRSE Draft Regional Plan Scoping Consultation Log – Outlined in Table B.1

Table B.1 : WRSE Scoping Consultation Log

Ref	Organisation	Topic / Report section	Feedback	Response
1	Natural England	Overarching advice	There is much in the Strategic Environmental Assessment (SEA) scoping report that is good and Natural England welcomes WRSE commitment to environmental assessment	Noted. No action required.
2	Natural England	Overarching advice	The Habitats Regulations Assessment (HRA) methodology in Appendix F does not appear to have fully had regards to advice contained within Natural England's response to the draft Environmental Assessment Methodology Guidance sent on the 20th July 2020. In particular the reference and language used with regards to assessment of plans and programme impacts sites protected under Conservation of Habitats and Species Regulations 2017 (as amended) is not consistent with the HRA tests or relevant Government guidance and therefore should be amended (see Annex IA for further details).	Noted. The HRA methodology will be amended to comply up with Natural England's response to the draft Environmental Assessment Methodology Guidance sent on the 20th July 2020.
3	Natural England	Overarching advice	As we previously set out there is a lack of precision in, not only the language used, but also the methodology proposed in terms of assessment of ecological impacts (as opposed to other environmental impacts) that at best renders some of the guidance unhelpful at worst could potentially lack compliance with legislation and drivers.	We feel that the inclusion of a proposal to sift options using a RAG scoring, dependent on distance to N2K sites alongside and in addition to the HRA process probably confused issues here. The RAG scoring has been removed from the assessment process, at least partly to remove this ambiguity. Beyond this, hopefully the refreshed methodology in

Ref	Organisation	Topic / Report section	Feedback	Response
				line with the above comment will include the require precision and ensure compliance with legislation.
4	Natural England	Overarching advice	Natural England has made recommendations for amendments to the methodology (See Annex 1A and 1B for further details)	Noted. See above.
5	Natural England	Appendix F HRA - Section F1 Guidance	This section should begin by reference to Regulation 9 of the Conservation of Habitats and Species Regulations 2017 (S.I. 2017/1012) as amended (Habitats Regulations) as this requires every competent authority, in the exercise of any of its functions, to have regard to the requirements of the Habitats Directive. This requirement includes restoring favourable conservation status. Regulation 10 places a duty on a competent authority, in exercising any function, to use all reasonable endeavours to avoid any pollution or deterioration of habitats of wild birds. In addition, regulation 63 places obligations on competent authorities in respect of plans or projects likely to have a significant effect on a protected site. Note that for marine protected area that are European and Ramsar sites the legal tests are the same as terrestrial European sites. In England, as a matter of policy, sites listed or proposed under the “Ramsar Convention on Wetlands of International Importance” receive the same level of protection as European sites.	We will include reference to the described Regulations. We are aware of, and agree with, the rest of this content of this comment.

Ref	Organisation	Topic / Report section	Feedback	Response
6	Natural England	Appendix F HRA - Section F1 Guidance	Reference to draft guidance is welcome but it would be more helpful to the companies for their HRAs to refer to the legislation and legislative tests (set out above) that require the Habitats Regulations Assessments to be undertaken and to refer to the relevant Government guidance. Outside of the draft the remaining guidance referred to in Appendix F is largely out-of-date and much case law has occurred since the guidance referred to in section F.1 was written. Case law has significantly influenced the applications of the Habitats Regulations to plans and projects especially with regards to the likely significant effect and appropriate assessment stages. The UK Water Industry is updating its guidance on SEA and HRA assessments to take account of the changes in legislative interpretation and the legislation itself (i.e. Updates in 2017 and 2019).	We will update the methodology and documents to align with the UK Water Industry guidance on HRA as necessary.
7	Natural England	Appendix F HRA - Section F1 Guidance	The stages of the Habitats Regulations set out in the methodology are muddled and not strictly in compliance with the guidance. The Government guidance now refers to sites covered by the provisions of the Habitats Regulations as 'habitats sites' in line with the wording in the National Planning Policy Framework. This nomenclature may be useful for WRSE going forwards as it will be necessary to replace reference to European sites after December 2020	Noted. We will refer to sites as 'habitat sites' rather than Designated Sites. All stages of the HRA will be clear and distinct, to comply with all relevant legislation.
8	Natural England	Appendix F HRA - Stage 1 Likely Significant effect test	Under this section the text states "HRA screening determines whether there will be any LSE on any European site as a result of an options implementation (either on their own or 'in combination' with other plans or projects) and, if so, whether these effects will result in any potential adverse effects on the	Agree - assessing for adverse effects on integrity will not be undertaken at Stage 1.

Ref	Organisation	Topic / Report section	Feedback	Response
			site's integrity." Pg116 This statement combines the LSE test with the stage 2 integrity test which can only be undertaken within an appropriate assessment. This is an inaccurate statement and should be replaced.	
9	Natural England	Appendix F HRA - Stage 1 Likely Significant effect test	The methodology goes on to state 'Likely' Significant Effect means one that cannot be ruled out on the basis of objective information. A likely effect would be considered significant if it could undermine a site's integrity and/or the conservation objectives and/or qualifying features of that European site. Pg. 116 This is incorrect in terms of the definition of likely and significance. Tests of the site's integrity do not occur at the likely significant effect stage. Government guidance on appropriate assessments states "A significant effect should be considered likely if it cannot be excluded on the basis of objective information and it might undermine a site's conservation objectives. A risk or a possibility of such an effect is enough to warrant the need for an appropriate assessment". Natural England recommend you replace the text on Pg116 with the above information.	As above, agree. We can use the provided wording to better explain our methodology.
10	Natural England	Appendix F HRA - Stage 1 Likely Significant effect test	The methodology goes on to state that "If a conclusion of no LSE cannot be reached on the basis of high-level scheme specific information, there will be the opportunity and requirement for more detailed investigation at the appropriate assessment (Stage 2) if the option is taken forward by WRSE".Pg117. This suggests that a plan level appropriate assessment will not be undertaken of the programmes. It would be helpful if clarification that appropriate assessments will be undertaken of the WRSE options for which a likely	Appropriate Assessment will be undertaken at a plan level, if necessary. It is important to note that many other assessments and factors will contribute to the optioneering process that moves us from the long list of options to the short list. The

Ref	Organisation	Topic / Report section	Feedback	Response
			significant effect cannot be excluded on objective evidence as appears to be the case later in the methodology	short list may or may not therefore include options for which a likely significant effect cannot be excluded on objective evidence. Individual options will then be grouped into viable combinations called Programmes that, in their totality, may be a solution for providing adequate water resources across the WRSE administrative area. At Appropriate Assessment stage, these Programmes will be considered as a whole, so effectively at this stage the (potential) Regional Plan is being assessed.
11	Natural England	Appendix F HRA - Zone of Influence	Whilst Natural England welcomes the concept of zones of influence, the distance criteria in Table F.1: for the zones of influence do not appear precautionary and it is unclear what evidence was used to select these distances. Since a second screening stage happens after this stage 1 screening the distances used here should be as precautionary as possible. For example, raising a large reservoir could impact a designated site kilometres downstream if it reduces the freshwater flows, for example,	This is a confusion between the HRA process the separate sifting that was proposed, which included RAG assessment based on proximity. This was distinct from, and unrelated to, the HRA process, but because of

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			<p>and yet only a 500m screening area is chosen. It is unclear how issues such as habitat severance and reduced connectivity would be screened at this initial stage. For example, a large reservoir could interrupt flight pathways of certain bat species many kilometres away from the SAC and though severance issue is covered in step 2 of the proposed WRSE methodology such impacts would already have been screened out by the stage 1-step 1 screening.</p>	<p>the ambiguity it has created, has been removed from the assessment proposals.</p>
12	Natural England	Appendix F HRA - Zone of Influence	<p>The guidance goes on to state it should be noted that for alterations to current abstractions, only effects on European sites downstream of new abstractions are considered as potential LSE. For increases to current abstraction volume it is assumed that the increased abstraction is still within the current licence limits and therefore unlikely to result in impacts on designated sites, as they are protected by the Environment Agency's Review of Consents process. Pg. 118. Natural England has previously advised in consultation webinars that groundwater abstractions can act upstream and downstream as can abstractions on freshwater but tidal sections of rivers. In addition we have advised it is no longer safe for long term planning to rely on the Environment Agency's review of consents(RoC)for likely significant effect. RoC is a good place to begin for assessment of impact pathways to existing assets but much of the information on which it was based is 15 to 20 years old and the legislation, the caselaw, the evidence base and the climate have all changed since this assessment was undertaken</p>	<p>Noted. Assessment of abstraction sites will not confine themselves to downstream effects. The EA's Review of Consents will not solely be relied on. Alterations to current abstractions will be subject to full assessment and will not assume that the RoCs are sufficient to rule out LSE.</p>

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13	Natural England	Appendix F HRA - Zone of Influence	Assessment of plans or projects must use the best available evidence, relying on a historic assessment when features continue to decline is not consistent with the precautionary principle and will make no contribution to government aspirations in the 25 Year Environment Plan (25YEP) which are the stated environmental "destination" of WRSE. Government guidance on appropriate assessments states The conservation objectives relate to each of the habitats and species for which the site was designated and will be provided in more detail by Natural England. A competent authority must consult Natural England for the purposes of the assessment and must have regard to any representations that Natural England may wish to make within a reasonable time (as specified by the competent authority). Natural England's formal advice on conservation objectives is publicly available for both European terrestrial sites and European marine sites	Agree
14	Natural England	Appendix F HRA - Zone of Influence	The methodology states "With strategy-level HRAs, uncertainty is sometimes addressed by including caveats or mitigation as an assumption to the plan (and therefore all the plan components) to ensure that significant or adverse effects will not occur. "This approach was never an acceptable approach to HRA of a plan and since you later go on to explain that mitigation cannot be taken into account at LSE stage due to recent caselaw, Natural England recommends you remove this statement.	Agree - we will remove this statement.
15	Natural England	Appendix F HRA - Zone of Influence	Stage 1.5 and the section above on uncertainty are really the early parts of the appropriate assessment and	We will review and amend if appropriate

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			it might be more logical to put 1.5 into section 2	
16	Natural England	Appendix F HRA - Stage 2 Appropriate Assessment	Stage 1.5 and 2 involve liaison with Natural England. It is essential that the timetable for this is agreed with Natural England in advance with reasonable consultation timescales. This will ensure Natural England is able to adequately resource this consultation. As set out in the Government Guidance referred to above conservation objectives are available for most 'habitats sites' apart from the newly classified Solent and Dorset Coast SPA. As set out in the Government guidance quoted above most habitats sites also have supplementary advice to the conservation objectives which can help with the appropriate assessment.	We will keep Natural England updated in terms of our programme, and will agree suitable times and durations for consultation.
17	Natural England	Appendix F HRA - In Combination assessment	This assessment should not only consider in combination effects with other water resources options as set out, but also other options that could combine to have a likely significant effect. For example discharges affect water quality which can be exacerbated by abstraction impacts. At a high level impacts with local plans could be considered.	Agree - the in-combination effects will consider all options that could combine to have LSE, both within the water industry and wider study area.
18	Natural England	Appendix F HRA - Dealing with Uncertainty	This section states no adverse effects, then the option will not go ahead (subject to provision of over-riding public interest).Pg124This should read "no adverse effects, then the option will not go ahead unless the project can prove no alternatives and imperative reasons of over-riding public interest (IROPI) and secure necessary compensation". The test of no alternatives comes before the IROPI test in the regulations as set out in the subsequent sections of the SEA methodology text. Government guidance states "Where an adverse effect on the site's integrity cannot be ruled out,	Agree - Alternatives will be considered prior to IROPI, which itself will only be considered if the necessary compensatory measures can be secured.

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			and where there are no alternative solutions, the plan or project can only proceed if there are imperative reasons of over-riding public interest and if the necessary compensatory measures can be secured”	
19	Natural England	Appendix F HRA - Need for compensatory habitat	The final stage after IROPI consideration is compensatory habitat since the 'no alternatives 'and IROPI stages are covered in this guidance the need for compensatory habitat should be included at the end of the document	Agree - we will add this section to the description of the process.
20	Natural England	SEA - Plans & Programmes	Since many of the strategic resource options in the WRSE are likely to be National Strategic Infrastructure Projects (NSIPs) you should reference to the Planning Act 2008. You may wish to include National Parks and Access to the Countryside Act 1949 for completion. You may wish to consider referring to the relevant case law to assessment of plans and projects under both Habitats Regulations and Strategic Environmental Assessment. You may wish to include the WISER guidance.	The suggested plans and legislation will be reviewed and included in the plans and programmes review
21	Natural England	SEA - Plans & Programmes - Local plans for improvements	There are a number of plans for improvements of biodiversity that may be of use to refer to as the WRSE plans evolves. River restoration plans for a number of SSSI rivers exist and have relevance to in combination abstraction impacts and their mitigation. There are other biodiversity restoration plans including the Natural Capital improvement plans by local Nature Partnership (e.g. Sussex Nature	Agreed that these plans will be relevant. At this stage for the regional plan they are considered too detailed but they will be referenced and should be used as options are taken forward in WRMP24.

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			Partnership). Having regards to the relevant local plans may be of more relevant as the SEA and WRSE plans emerge and in plan comparisons than in the SEA per se.	
22	Natural England	Baseline	<p>Generally the baseline summary is good however in Natural England's view the scoping document underplays information on the state and declining trends of some of the environmental baseline and the part which abstractions and public water supply play in the baseline condition. In our letter to WRSE of the 4th September Natural England stated: The existing amount of water taken from the environment for abstraction in the south east is too high and the impacts this is having on our wildlife, including some of our most iconic and legally protected habitats and species is unacceptable. The situation is worse in drought with permits and orders in company's drought plans that impact some of our most precious wildlife throughout the south east including orders that cannot conclude no adverse effects on integrity of European site features. This represents a failing of the most stringent legal protection for any ecologically protected sites in England. Many aquifers are not at good ecological status for their quantity of water. Climate change is predicted to make this situation more difficult, with hotter drier summers increasing wildlife's need for water as well as impacting supply and increasing demand. This is not reflected adequately in either the baseline section nor the future climate section.</p>	<p>The environmental destination work will address the issues raised in this scoping response. The more detailed baseline can be incorporated into the assessment process and the modelling of impacts on flow deficits will be reviewed. The catchment mapping and environmental resilience systems modelling will also be incorporated into the overall assessment. Climate change scenarios will be developed for land use changes and the EA's environmental destination scenarios will be run through the simulator model. All this will contribute to the SEA.</p>

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23	Natural England	Baseline Maps	Though it is difficult to be certain, as the information on these baseline maps is very high level, some of the information appears incomplete. South Downs and the New Forest National Parks are missing from the protected landscapes map key which only shows the Areas of Outstanding Natural Beauty, the Parks are on the maps but difficult to see. Some of the MCZs may be missing and some of the SPAs in maps C.4 and C.1 for example Solent and Dorset Coast SPA is missing. It might be worth including the national trails on these maps such as the south downs way, the Thames Path and the England Coast Path which is due to be completed in 2021.	Noted, the environmental database was updated following feedback to ensure that all relevant layers are up to date and the Dorset SPA is included
24	Natural England	SSSI Condition Baseline	It would be useful to compile the condition of the SSSIs in the region from the baseline data you have obtained especially since this pertains to a WRSE environmental destination and 25 YEP objective	As part of the HRA any linked SSSIs (sites that are also SSSIs) that could be affected by an option will be identified and the conditions assessment reported. This will then be used in the environmental assessment process and for the environmental destination.
25	Natural England	Table 4.1	Ecological sites in the WRSE Region lists one marine protected area but lists the SAC, SPA, Ramsar, Marine conservation Zones and SSSIs separately. Marine Protected Areas (MPA) is the catchall name used in the OSPAR convention for areas protected by legislation below mean high water. In the UK this includes Ramsar sites, SACs, SPAs (including those offshore), SSSIs and MCZs. Please can you clarify	Table 4.1 will be reviewed and clarified.

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			this list and what the MPA is that is not also one of the other designations	
26	Natural England	Table 4.7 WFD classifications	The updated classifications are now available and this baseline information should be updated. Priority habitats lists –you may wish to include a summary of the regions chalk streams in the tables given their prominence in the environmental destination for WRSE and in the current abstraction profiles of WRSE companies	Noted, baseline information to be updated.
27	Natural England	Natural Capital Baseline - urban	it is unusual to classify urban as a natural capital. In the text you refer to wildlife and habitats that occur in urban environments particularly in parks and gardens –It is arguable if the urban environment is the natural capital or it is the parks and gardens and their wildlife that is natural capital.	Noted, Urban was used as an overarching term for the different Natural Capital Stocks within the urban environment in line with the national natural capital atlas such as: Blue space Green space - not semi-natural Open mosaic habitats Woodland, scrub and hedge Semi-natural habitats Further detailed will be provided within the environmental assessment report.
28	Natural England	Natural Capital Baseline - coastal and marine	if the WRSE region goes out to 1 nautical mile (as the WFD does) it is surprising that the WRSE region only has 1% coverage of marine and coastal habitats. Clarification of this point would be helpful. The	The agreed the percentage covers will be updated and Marine capital

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			importance of the near shore marine and coastal habitats for recreation, health and migratory fish is not fully recognised and information on this should be expanded.	considered within the assessment
29	Natural England	Key issues and opportunities	Natural England welcomes the reference to net gain as an opportunity. The state of the natural environment included that most impacted should be referenced more fully in the issues section. Please refer to Natural England's letter dated 4th September on WRSE's Policy consultation. In that Natural England recommended that the policies of WRSE should be more clearly the 25 YEP policies and there should be clearly stated commitments to how your policies are going to contribute to the 25 YEP goals. The baseline, issues and opportunities list should set out more clearly the potential of WRSE to contribute to Governments 25 YEP goals including: An aim to restore "75% of our one million hectares of terrestrial and freshwater protected sites to favourable condition, securing their wildlife value for the long term "The Defra 25 Year Environment Plan states "We will achieve a growing and resilient network of land, water and sea that is richer in plants and wildlife this includes[...] creating or restoring 500,000 hectares of wildlife-rich habitat outside the protected site network, focusing on priority habitats as part of a wider set of land management changes providing extensive benefits."	The key issues and opportunities will be updated to make it clearer how the WRSE regional plan could support and contribute to the 25 Year Environment Plan goals.
30	Natural England	Key issues and opportunities - nature based solutions and synergistic impacts	The issues and opportunities section is very light on the need for and benefits of nature-based solutions. Reference should be made to opportunities to use nature based solution to deliver multiple benefits such as carbon sequestration, biodiversity, nutrient	The key issues and opportunities table will be updated to include more reference to the need for and benefits of

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			capture, urban cooling, flood risk mitigation in addition to improved infiltration and storage of water for resources.	nature-based solutions. This will be a combination of the natural capital assessment and the outcomes from the catchment workshops, this will support the development of NBS options.
31	Natural England	Key issues and opportunities - nature based solutions and synergistic impacts	One issue common to all SEAs is that separating the impacts into separate topics makes it more difficult to identify the synergistic impacts of schemes but also the multiple benefits from nature-based solutions	Noted, it is aimed that by using the SEA and Natural capital assessment that benefits across different areas will all be captured. In addition, as the SEA benefit score will be the combination of all the SEA positive impacts it will capture benefits that span multiple topic areas.
32	Natural England	Key issues and opportunities - making water available for wildlife to adapt to climate change	Inherent in the Defra objective above is the need to make wildlife more resilient to climate change. In the climate section, the opportunity to make more space and in particular water available for wildlife is not adequately covered. There are two opportunities linked to climate change for wildlife for the WRSE: i)The to reduce impacts of abstraction and water supply infrastructure from current levels and leave more water to enable wildlife to be more resilience to climate change in its current location ii)To reduce impacts of abstraction and water supply infrastructure from current levels and leave more	The suggested opportunities will be added into the key issues and opportunities section.

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			<p>water to enable wildlife to adapt to climate change and more, in particular for those freshwater species to avoid saline intrusion by migrating upstream. Currently there is insufficient water left in the environment to create new water dependant habitats to help even our most rare and protected wildlife adapt to climate change.</p> <p>The issue of “freshwater squeeze” is particularly acute in the South East where we have a sinking coastline due to isostatic readjustment from the last ice age and where our highly modified coast is forcing saline wedges higher up estuaries than would naturally be the case.</p>	
33	Natural England	Proposed SEA objectives and assessment - Biodiversity Objectives	Table 6.1 is more closely aligned to the objectives in the 25 YEP and statutory requirements than the issues and options table which is welcome.	Noted. As per the comment above the key issues and opportunities will be updated to include clearer alignment and reference to the 25 YEP.
34	Natural England	Proposed SEA objectives and assessment - Biodiversity Objectives	The first objective which currently states “Is the option likely to affect the conservation status of any SPA, SACs, Ramsar sites, SSSI or locally designated sites”? Needs to be reworded as Is the option likely to affect the conservation status of any SPA, SACs, Ramsar sites and MCZ, undermine or prevent restoration of SSSI condition or affect the condition of locally designated sites?	The first assessment question under the biodiversity SEA objective will be updated as suggested.
35	Natural England	Proposed SEA objectives and assessment - Biodiversity Objectives	The reference to BAP habitats is more strictly referred to as Section 41 of the NERC act habitats and species of principal importance for the purpose of conserving biodiversity.	The wording referring to BAP habitats will be updated in line with the NERC Act

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36	Natural England	Proposed SEA objectives and assessment - Biodiversity Objectives	<p>In line with the advice above (question 3) – an additional biodiversity objective could be including regarding the needs of wildlife to adapt to climate change. For example an objective could be framed along the lines of: “Does the option enable or reduce the potential of water dependent wildlife to adapt to climate change”. Inclusion of climate change adaptation for wildlife in assessment is supported by Government and water sector policy:</p> <p>The Defra 25 Year Environment Plan aspires to “take all possible action to mitigate climate change, while adapting to reduce its impact”. WISER (page 54) states “a priority for all should be to work together to build an evidence-based understanding of the likely effects of climate change and identifying and implementing low carbon solutions that address any negative environmental impacts that may arise”.</p>	An additional assessment question/sub-theme under the biodiversity objective will be added to cover this issue.
37	Natural England	High-Level screening RAG criteria and definitions/ SEA objectives scoring criteria - Table 7.1	The table is not completely consistent with legislative tests and information and has not fully had regards to Natural England’s comments in our letter of the 30th July 2020 to Nick Price acting on behalf of WRSE.	The RAG screening is not part of the HRA legislative process and is not the Stage 1 Test of Likely Significance. It was included to ensure the water companies unconstrained to constrained list screening was consistent and picked up 'show stoppers'. Due to delays getting option information the RAG screening is now less prominent in

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				our approach. The HRA process starts with the Stage 1 Test of Likely Significance following the proposed method set out in HRA Method Statement in Appendix F of the Scoping Report.
38	Natural England	High-Level screening RAG criteria and definitions/ SEA objectives scoring criteria - Assessment of SPAs, Sacs and European sites	The first line with regards to impacts on SPAs, SACs and Ramsar sites needs to be rewritten with regards to the tests of the Habitats Regulations. Both still refer to criteria related to these sites that are not related to their conservation objectives and refer to adverse effects which have a specific meaning in the legislation with respect to sites covered by the Conservation of Habitats and Species Regulations 2017 (as amended). The 400 m distance selected is explicitly related to bird disturbance and in particular to the Thames Basin Heaths SPA. Other impacts from further away will be adverse for other features and impacts. In addition adverse effects can only be assessed as part of an appropriate assessment in light of the sites conservation objectives. The statements in table 7.1 do not refer to the legislative tests nor the conservation objectives and therefore are not compliant with the legal assessment of plans or projects. In addition this table (7.1) is not consistent with the HRA methodology in Appendix F – and the SEA of a plan cannot assess the impacts of plan options on SACs, SPAs and Ramsar sites differently to the HRA. Natural England recommends that the first	Please see response to comment 37. The SEA will use the results of the HRA to inform the SEA objective on biodiversity in relation to effects on Natura 2000 sites.

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			line simply refers to the HRA and the SEA matrices compile the data from the HRA screening set out in appendix F but subject to the amendments listed in Annex 1 A above.	
39	Natural England	High-Level screening RAG criteria and definitions/ SEA objectives scoring criteria - Assessment of SPAs, Sacs and European sites	SEA objectives Assessment Scoring criteria Appendix E - This table does not appear to be related to the legislative tests for biodiversity or landscapes. Links to National Planning Policy Framework polices are unclear. This should be rectified.	SEA scoring for Natura 2000 sites will be in line with the HRA and the HRA results will be used as evidence for the assessment under the biodiversity objective. Links to the NPPF policies will be made clearer.
40	Natural England	High-Level screening RAG criteria and definitions/ SEA objectives scoring criteria - Other designated sites wider biodiversity and landscape	Marine conservation zones are not referred to in Table 7.1. Natural England welcomes reference to the SSSI IRZs but we do not agree with the wording of assessment for the red category. Our IRZs are the filter we recommend for more detailed assessment.	Due to options information delays the RAG assessment will not be used to screen options. MCZs and SSSIs will be covered as part of the SEA assessment and effects on these sites from options will be considered.

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41	Natural England	High-Level screening RAG criteria and definitions/ SEA objectives scoring criteria - Other designated sites wider biodiversity and landscape	Impacts on protected landscapes of options use single distance criteria – these distance criteria are not related to the likely impact of the options. A new large reservoir may have landscape impacts several kilometres away and small pipelines may not affect a designated landscape unless inside the landscape or in a very obvious location in the context or setting. The concept of “context and setting” of protected landscapes are not referred to and should be in landscape assessment criteria. The concept of major development in a protected landscapes which should be avoided based on policies in the NPPF is not referred to. Natural England recommend the landscape criteria are amended to better reflect the legislative tests and policy tests for impacts on landscape.	Due to options information delays the RAG assessment will not be used to screen options. Effects of options on landscape will be considered as part of the SEA which will include looking at landscape designations and effects on the setting and character of the landscape. It is agreed that distances do not provide an effective assessment which is why the SEA looks at wider effects on setting and character.
42	Natural England	High-Level screening RAG criteria and definitions/ SEA objectives scoring criteria - Other designated sites wider biodiversity and landscape	In the more detailed options assessment describes how the final assessment will provide an assessment of the residual effects with embedded mitigation. Natural England strongly recommends that the impact matrices include a version without mitigation and then the final residual impacts matrix. In Natural England’s experience there is a tendency in SEAs to overestimate the efficacy of mitigation especially with regards to protected habitats and landscapes. This can lead SEAs to provide false “positives” where options are seen as low risk but at the project scale cannot be delivered as the mitigation is shown to be ineffective. In Natural England’s experience this has proven very costly to companies in	The SEA assessment will look at the effects of options both pre and post mitigation. The pre-mitigation will include anything that is inherently part of the project and is costed for, so essential it is the option not mitigation. Anything additional will be considered as mitigation and will be included in the residual effects assessment.

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			the WRSE region and lead to significant delays in implementing schemes.	
43	Natural England	Any other comment	Pg. 12 states “Supply options may include transfers, desalination, water reuse, conjunctive use, aquifer storage and recovery, reservoirs and trading”. Natural England recommends adding in nature based solutions, to improve aquifer recharge and water retention in this list.	Nature-based solutions will be added to the list as potential option types.
44	Environment Agency	Additional plans or programmes relevant to the WRSE regional plan SEA	<p>There is a comprehensive coverage of relevant international, national or regional plans to inform the scoping report. Specific points for consideration:</p> <ul style="list-style-type: none"> • The Environment Agency’s National Framework and supporting Guiding Principles for Environmental Destination • The draft Water Resources Planning Guidelines and supporting technical notes that are out for consultation • Any documents relating to OxCam development • Consider EA Strategic and Local Outcome Plans. These are currently being developed but may be worth noting. • Consideration of other regional groups’ publications – Water resources East, water west, • Our catchment management strategies have been renamed as abstraction licensing strategies. These documents set out the policy framework under which abstraction decisions including water company proposals will be considered. These constraints and availability of new volumes of water will be outlined in 	The suggested plans, programmes and guidance documents will be included where appropriate and available.

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			<p>these documents. There is often a tendency to use or develop new conceptual tools and models to consider potential implications, and water availability. These tools cannot automatically replace existing and trusted applications. The outcome of these new tools will need to be compared with these existing tools to understand any differences. It is these existing tools that have been used to format the policies position under which these proposals will be considered.</p>	
45	Environment Agency	Baseline information	<ul style="list-style-type: none"> • With regards to the climatic factors, how will sunshine, snowfall and wind climatic data be used in the SEA assessment? • It is good to see use of GIS to help evaluate the number of options being considered by WRSE, but this should not replace local assessment which may provide more detailed information to enable well-informed and integrated assessment of effects of options. • Flood risk, page 27- What are the impacts of flood risk to the security of water supply security (i.e. water quality problem) and are there any measures to reduce the flood risk on natural environmental and water supplies? • Future baseline, page 37 – this section could be expanded more, and justification provided on how these key trends are identified and whether there are other elements that are missing from the assessment. • Each individual main river should have been set an Ecological Flow objective. This data will be critical when comparing if a new water 	<p>Climate change scenarios will be incorporated into the assessment process. A proportionate approach will be undertaken but recommendations for more detailed assessments will be proposed for the WRMP24 SEAs. Other work streams are looking at water supplies with regard to flood risk and resilience this will be incorporated into the SEA. Future climate change scenarios and trends will be modelled these will use the latest NE and EA guidance and the results will inform</p>

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			<p>company proposal is indeed compatible with the SEA objections.</p> <ul style="list-style-type: none"> Existing ALF/AMP/Sustainability Reductions changes will all need to be understood. These licensing changes will help to identify existing sensitivities and/or where resources have already been changed for environmental reasons. 	<p>the SEA. EFI and EF objectives will be used to inform the environmental ambition, a review of potential licence changes will be undertaken.</p>
46	Environment Agency	Key issues and opportunities identified	<p>Table 5.1:</p> <ul style="list-style-type: none"> The impacts of climate change on habitats and ecosystem should be covered too. Also monitor sustainability and reduce impacts on Chalk groundwater or Chalk streams should be included. Stakeholders' participation in catchment management schemes could be mentioned. Will there be any links between SE SEA and new ELM (Environmental Land Management) scheme in regard to land/ soil management? The report recognises the area is already water-stressed with a growing population base that equally has a disproportionately high demand for water. The statistics provided show how climatic factors could have a significant influence both on future water availability and will need to be incorporated when deciding on environmental safeguards. The environmental needs to today might be considerably different in 50-75 years-time. These themes will be central in deciding if and where new resources might be available. This availability is not just about 	<p>Agreed - this will be addressed by incorporating the results from other workstreams, such as resilience, catchment mapping and environment destination into the assessment process. Trade offs and the wider importation issues will be considered as part of the assessment process.</p>

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			<p>now but in the future with the lowest environmental implications.</p> <ul style="list-style-type: none"> • The report does set some high aspirations with regard no adverse environmental implications by stating no effect on surface water and/or groundwater quality or quantity. It will be interesting to see how going through SEA methodology within a water stressed area that these principles can be adhered to. Surface water and groundwater sources already have limited capacity to supply additional sources of water with the need to safeguard (or improve) environmental standards. • Table 6.3 highlights the potential conflict between protecting biodiversity and meet all resource requirements. The issue will be how the process can deal with many negative outcomes. • Environmental gain versus environmental cost – likelihood is that at least a proportion of new water supplies will need to be imported. These imports will need not just to supply additional water but may have to replace existing damaging sources of water. These imports will have an environmental cost which also needs to be considered and compared against the environmental gain. This trade-off to meet the aspirations mentioned will need to neutralise (wherever possible) the imported environmental costs (e.g. carbon costs and new infrastructure). It would be useful to make these comparison as there will need to be trade-off somewhere. 	
47	Environment Agency	Proposed SEA objectives and assessment questions/ sub-themes	The report has not highlighted strong linkages between SEA and Natural Capital element. Would there be any implication and opportunities that NC can provide within the WRSE SEA objectives?	Acknowledged that a great link could be highlighted in the report. As stated in section 6.1 "The SEA

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				assessment will also consider the impacts on natural capital stocks that cannot be incorporated within the Natural Capital metric".
48	Environment Agency	Proposed SEA objectives and assessment questions/ sub-themes	<ul style="list-style-type: none"> • Table 6.2 Page 50 does not reflect the synergies between different objectives but only shows comparisons of compatibility and non-relevancy. • “The WRSE environmental assessments including the SEA will support the environmental destination by assessing and informing the long-term resilience of the regional plan and aiming to achieve a plan that provides environmental net gain against the four environmental metrics.” The text in yellow is taken from Page 3 Section 2.3 and indicates potentially that the selected options might not be able to achieve the aspirations indicated by the SEA methodology. 	Noted. Potential synergies between objectives will be discussed. Wording on 'aiming to achieve' will be amended as the regional plan should be developed to achieve environmental net gain.
49	Environment Agency	Proposed SEA objectives and assessment questions/ sub-themes	<ul style="list-style-type: none"> • Future direction with regard to legislation. The robustness of a proposal would be subject to modelling and assessment linked to changing climatic factors but environmental legislation is also likely to further development. There could be scope to consider how selected proposals would fair if additional environmental objectives were established to safeguard flora and fauna. 	The ongoing guidance and legislation development is being closely monitored. The catchment mapping work will look at additional options to support environmental improvements such as river restoration projects. The overarching objectives for the regional plan or the WRMP24

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				SEA should reflect this.
50	Environment Agency	High-level screening RAG Criteria and Definitions and/or the SEA objectives scoring criteria	<ul style="list-style-type: none"> • There is a general risk of simplification of qualitative information and actual negative or positive effects in SEA scoring mechanisms. However, we recognise that this is a high level screening, but screening decisions should be sense-checked with stakeholders and regulators. • Any screening approach which involves a level of professional judgment is open to an element of interpretation. The RAG criteria only deals with a small aspect of the potential environmental implications. The Water criteria solely highlights SPZ, NVZ and flood risk. These criteria do not deal with the traditional water resource considerations which will need to be covered by other assessment methodology to assess the implications of individual resource options. • The outcome from this exercise should be explained through further consultation highlighting where professional judgement has been used. 	The RAG assessment is not part of any of the statutory assessment and was meant to be used a validation of the water companies own unconstrained to constrained list screening and potentially identify any 'show-stoppers' that had come through. However, due to options information delays the RAG assessment will not be used to screen options.
51	Environment Agency	Other comments on the scoping report	Further details on how the numerical valuation of effects will be incorporated into the decision making modelling?	Details on how numerical values will be included in the investment model are provided in the WRSE method guidance document. The environmental assessment results will be translated into four metrics: SEA positive, SEA negative, BNG

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				and natural capital, which will then go into the investment model. These SEA values are purely for comparison of options within the investment model and are not part of the formal SEA process. Further information on how the metrics will be developed from the environmental assessment results can be provided and/or discussed with the EA for clarification.
52	Environment Agency	Other comments on the scoping report	We recognise that producing an assessment covering the whole of the south east presents challenges in ensuring an appropriate level of detail. Will there be any consideration through SEA of the geological differences across WRSE Area that lead to the WR pressures/ benefits? For example, an emphasis on protecting chalk groundwater resources where aquifer is present for riverine baseflow (whilst acknowledging the need to prevent unsustainable abstraction) and looking to assess winter storage/ NFM capacity in those areas with more spatey river flow that do not have the baseflow buffer element. Solutions and risks need to be mapped and assessed according to the nature of the environment, not just to the efficacy of the built infrastructure of the “water grid”.	There will be additional work undertaken with regard to vulnerable catchment and chalk rivers. streams and groundwater this will form part of the environmental ambition which will contribute to the SEA. The combination of the various other workstreams such as: options appraisal, catchment mapping, catchment resilience and environmental destination will support the SEA

Ref	Organisation	Topic / Report section	Feedback	Response
53	Environment Agency	Uncertainties	The scope does not seem to consider uncertainty much (beside the appendix on the Habitats Regulations Assessment Method) – how will the uncertainty in assessments be dealt with?	Noted - we will review the potential for quantification of uncertainty within the SEA, Natural Capital and BNG. Uncertainty is considered within the WFD assessments and INNS.
54	Environment Agency	Consideration of multi-purpose schemes	How has multi-purpose of options including social and environmental benefits to wider communities/stakeholders been considered? Active inclusion of stakeholders in development and monitoring development and implementation on larger water schemes will be good.	There is considerable consultation being undertaken with regard to catchment management and the development of options that include NBS and those that are socially beneficial. This work will support the environmental assessments and catchment portfolio options development.
55	Environment Agency	Natural Capital	<ul style="list-style-type: none"> • In previous documents it was stated that the ecosystem services metrics may be limited to 5 services. We would suggest that further services should be considered. • In regard to the habitats to be assessed would recommend that due to the local significance that chalk streams to be included as a specific habitat 	The Five ecosystem services were suggested in line with the WRMP24 supplementary guidance on environment and society in decision making. Following scoping we will be assessing 3 additional services - food production, recreation & amenity and air pollutant removal.

Ref	Organisation	Topic / Report section	Feedback	Response
				<p>Additionally impacts of natural capital stocks that are not captured here will be assessed in the SEA assessment.</p> <p>Agreed that chalk streams should be mapped and considered as a unique habitat. This was raised during consultation</p>
56	Environment Agency	Baseline Maps	<ul style="list-style-type: none"> • Mapping with multiple layers could be used to highlight potential areas with multi-purpose environmental benefits for future investments? Will this be considered as well as using mapping to assess impacts? 	This will not be considered within the environmental assessment as this focuses on developed options however this has been addressed within the WRSE catchment workshops and subsequent Blue green option development.
57	Environment Agency	Drinking Water Protections zones	Expected impacts of drinking water protected areas would need to be considered	Assume this is referring to Drinking water safeguard zones. If so these are designated areas in which use of certain substances such as fertilisers, pesticides and other chemicals must be carefully managed to prevent pollution of water that is abstracted for use as drinking

Ref	Organisation	Topic / Report section	Feedback	Response
				water. It is not considered that the options will affect use of fertiliser and pesticides, apart from potentially catchment management options. Chemicals may be used to treat water but discharges would be within licence and water quality requirements.
58	Environment Agency	Section 1.3	Pg. 11. Amendment to bullet four: <ul style="list-style-type: none"> Decide on the scope for the SEA, ensuring that it covers all the likely significant environmental effects and identification of designated and environmentally sensitive sites of the WRSE regional plan 	Wording to the bullet point will be amended
59	Environment Agency	Section 1.3	Pg. 11. Amendment to bullet five: <ul style="list-style-type: none"> Provide sufficient opportunity to engage and collaborate with the Consultation Bodies and wider stakeholders. <p>Would also recommend that you would need to include specific regard to local government – councils / planning authorities particularly around population impacts / housing developments / demand measures / water efficient technologies.</p>	Wording to the bullet point will be amended
60	Environment Agency	Section 2.2	Pg. 12. Amendment to bullet four (replace): <ul style="list-style-type: none"> Mitigate the impacts of climate change through demand and supply interventions to ensure water is available for society and the environment 	The wording in the bullet points is taken from the WRSE aims on its website. This comment will be fed back to WRSE for discussion and update if agreed.

Ref	Organisation	Topic / Report section	Feedback	Response
61	Environment Agency	Section 2.2	Pg. 12/13 Paragraph under bullets: <ul style="list-style-type: none"> • Supply options may include transfers, desalination, water reuse, conjunctive use, aquifer storage and recovery, rainwater harvesting, catchment management schemes, reservoirs and trading. Demand management options may include leakage reduction, water metering, seasonal water rates, targeted restrictions, behavioural measures and water efficiency measures. 	The wording will be amended
62	Environment Agency	Section 2.3	Pg. 13. Paragraph 1: <ul style="list-style-type: none"> • The terms refers to the consideration of actions to enhance the environment and build resilience to future challenges 	The wording will be amended
63	Environment Agency	Section 2.3	Pg. 13. Paragraph 2: <ul style="list-style-type: none"> • Water quality and availability requirements for the environment. The forecast will be based on current adverse environmental impacts, previous investigations, river basin management plans, regional policies and a range of flow-based targets where no other evidence exists. 	The wording will be amended
64	Environment Agency	Section 2.3	•Last paragraph on page 13 talks about plan aiming to provide environmental net gain against the four environmental metrics. What are those?	The environmental metrics are those proposed to translate the environmental assessment results into metrics for the investment model: SEA positive, SEA negative, BNG and Natural capital as set out in the WRSE methodology guidance document

Ref	Organisation	Topic / Report section	Feedback	Response
65	Environment Agency	Section 3.2	<p>Pg. 16. Bullet Point List: Points to be added...</p> <ul style="list-style-type: none"> • Carbon sequestration with the aim of net zero carbon emissions by 2050 as per Paris Climate Agreement (and legislation passed by UK govt. in 2018) • Habitat creation and safeguarding ecosystem services (Woodland Carbon Guarantee scheme in line with the Woodland Carbon Fund) • Catchment management / nature based solutions working to enhance natural processes (existing work through CaBA) • Reduce water waste and leakage (Ofwat targets and penalties) • Improve resilience to extreme droughts ensuring consistency with WRMP24 (1/500 year resilience) 	The suggested bullet points will be included in themes and messages from the plans and programme review listed in Section 3.2.
66	Environment Agency	Table 4.1	<ul style="list-style-type: none"> • Ecological sites in the WRSE – taking account of the current interest in chalk streams, it would be useful to specifically mention chalk streams; not all of them are protected areas. Those outside SPA/ SAC/SSSI designation are simply NERC priority habitats included in UK BAP (like those in Herts and North London Area). If not specifically chalk streams (as some of those will be accounted under other protected areas, UK BAP priority sites should be added to the list. 	Noted - all chalk streams will be considered where appropriate.
67	Environment Agency	Section 4.2.2	<ul style="list-style-type: none"> • Since this is an SEA for WR plans it would be useful to recognise role of abstraction in limiting flows to reach GES/P and causing poor status of groundwater bodies. Physical modifications and pollution might be top three but it is the water resources situation driving strategic resource options because of significant deficits in the region at present and into the future. 	Section 4.2.2 will be updated to reference the role of abstraction in limiting flows to reach GES/P and causing poor status of groundwater bodies along the with the other sources identified.

Ref	Organisation	Topic / Report section	Feedback	Response
68	Environment Agency	Table 4.10	<ul style="list-style-type: none"> This does not seem to recognise the significance of drought/ prolonged dry weather – their consequences, recent frequency and duration of dry periods that led to increased public interest and concerns of the state of chalk rivers especially but also raised questions over resilience of public water supplies. 	Table 4.10 will be updated to include more reference to drought and prolonged dry weather
69	Environment Agency	Table 4.14	<ul style="list-style-type: none"> Some more details on water environment would be welcomed, like chalk streams, wetlands featuring in the AONB.... 	Table 4.14 will be updated to include additional details on features within the identified AONB such as chalk streams
70	Environment Agency	Section 4.22	<ul style="list-style-type: none"> 2015 classifications used – 2019 classifications now available 	The baseline will be updated with the 2019 classifications
71	Environment Agency	Section 4.2.10	<ul style="list-style-type: none"> Natural capital section doesn't provide information on services provided by the environment in the WRSE region. What is the state of these natural capital assets? Is it overall good/ poor/ at risk? It seems also that groundwater is missing from the list and would assume that's a critical natural capital asset for the SEA? 	<p>The current state of groundwater stocks and the likely impacts of the proposed regional plan on these stocks will be captured in the Environmental ambition assessment.</p> <p>A Natural Capital baseline will be provided in the environmental report, a baseline could not be established before the zone of influence for the plan has been finalised.</p>
72	Environment Agency	Section 4.3	<ul style="list-style-type: none"> Again future considerations for groundwater are missing. It would be useful to include maybe separate consideration for groundwater and surface water as 	The future baseline section will be updated to include

Ref	Organisation	Topic / Report section	Feedback	Response
			the response to climatic conditions/ human activity/ pollution and remediation has different timeframe and potentially consequences. Risks also will vary.	groundwater and surface water.
73	Environment Agency	Section 5.1	Table 5.1: <ul style="list-style-type: none"> Biodiversity, Flora and Fauna – should clearly state no adverse impacts to internationally designated sites. 	The key issues and opportunities will be updated to include the suggestions
74	Environment Agency	Section 5.1	Table 5.1: <ul style="list-style-type: none"> How do we understand cost-effective in this context? <ul style="list-style-type: none"> (Biodiversity section) Wetland and marsh habitat rely on water, the WRSE regional plan should ensure that it does not affect these areas through over abstraction and should look for opportunities to reduce abstraction pressure where cost effective and possible. 	The key issues and opportunities will be updated to include the suggestions proposed by the catchment mapping workstream this will combine NDS with abstraction reduction scenarios to determine best value outcomes.
75	Environment Agency	Section 5.1	<ul style="list-style-type: none"> Water – should clearly state protection of flow regimes and compliance with EFI and CSMG where applicable. CSMG targets for Water Quality also of relevance, alongside WFD improvements. As opposed to saying the 'The WRSE regional plan has the opportunity to improve the environment by leaving more water in the region's rivers, streams and underground sources. It should state: 'The WRSE regional plan will take account of compliance with EFI and CSMG flow targets for designated sites, and non-designated sites where applicable. The WRSE regional plan will leave ensure more water is available in the environment to mitigate impacts from climate change and help achieve biodiversity net gains.' Important to recognise here another significant pressure: 	Noted

Ref	Organisation	Topic / Report section	Feedback	Response
			abstraction. Many of the waterbodies are failing GES/P due to abstraction having detrimental impact (among other pressures of course) on flows. There are also groundwater bodies (like chalk aquifers) at risk or already at poor WFD quantitative status. Drought and prolonged dry weather detrimental impact on water environment exacerbated further by abstraction is also omitted here.	
76	Environment Agency	Section 5.1	<ul style="list-style-type: none"> • Soil – promote regenerative agricultural practices and implement catchment management schemes to reduce water quality impacts, and enhance ecosystem services for the benefit of the environment and society. To be included / amended: <ul style="list-style-type: none"> o Promote regenerative agricultural practices o Prioritise the implementation of catchment management solutions to help manage soils and reduce impacts of waterbodies o Ensure measures are taken to prevent soil erosion o Ensure the sustainable use of land o Reduce nutrient loads within surface water and groundwater bodies 	The key issues and opportunities will be updated to include the suggestions
77	Environment Agency	Section 5.1	<ul style="list-style-type: none"> • Air – Opportunity isn't entirely clear? Needs more detail – planting of trees, reduced emissions from Water Treatment Works? 	The key issues and opportunities will be updated to include the suggestions
78	Environment Agency	Section 5.1	<ul style="list-style-type: none"> • Climatic Factors – To also include alongside hotter and drier summers and warmer and wetter winters, short duration 'extreme weather events' such as thunderstorms and heatwaves. • To be added to implications – increased demand due to extreme events (i.e. heatwaves). Greater risks to rapid responding 	The key issues and opportunities will be updated to include the suggestions

Ref	Organisation	Topic / Report section	Feedback	Response
			<p>catchments (i.e. North Sussex clay catchments).</p> <ul style="list-style-type: none"> To add the following bullets: <ul style="list-style-type: none"> - Ensure zero net emissions - Promote nature based solutions and restore habitats to offset and sequester carbon within the WRSE region, while also achieving biodiversity net gains 	
79	Environment Agency	Section 5.1	<ul style="list-style-type: none"> Population, Communities and Human Health – Ensure an economically sustainable water supply for customers. This may see the economic value of water increase and require a greater value to be assigned to water through increased charges and / or seasonal water rates. 	The key issues and opportunities will be updated to include the suggestions
80	Environment Agency	Section 5.1	<ul style="list-style-type: none"> Landscape - Amend bullets <ul style="list-style-type: none"> - Ensure the protection of landscape character - Enhance landscapes by working with stakeholders through habitat creation, implementation of catchment based solutions and safeguarding existing habitats. 	The key issues and opportunities will be updated to include the suggestions
81	Environment Agency	Section 5.1	<ul style="list-style-type: none"> Material Assets – Nothing on leakage? <ul style="list-style-type: none"> - Achieve required leakage reduction targets - Reduce unplanned outages 	The key issues and opportunities will be updated to include the suggestions
82	Environment Agency	Section 6.1, Table 6.1	<ul style="list-style-type: none"> Soil <ul style="list-style-type: none"> - Will the option promote the sustainable use of land? - Will the option prevent nutrient loading in water bodies? 	The suggested assessment questions will be added
83	Environment Agency	Section 6.1, Table 6.1	<ul style="list-style-type: none"> Water: <ul style="list-style-type: none"> - Will the option mitigate flood risk? (i.e. attenuation of flows through NFM, catchment storage etc.) Flood: <ul style="list-style-type: none"> - Will the option mitigate flood risk? (i.e. attenuation of flows through NFM, catchment storage etc.) Protect and enhance: <ul style="list-style-type: none"> - Will the option comply with flow targets (i.e. EFI, CSMG)? Deliver reliable and resilient water supplies: <ul style="list-style-type: none"> - Does the option reduce the presence of containments in waterbodies, and make more water available to the environment? 	The suggested assessment questions will be added

Ref	Organisation	Topic / Report section	Feedback	Response
84	Environment Agency	Section 7.1, Table 7.1	<p>Water: Rag criteria should also include:</p> <ul style="list-style-type: none"> - Drinking water protected areas – integration of surface water safeguard zones - WFD waterbody status (flagging system for no impacts (green), potential impacts (medium), expected impacts (red)) 	<p>The RAG assessment is not part of any of the statutory assessment and was meant to be used a validation of the water companies own unconstrained to constrained list screening and potentially identify any 'show-stoppers' that had come through. However, due to options information delays the RAG assessment will not be used to screen options. The SEA and WFD will cover the criteria suggested.</p>
85	Environment Agency	Proposed RAG criteria and definitions	<ul style="list-style-type: none"> • Whilst it includes SSSI impact zones, it also just looks at distance as a criteria for assessment purposes for priority habitat. Distance doesn't of course determine whether an action or plan/project will necessarily impact on it. So this doesn't seem an appropriate method to use. In the Appendix, the assessment scoring criteria uses the level of impact to determine the scale of the effect, which is better. However it doesn't really provide a clear basis for assessing what a 'major' or 'moderate' impact would be. As this will vary depending on what is impacted on. • It isn't clear how impacts on species would be determined for example, as this would be reliant on having sufficient population data to determine impacts, which is 	<p>The RAG assessment is not part of any of the statutory assessment and was meant to be used a validation of the water companies own unconstrained to constrained list screening and potentially identify any 'show-stoppers' that had come through. However, due to options information delays the RAG assessment will not be used to screen options.</p>

Ref	Organisation	Topic / Report section	Feedback	Response
			<p>unlikely.</p> <ul style="list-style-type: none"> • A lot of the assessment criteria actually would not assess watercourses either, as most are not a priority habitat, or locally or nationally designated. WFD only looks at a waterbody scale and so does not consider smaller impacts. • It would be useful to understand the definition of the criteria and the level of detail that will be provided to inform these judgements. • Also need some further explanation on how detailed considerations for biodiversity will fit into a plan covering the whole of the south east. • 'Green corridors' and migration routes have been included, so to some extent river corridors might be covered, but need further confirmation. • We don't have any guidance on how to specifically include streams and rivers other than as a generic habitat type, Only chalk streams, SSSI rivers and a handful of less modified rivers meet the criteria of priority river habitat. 	<p>The SEA will look at more than just distances when considering effects of an option. Further clarity will be provided on the SEA scoring definitions for major and moderate and how these will be assessed. The regional plan is a high-level assessment therefore, local level data won't be included and this should be covered as part of WRMP24. The level of detail of the assessment will also be proportionate to a regional plan level strategic assessment. The HRA and WFD assessments will provide more specific information which will also feed into the SEA assessment under the relevant objectives.</p>
86	Environment Agency	Figure 7.1	Figure should be updated to demonstrate how potentially mitigated options go back into the options mix for detailed assessment?	Noted, figure will be updated.

Ref	Organisation	Topic / Report section	Feedback	Response
87	Environment Agency	Section 7.3	Multi-criteria analysis uses some subjectivity. Who and how will be deciding what constitutes major positive/ negative effects? Will there be weighting applied to different types of habitats if trade-offs occur?	Major effects are defined in the SEA scoring definitions in Appendix E. The SEA will just report the findings of the assessment. It is up to WRSE decision-makers to agree on decisions regarding trade-offs. For SEA results will be simplified into a metric for each options but the metric should reflect the degree of effects, although there will be trade-off within this. Therefore, the SEA results themselves should be used alongside the metrics to provide a full picture of effects of an option.
88	Environment Agency	Section 7, resilience to climate change	The assessment will also look into resilience to climate change of options. It is not clear whether this includes habitats/ecosystems. Clarification on this would be helpful.	Noted - this will include habitats and ecosystems and included in the catchment
89	Environment Agency	Appendix E Page 108	Shouldn't there be added an objective: water environment more resilient to drought/ prolonged dry weather?	This will be included as an assessment question under the water environment objective

Annex C: Policies, Plans and Programmes Review

A review of the policies, plans, and programmes relevant to the WRMP was undertaken as part of the SEA Scoping process. The aim was to determine how the emerging WRMP may be affected by these external factors. Furthermore, the WRMP must aim to support current relevant policies, plans, programmes, and environmental protection legislation at international, national, and local levels. The WRMP must aim to support, and where possible, strengthen the objectives of other local plans and strategies within the Thames Water region.

A review of these documents is required to identify potential inconsistencies or constraints, and consistencies between these documents and the draft WRMP to inform the development of the SEA Framework. Table 3.2 lists current relevant policies, plans, and programmes which were considered during the SEA scoping stage and updated following scoping consultation.

Table C.1: Policies, Plans and Programme Review

Document Name	Key Objectives, Requirements, and Guidance
International	
Berne Convention on the Conservation of European Wildlife and Natural Habitats (1979)	The aims are to conserve wild flora and fauna and their natural habitats and to promote European cooperation. Particular importance is placed on the need to protect endangered natural habitats and endangered vulnerable species, including migratory species.
Bonn Convention on the Conservation of Migratory Species of Wild Animals (1979)	The Convention aims to conserve terrestrial, aquatic, and avian migratory species throughout their range.
Charter for the Protection and Management of the Archaeological Heritage (1990)	The charter lays down principles relating to the different aspects of archaeological heritage management. These include the responsibilities of public authorities and legislators, principles relating to the professional performance of the processes of incentivisation, survey, excavation, documentation, research, maintenance, conservation, preservation, reconstruction, information, presentation, public access and use of the heritage, and the qualification of professionals involved in the protection of the archaeological heritage. The Charter states that policies for the protection of archaeological heritage should constitute an integral component of policies relating to land use, development, and planning as well as of cultural, environmental and educational policies.
Commitments arising from the World Summit on Sustainable Development (WSSD), Johannesburg (2002)	Adopted at the World Summit on Sustainable Development in 2002 and built upon earlier declarations made at previous conferences and summits. It commits nations to take a collective responsibility to build a human, equitable and caring global society cognisant of the need for human dignity for all. The Declaration also reinforces the three pillars of sustainable development: environmental, economic and social development at the local, national, regional and global level.
Convention on Biological Diversity (1992)	The Biodiversity Convention has three main aims which are to conserve biological diversity; to ensure the sustainable use of the components of biological diversity; and the fair and equitable sharing of the benefits arising out of the utilization of genetic resources.

Document Name	Key Objectives, Requirements, and Guidance
Convention for the Protection of the Architectural Heritage of Europe (2009)	The aim of this Convention is to protect the archaeological heritage as a source of the European collective memory and as an instrument for historical and scientific study. Sources are considered to be elements of the archaeological heritage all remains and objects and any other traces of mankind from past epochs, the preservation and study of which help to retrace the history of mankind and its relation with the natural environment, for which excavations or discoveries and other methods of research into mankind and the related environment are the main sources of information, and which are located in any area within the jurisdiction of the Parties. The archaeological heritage shall include structures, constructions, groups of buildings, developed sites, moveable objects, monuments of other kinds as well as their context, whether situated on land or under water.
Convention on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters (Aarhus Convention) (1998)	The Aarhus Convention was created to give empowerment to citizens and civil society organisations in relation to environmental matters and is founded on the principles of participative democracy. It provides for access to environmental information; public participation in environmental decision making; and access to justice.
Kyoto Protocol on Climate Change (1997)	The Kyoto Protocol was adopted in 1997 and ratified in 2005. It commits its parties to limit climate change by setting internationally binding targets for emission reductions. Covering the six main GHGs, it required the UK to reduce emissions by 12.5% in the first commitment period (2008-2012). This was successfully achieved, and a second commitment period has been agreed whereby European Union (EU) countries will aim to achieve a joint 20% reduction compared to 1990 levels.
Paris Agreement (2015)	The Paris Agreement came out of the COP21 and aims to limit global temperature rises to 1.5°C to 2°C above pre-industrial levels. It brings together 196 parties from across the world into a common cause and requires all parties to put forward nationally determined contributions to strengthen efforts in the years ahead. It also aims to strengthen the ability of countries to deal with the impacts of climate change.
Ramsar Convention on Wetlands of International Importance especially as Wildfowl Habitat (1971)	Provides the framework for national action and international cooperation for the conservation and wise use of wetlands and their resources. The aim is 'the conservation and wise use of all wetlands through local and national actions and international cooperation, as a contribution towards achieving sustainable development throughout the world'. The Convention uses a broad definition of the types of wetlands covered, including lakes and rivers, swamps and marshes, wet grasslands and peatlands, oases, estuaries, deltas and tidal flats, near-shore marine areas, mangroves and coral reefs, and human-made sites such as fishponds, rice paddies, reservoirs, and salt pans.

Document Name	Key Objectives, Requirements, and Guidance
UN Framework Convention on Climate Change (1992)	The stated objective is to achieve stabilisation of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system. The parties should protect the climate system for the benefit of present and future generations of humankind, on the basis of equity and in accordance with their common but differentiated responsibilities and respective capabilities.
European	
A Clean Planet for all: A European strategic long-term vision for a prosperous, modern, competitive and climate neutral economy (2018)	The long-term strategy sets out Europe's commitment to lead in global climate action and to present a vision that can lead to achieving net-zero greenhouse gas emissions by 2050 through a socially-fair transition in a cost efficient manner. It looks into the portfolio of options available for Member States, business and citizens, as well as into how these can contribute to the modernisation of our economy and improve the quality of life of Europeans, protect the environment, and provide for jobs and growth.
Ambient Air Quality Directive (2008/50/EC)	It establishes ambitious, cost-effective targets for improving human health and environmental quality up to 2020. The EU objective on air quality is 'to achieve levels of air quality that do not result in unacceptable impacts on, and risks to, human health and the environment'.
Blueprint to Safeguard Europe's Water Resources (2012)	The Blueprint outlines actions in relation to improved implementation of current water legislation and the integration of water policy objectives into other policies, and also aims to fill the gaps in regard to water quantity and efficiency. The objective is to ensure that a sufficient quantity of good quality water is available for people's needs, the economy and the environment throughout the EU. It is closely linked to EU's 2020 Strategy and the 2011 Resource Efficiency Roadmap, however the analysis spans up to 2050 and is therefore expected to drive EU water policy over the long term.
Council Directive concerning Urban Waste Water Treatment (91/271/EEC)	The objective of this Directive is to protect the environment from the adverse effects of urban waste water discharges and discharges from certain industrial sectors. The Directive concerns the collection, treatment, and discharge of such waste water.
Council Regulation No. 1100/2007 of 18 September 2007 establishing measures	Updated 2019. Advice from the International Council for the Exploration of the Sea (ICES) in 2006 indicated that the stock of the European eel (<i>Anguilla anguilla</i>) is outside safe biological limits across European waters. The population has declined significantly, reducing to 5% of the original 1980s stock levels. In response to this advice, the European Union adopted Council Regulation (EC) No 1100/2007, which requires Member States to undertake a series of measures aimed at the recovery of eel stock. The goal is to achieve 40% escapement of adult eels, relative to that in

Document Name	Key Objectives, Requirements, and Guidance
for the recovery of the stock of European eel	<p>absence of anthropogenic factors, to sea to spawn. The EU Regulation was transposed into UK law under The Eels (England and Wales) Regulations 2009.</p> <p>Eleven Eel Management Plans have been prepared, one for each River Basin District identified in England and Wales. The plans outline the current situation and how we intend to achieve the targets required by the European Regulation. Such measures include a reduction in fishing pressure, improving access and habitat quality, and reducing the impacts of entrainment. The measures that will require the installation of passes at obstructions and screens at abstraction and discharge points that prevent the migration of eels.</p>
Directive on Animal health requirements for aquaculture animals and products thereof, and on the prevention and control of certain diseases in aquatic animals (2006/88/EC)	Directive on Animal health requirements for aquaculture animals and products thereof, and on the prevention and control of certain diseases in aquatic animals (2006/88/EC)
Directive on Bathing Water (76/160/EEC); and Directive 2006/7/EC repealing Directive 76/160/EEC (from 2014)	The overall objective of the Directive remains the protection of public health whilst bathing, but the revised Directive also offers an opportunity to improve management practices at bathing waters and to standardise the information provided to bathers across Europe and aims to set more stringent water quality standards and also puts a stronger emphasis on beach management and public information.
Directive on the Assessment and Management of Flood Risks (2007/60/EC)	The Directive's aim is to reduce and manage the risks that floods pose to human health, the environment, cultural heritage and economic activity. The Directive shall be carried out in coordination with the Water Framework Directive, notably by flood risk management plans and river basin management plans being coordinated, and through coordination of the public participation procedures in the preparation of these plans
Directive on the assessment of the effects of certain plans and programmes on the environment (2001/42/EC)	The Directive, known as the SEA Directive, sets out the requirement for the assessment of certain plans and programmes on the environment. An SEA is mandatory for plans/programmes which are prepared for agriculture, forestry, fisheries, energy, industry, transport, waste/ water management, telecommunications, tourism, town & country planning or land use and which set the framework for future development consent of projects listed in the EIA Directive. SEA is also required where plans/programmes have been determined to require an assessment under the Habitats Directive.

Document Name	Key Objectives, Requirements, and Guidance
Directive on the Conservation of Natural Habitats and of Wild Flora and Fauna (92/43/EEC)	<p>The main aim of the Habitats Directive is to promote the maintenance of biodiversity, taking account of economic, social, cultural and regional requirements. While the Directive makes a contribution to the general objective of sustainable development; it ensures the conservation of a wide range of rare, threatened or endemic species, including around 450 animals and 500 plants. Some 200 rare and characteristic habitat types are also targeted for conservation in their own right. The Directive provides for a ban on the downgrading of breeding and resting places for certain strictly protected animal species. Exceptions to the strict protection rules can be granted under very specific conditions. The Habitats Directive also establishes the EU wide Natura 2000 ecological network of protected areas. For these areas it provides a high level of safeguards against potentially damaging developments. Together with the Birds Directive, the Habitats Directive forms the backbone of EU nature protection legislation</p>
Directive on the Conservation of Wild Birds (79/409/EEC) (as amended)	<p>Directive 2009/147/EC of the European Parliament and of the Council of 30 November 2009 on the conservation of wild birds (this is the codified version of Directive 79/409/EEC as amended). This Directive ensures far-reaching protection for all of Europe's wild birds, identifying 194 species and sub-species among them as particularly threatened and in need of special conservation measures. There are a number of components to this scheme:</p> <ul style="list-style-type: none"> • Member States are required to designate SPAs for 194 particularly threatened species and all migratory bird species. SPAs are scientifically identified areas critical for the survival of the targeted species, such as wetlands. They are part of the Natura 2000 ecological network set up under the Habitats Directive 92/43/EEC. • A second component bans activities that directly threaten birds, such as the deliberate killing or capture of birds, the destruction of their nests and taking of their eggs, and associated activities such as trading in live or dead birds (with a few exceptions). • A third component establishes rules that limit the number of bird species that can be hunted (82 species and subspecies) and the periods during which they can be hunted. It also defines hunting methods which are permitted (e.g. non-selective hunting is banned)
Drinking Water Directive (1998/83/EC)	<p>The Drinking Water Directive sets out the following objectives:</p> <ul style="list-style-type: none"> • Sets quality standards for drinking water quality at the tap (microbiological, chemical and organoleptic parameters) and the general obligation that drinking water must be wholesome and clean • Obliges Member States to regular monitoring of drinking water quality and to provide to consumers adequate and up-to-date information on their drinking water quality

Document Name	Key Objectives, Requirements, and Guidance
	<ul style="list-style-type: none"> Member States may exempt water supplies serving less than 50 persons or providing less than 10 m³ of drinking water per day as an average and water in food-processing undertakings where the quality of water cannot affect the wholesomeness of the foodstuff in its finished form.
EC Directive on Bathing Water (76/160/EEC); and Directive 2006/7/EC repealing Directive 76/160/EEC (from 2014)	The overall objective of the Directive remains the protection of public health whilst bathing, but the revised Directive also offers an opportunity to improve management practices at bathing waters and to standardise the information provided to bathers across Europe and aims to set more stringent water quality standards and also puts a stronger emphasis on beach management and public information.
EC Directive on the Conservation of Natural Habitats and of Wild Flora and Fauna (92/43/EEC)	The main aim of this Directive is to promote the maintenance of biodiversity, taking account of economic, social, cultural, and regional requirements. While the Directive makes a contribution to the general objective of sustainable development; it ensures the conservation of a wide range of rare, threatened or endemic species, including around 450 animals and 500 plants. Some 200 rare and characteristic habitat types are also targeted for conservation in their own right. The Directive provides for a ban on the downgrading of breeding and resting places for certain strictly protected animal species. Exceptions to the strict protection rules can be granted under very specific conditions. The Habitats Directive also establishes the EU wide Natura 2000 ecological network of protected areas. For these areas it provides a high level of safeguards against potentially damaging developments. Together with the Birds Directive, the Habitats Directive forms the backbone of EU nature protection legislation.
EC Directive on the Conservation of Wild Birds (79/409/EEC)	<p>Directive 2009/147/EC of the European Parliament and of the Council of 30 November 2009 on the conservation of wild birds (this is the codified version of Directive 79/409/EEC as amended). This Directive ensures far-reaching protection for all of Europe's wild birds, identifying 194 species and sub-species among them as particularly threatened and in need of special conservation measures. There are a number of components to this scheme:</p> <p>Member States are required to designate Special Protection Areas (SPAs) for 194 particularly threatened species and all migratory bird species. SPAs are scientifically identified areas critical for the survival of the targeted species, such as wetlands. They are part of the Natura 2000 ecological network set up under the Habitats Directive 92/43/EEC.</p> <p>A second component bans activities that directly threaten birds, such as the deliberate killing or capture of birds, the destruction of their nests and taking of their eggs, and associated activities such as trading in live or dead birds (with a few exceptions).</p>

Document Name	Key Objectives, Requirements, and Guidance
	<p>A third component establishes rules that limit the number of bird species that can be hunted (82 species and subspecies) and the periods during which they can be hunted. It also defines hunting methods which are permitted (e.g. non-selective hunting is banned).</p>
<p>EC Drinking Water Directive (98/83/EC)</p>	<p>The Drinking Water Directive sets out the following objectives:</p> <p>Sets quality standards for drinking water quality at the tap (microbiological, chemical, and organoleptic parameters) and the general obligation that drinking water must be wholesome and clean</p> <p>Obliges Member States to regular monitoring of drinking water quality and to provide to consumers adequate and up-to-date information on their drinking water quality</p> <p>Member States may exempt water supplies serving less than 50 persons or providing less than 10m³ of drinking water per day as an average and water in food-processing undertakings where the quality of water cannot affect the wholesomeness of the foodstuff in its finished form</p>
<p>EC Freshwater Fish Directive (2006/44/EC)</p>	<p>Updated 2013. The Freshwater Fish Directive is to be repealed in 2013 by the EC Water Framework Directive. The EC Freshwater Fish Directive (2006/44/EC) was originally adopted on 18 July 1978 but consolidated in 2006. The Directive seeks to protect those fresh water bodies identified by Member States as waters suitable for sustaining fish populations. For those waters it sets physical and chemical water quality objectives for salmonid waters and cyprinid waters.</p>
<p>EC Groundwater Directive (2006/118/EC)</p>	<p>This directive establishes a regime which sets underground water quality standards and introduces measures to prevent or limit inputs of pollutants into groundwater. The directive establishes quality criteria that takes account local characteristics and allows for further improvements to be made based on monitoring data and new scientific knowledge.</p> <p>The directive thus represents a proportionate and scientifically sound response to the requirements of the Water Framework Directive (WFD) as it relates to assessments on chemical status of groundwater and the identification and reversal of significant and sustained upward trends in pollutant concentrations. Member States will have to establish the standards at the most appropriate level and take into account local or regional conditions. The groundwater directive complements the Water Framework Directive. It requires:</p> <p>Groundwater quality standards to be established by the end of 2008</p>

Document Name	Key Objectives, Requirements, and Guidance
	<p>Pollution trend studies to be carried out by using existing data and data which is mandatory by the Water Framework Directive (referred to as 'baseline level' data obtained in 2007-2008)</p> <p>Pollution trends to be reversed so that environmental objectives are achieved by 2015 by using the measures set out in the WFD</p> <p>Measures to prevent or limit inputs of pollutants into groundwater to be operational so that WFD environmental objectives can be achieved by 2015</p> <p>Reviews of technical provisions of the directive to be carried out in 2013 and every six years thereafter</p> <p>Compliance with good chemical status criteria (based on EU standards of nitrates and pesticides and on threshold values established by Member States)</p>
EC Marine Strategy Framework Directive (2008/56/EEC)	The aim of the Marine Strategy Framework Directive is to protect more effectively the marine environment across Europe. It aims to achieve Good Environmental Status (GES) of the EU's marine waters by 2020 and to protect the resource base upon which marine-related economic and social activities depend. The Directive enshrines in a legislative framework the ecosystem approach to the management of human activities having an impact on the marine environment, integrating the concepts of environmental protection and sustainable use.
EC Nitrates Directive (91/676/EC)	The Nitrates Directive aims to protect water quality across Europe by preventing nitrates from agricultural sources polluting ground and surface waters and by promoting the use of good farming practices. This Directive forms integral part of the Water Framework Directive and is one of the key instruments in the protection of waters against agricultural pressures.
EC Water Framework Directive (2000/60/EC)	<p>The WFD has the following key aims:</p> <ul style="list-style-type: none"> • Expanding the scope of water protection to all waters, surface waters and groundwater • Achieving 'good status' for all waters by a set deadline • Water management based on river basins • 'Combined approach' of emission limit values and quality standards • Getting the prices right • Getting the citizen involved more closely • Streamlining legislation

Document Name	Key Objectives, Requirements, and Guidance
	There are a number of objectives in respect of which the quality of water is protected. The key ones at European level are general protection of the aquatic ecology, specific protection of unique and valuable habitats, protection of drinking water resources, and protection of bathing water. Member States must aim to reach good chemical and ecological status in inland and coastal waters by 2015.
Energy Act 2013	The Act makes provides a framework for delivering secure, affordable and low carbon energy. It includes provisions for decarbonisation and the duties in relation to it.
Establishing measures for the recovery of the stock of European eel 2007 (1100/2007)	Advice from the International Council for the Exploration of the Sea (ICES) in 2006 indicated that the stock of the European eel (<i>Anguilla anguilla</i>) is outside safe biological limits across European waters. The population has declined significantly, reducing to 5% of the original 1980s stock levels. In response to this advice, the European Union adopted Council Regulation (EC) No 1100/2007, which requires Member States to undertake a series of measures aimed at the recovery of eel stock. The goal is to achieve 40% escapement of adult eels, relative to that in absence of anthropogenic factors, to sea to spawn. The EU Regulation was transposed into UK law under The Eels (England and Wales) Regulations 2009. Eleven Eel Management Plans have been prepared, one for each River Basin identified in England and Wales. The plans outline the current situation and how we intend to achieve the targets required by the European Regulation. Such measures include a reduction in fishing pressure, improving access and habitat quality, and reducing the impacts of entrainment. The measures that will require the installation of passes at obstructions and screens at abstraction and discharge points that prevent the migration of eels.
EU Air Quality Directive (2008/50/EC)	It establishes ambitious, cost-effective targets for improving human health and environmental quality up to 2020. The EU objective on air quality is 'to achieve levels of air quality that do not result in unacceptable impacts on, and risks to, human health and the environment.'
EU Biodiversity Strategy for 2030: Our life insurance, our natural capital (2011)	<p>Strategy to halt the loss of biodiversity and ecosystem services in the EU by 2030 and the strategy aims to build societies' resilience to future threats such as:</p> <ul style="list-style-type: none"> • The impacts of climate change • Forest fires • Food insecurity • Disease outbreaks – including by protecting wildlife and fighting illegal wildlife trade.

Document Name	Key Objectives, Requirements, and Guidance
	As part of the strategy, the following actions will be taken: establishing a larger EU-wide network of protected areas on land and at sea, launching an EU nature restoration plan, introducing measures to enable the necessary transformative change and introducing measures to enable the necessary transformative change.
EU Directive 2007/60/EC on the Assessment and Management of Flood Risks	Its aim is to reduce and manage the risks that floods pose to human health, the environment, cultural heritage, and economic activity. The Directive requires Member States to first carry out a preliminary assessment by 2011 to identify the river basins and associated coastal areas at risk of flooding. For such zones they would then need to draw up flood risk maps by 2013 and establish flood risk management plans focused on prevention, protection, and preparedness by 2015. The Directive applies to inland waters as well as all coastal waters across the whole territory of the EU.
EU Directive on the assessment of the effects of certain plans and programmes on the environment (SEA Directive) (2001/42/EC)	<p>The SEA Directive aims to ensure a high level of environmental protection and that environmental considerations are considered when preparing, adopting and implementing plans and programmes. It has applied since 2001 and been law in EU countries since 2004. This directive applied to the public plans and programmes which have been prepared and/or adopted by a competent authority and which are subject to legislative, regulatory and administrative rules. The directive sets out a number of steps to follow when assessing a plan or programme that it applies to:</p> <ul style="list-style-type: none"> • Scoping • Preparing the Environmental Report • Public consultation and participation • Decision-making • Monitoring <p>EU countries may provide for coordinated or joint procedures in order to avoid duplication of environmental assessment in respect of plans and programmes for which the obligation to carry out assessments arises simultaneously from this directive. From July 2006, and every 7 years from this date, the European Commission will continue to submit reports in the application of the directive to the European Parliament and the Council.</p>
EU Directive on the Promotion of the use of energy and renewable sources (2009/28/EC)	<p>This Directive has applied since 2009 and became law in EU countries in 2010. It creates a common set of rules for the use of renewable energy in the EU so as to limit greenhouse gas emissions and promote cleaner transport. It sets nationally binding targets for all EU countries with the overall aims of making renewable energy sources account by 2020 for 20% of EU energy and 10% of energy specifically in the transport sector. Key points include:</p> <ul style="list-style-type: none"> • EU countries should build the necessary infrastructure for using renewable energy sources in the transport sector

Document Name	Key Objectives, Requirements, and Guidance
	<ul style="list-style-type: none"> • Each EU country must be able to guarantee the origin of electricity from renewable sources • Each EU country is to make a national action plan for 2020, setting out how to achieve the national target for renewables in gross final energy consumption as well as the 10% target for renewable energy sources in transport. • EU countries can exchange sources energy from renewable sources and to count toward their action plans, EU countries can also receive renewable energy from countries outside the EU provided the energy is used inside the EU.
<p>EU Directive on transmissible animal diseases and amending and repealing certain acts in the areas of animal health ('EU Animal Health Law') (2016/429/EU)</p>	<p>Since April 2021 this directive has replaced the directive on animal health requirements for aquaculture animals and products thereof, and on the prevention and control of certain diseases in aquatic animals (2006/88/EC). The aim of the new directive is to prevent and control animal diseases that can be transmitted to other animals or humans. The EU animal health law is part of a package of measures proposed by the European Commission in May 2013 to strengthen the enforcement of health and safety standards for the entire agri-food chain. The direction prioritises 5 main points:</p> <ul style="list-style-type: none"> • Clearer responsibilities for farmers • Simplified administration for international trade in certain live animals and animal products • A clearer legal basis and better tools for veterinary authorities to fight diseases • More flexibility to adjust rules to local circumstances and emerging issues such as climate and social change • Reducing adverse effects on animal and human health and the environment.
<p>European Charter for the Protection and Sustainable Management of Soil (2003)</p>	<p>The Charter sets out to protect soil as a complex natural resource which is fundamental to life. It recognises that:</p> <ul style="list-style-type: none"> • Soil is a precious asset • Soil is a limited resource which is easily destroyed • Land has a wide variety of uses and a proper planning policy is needed by Governments for urban development and civil engineering projects • Farmers and foresters must preserve the soils quality • Soil must be protected from erosion and pollution • Further research and collaboration is required to ensure the wise use and conservation of soil.

Document Name	Key Objectives, Requirements, and Guidance
European Commission Environmental Liability Directive (2004/35/EC)	The Directives relates to the prevention and remedying of environmental damage (ELD) and establishes a framework based on the polluter pays principle to prevent and remedy environmental damage. The Directive defines "environmental damage" as damage to protected species and natural habitats, damage to water and damage to soil.
Fresh Water Fish Directive (2006/44/EC)	The Directive concerns the quality of fresh waters and shall apply to those waters designated by the Member States as needing protection or improvement in order to support fish life. This directive shall not apply to waters in natural or artificial fishponds used for intensive fish-farming.
Groundwater Directive (2006/118/EC)	<p>This directive establishes a regime which sets underground water quality standards and introduces measures to prevent or limit inputs of pollutants into groundwater. The directive establishes quality criteria that takes account local characteristics and allows for further improvements to be made based on monitoring data and new scientific knowledge. The directive thus represents a proportionate and scientifically sound response to the requirements of the WFD as it relates to assessments on chemical status of groundwater and the identification and reversal of significant and sustained upward trends in pollutant concentrations. Member States will have to establish the standards at the most appropriate level and take into account local or regional conditions. The groundwater directive complements the WFD. It requires:</p> <p>Groundwater quality standards to be established by the end of 2008</p> <p>Pollution trend studies to be carried out by using existing data and data which is mandatory by the WFD (referred to as 'baseline level' data obtained in 2007-2008)</p> <p>Pollution trends to be reversed so that environmental objectives are achieved by 2015 by using the measures set out in the WFD</p> <p>Measures to prevent or limit inputs of pollutants into groundwater to be operational so that WFD environmental objectives can be achieved by 2015 Reviews of technical provisions of the directive to be carried out in 2013 and every six years thereafter</p> <p>Compliance with good chemical status criteria (based on EU standards of nitrates and pesticides and on threshold values established by Member States)</p>
Limiting Global Climate Change to 2 Degrees Celsius:	This a set of binding legislation to ensure the EU meets its climate and energy targets for the year 2020. The targets are:

Document Name	Key Objectives, Requirements, and Guidance
The Way Ahead for 2020 and Beyond (2007)	<ul style="list-style-type: none"> • 20% reduction in GHGs • 20% of EU energy from renewables • 20% improvement in energy efficiency.
Mainstreaming Sustainable Development into EU Policies (2009) including Johannesburg Declaration on Sustainable Development (2002) and Renewed EU Sustainable Development Strategy (2006)	The aim of the Marine Strategy Framework Directive is to protect more effectively the marine environment across Europe. It aims to achieve Good Environmental Status of the EU's marine waters by 2020 and to protect the resource base upon which marine-related economic and social activities depend. The Directive enshrines in a legislative framework the ecosystem approach to the management of human activities having an impact on the marine environment, integrating the concepts of environmental protection and sustainable use
Marine Strategy Framework Directive (MSFD) (2008/56/EEC)	<p>The MSFD has applied since 2008 and became law in Member States in 2010. The MSFD sets out a common EU approach and objectives for the prevention, protection, and conservation of the marine environment in view of the pressures and impacts of damaging human activities by means of an ecosystem-based approach. The MSFD requires members to:</p> <ul style="list-style-type: none"> • Develop strategies to achieve a 'good environmental status' (GES) by 2020 • Draw up and implement programmes of measures to achieve GES • Draw up a monitoring programmes to measure and assess the progress made toward these targets • Ensure the EC assesses whether the marine strategies constitute an appropriate framework to meet the directive's requirements and provides guidance accordingly.
Our life insurance, our natural capital: an EU biodiversity strategy to 2020 (2011)	<p>Strategy to halt the loss of biodiversity and ecosystem services in the EU by 2020. There are six main targets and 20 actions to help Europe reach its goal. The six targets cover:</p> <ul style="list-style-type: none"> • Full implementation of EU nature legislation to protect biodiversity • Better protection for ecosystems, and more use of green infrastructure • More sustainable agriculture and forestry • Better management of fish stocks • Tighter controls on invasive alien species

Document Name	Key Objectives, Requirements, and Guidance
	<ul style="list-style-type: none"> <li data-bbox="667 256 1458 288">• A bigger EU contribution to averting global biodiversity loss <p data-bbox="618 312 2096 560">The strategy is in line with two commitments made by EU leaders in March 2010. The first is the 2020 headline target: 'Halting the loss of biodiversity and the degradation of ecosystem services in the EU by 2020, and restoring them in so far as feasible, while stepping up the EU contribution to averting global biodiversity loss'; the second is the 2050 vision: 'By 2050, European Union biodiversity and the ecosystem services it provides – its natural capital – are protected, valued and appropriately restored for biodiversity's intrinsic value and for their essential contribution to human wellbeing and economic prosperity, and so that catastrophic changes caused by the loss of biodiversity are avoided'.</p>
Promotion of the use of energy and renewable sources Directive (2009/28/EC)	The Directive sets ambitious targets that the EU will reach a 20% share of energy from renewable sources by 2020 and a 10% share of renewable energy specifically in the transport sector. It also sets out to improve the legal framework for promoting renewable energy.
The Assessment and Management of Environmental Noise Directive (2002/49/EC)	This Directive was applied in 2002 and became law in EU countries in 2004. The Environmental Noise Directive aims to provide a common basis for combating the harmful effects of exposure to environmental noise across the EU. It seeks to control noise in built-up areas, public parks, quiet country areas, and near schools and hospitals. It does not apply to noise caused from domestic activities, in workplaces, inside transportations, or from military activities.
The Convention for the Protection of the Architectural Heritage of Europe (Granada Convention) (1985)	The Convention sets out to reinforce and promote policies for the conservation and enhancement of Europe's heritage. It also affirms the need for European solidarity with regard to heritage conservation and is designed to foster practical co-operation among the Parties. It establishes the principles of "European co-ordination of conservation policies" including consultations regarding the thrust of the policies to be implemented.
The Environmental Noise Directive (2002/49/EC)	The Directive is the EU's main instrument to identify noise pollution levels and covers the following three key action areas: the determination of exposure to environmental noise; ensuring that information on environmental noise and its effects is made available to the public; and preventing and reducing environmental noise where necessary and preserving environmental noise quality where it is good. It applies to noise to which humans are exposed, particularly in built-up areas, in public parks or other quiet areas in an agglomeration, in quiet areas in open country, near schools, hospitals and other noise-sensitive buildings and areas. It does not apply to noise that is caused by the exposed person himself, noise from domestic activities, noise created by neighbours, noise at workplaces or noise inside means of transport or due to military activities in military areas.

Document Name	Key Objectives, Requirements, and Guidance
The European Convention on the Protection of Archaeological Heritage (Valletta Convention) (1992)	The Convention aims to protect the archaeological heritage as a source of the European collective memory and as an instrument for historical and scientific study.
The European Landscape Convention (2004)	The Convention is also known as the Florence Convention and it aims to promote the protection, management and planning of European landscapes and organises European co-operation on landscape issues.
The Nitrates Directive (91/676/EEC)	The Nitrates Directive aims to protect water quality across Europe by preventing nitrates from agricultural sources polluting ground and surface waters and by promoting the use of good farming practices. This Directive forms integral part of the Water Framework Directive and is one of the key instruments in the protection of waters against agricultural pressures.
The Water Framework Directive (WFD) (2000/60/EC)	<p>The WFD has the following key aims:</p> <ul style="list-style-type: none"> • Expanding the scope of water protection to all waters, surface waters and groundwater • Achieving 'good status' for all waters by a set deadline • Water management based on river basins • 'Combined approach' of emission limit values and quality standards • Getting the prices right • Getting the citizen involved more closely • Streamlining legislation <p>There are a number of objectives in respect of which the quality of water is protected. The key ones at European level are general protection of the aquatic ecology, specific protection of unique and valuable habitats, protection of drinking water resources, and protection of bathing water. Member States must aim to reach good chemical and ecological status in inland and coastal waters by 2015.</p>
Thematic Strategy for Soil Protection (2006)	<p>The Strategy aims to protect soil and promote its sustainable use. It is based on the following guiding principles:</p> <p>Preventing further soil degradation and preserving its functions</p> <p>Restoring degraded soils to a level of functionality consistent at least with current and intended use, thus also considering the cost implications of the restoration of soil.</p>

Document Name	Key Objectives, Requirements, and Guidance
Thematic Strategy on Air Pollution (2005)	The Strategy recognises the impact of air pollution on human health and the environment. It establishes interim objectives for air pollution in the EU and proposes appropriate measures for achieving them.
Urban Wastewater Treatment Directive (91/271/EEC)	The objective of this Directive is to protect the environment from the adverse effects of urban wastewater discharges and discharges from certain industrial sectors. The Directive concerns the collection, treatment and discharge of such wastewater.
National	
A Green Future: Our 25 Year Plan to Improve the Environment, UK Government (2018)	<p>The 25 Year Plan sets out the Governments actions for improving the health of the natural environment. It includes six actions in order achieve clean air, plentiful and clean water, thriving plants and wildlife, reduced harm from environmental hazards, sustainable resource use and enhanced beauty, heritage and engagement with the natural environment:</p> <ul style="list-style-type: none"> • Using and managing land sustainably • Recovering nature and enhancing the beauty of landscapes • Connecting people with the environment to improve health and wellbeing • Increasing resource efficiency, reducing pollution and waste • Securing clean, productive and biologically diverse seas and oceans • Protecting and improving the global environment
A Narrative for Conserving Freshwater and Wetlands in England, Natural England (2016)	Provides a narrative as to why the natural ecosystem system function is important for freshwater and wetland wildlife and recognises the ecosystem service benefits. It aims to provide a strategic framework for decision making for conserving these important habitats.
Ancient Monuments & Archaeological Areas Act (1979)	An Act to consolidate and amend the law relating to ancient monuments; to make provision for the investigation, preservation and recording of matters of archaeological or historical interest and (in connection therewith) for the regulation of operations or activities affecting such matters; to provide for the recovery of grants under section 10 of the Town and Country Planning (Amendment) Act 1972 or under section 4 of the Historic Buildings and Ancient Monuments Act 1953 in certain circumstances; and to provide for grants by the Secretary of State to the Architectural Heritage Fund.

Document Name	Key Objectives, Requirements, and Guidance
<p>Ancient Woodland and Veteran Trees: Protecting them from development, Forestry Commission and Natural England (2014) (Updated 2017)</p>	<p>Sets out guiding principles for considerations when developments affect ancient woodlands or veteran trees. Ancient woodland is defined as an irreplaceable habitat which is important for wildlife, soils, recreational value and cultural, historical and landscape value. Ancient tree is one which attributes include the following: great age, size, condition, biodiversity, cultural heritage and value. The guidance also states that all ancient trees are veteran trees but not all veteran trees are ancient. A veteran tree may not be very old, but it has decay features, such as branch death and hollowing which contribute to its biodiversity, cultural and heritage value. When making decisions the following should be considered:</p> <p>Conserving and enhancing biodiversity</p> <p>Reducing the level of impact of the proposed development on ancient woodland and ancient and veteran trees.</p>
<p>Biodiversity 2020: A Strategy for England's Wildlife and Ecosystems (2011)</p>	<p>The Strategy builds on the Natural Environment White Paper and sets out how the UK is implementing the international and EU commitments. The mission for this strategy is as follows: 'to halt overall biodiversity loss, support healthy well-functioning ecosystems and establish coherent ecological networks, with more and better places for nature for the benefit of wildlife and people'.</p>
<p>Climate Change – UK Programme (2006)</p>	<p>As the key UK document on Climate Change it contains a very broad range of issues covering the UK's strategy for climate change, actions to reduce emissions and adaptation to climate change.</p> <p>The UK's legally binding target under the Kyoto Protocol to reduce its greenhouse gas emissions to 12.5% below 1990 levels by 2008-2012 and its domestic goal of a 20% reduction in carbon dioxide emissions below 1990 levels by 2010.</p> <p>Emissions reductions are focussed in the following sectors:</p> <p>Energy supply</p> <p>Business</p> <p>Transport</p> <p>Domestic</p> <p>Agriculture, forestry, and land use</p>

Document Name	Key Objectives, Requirements, and Guidance
	Public sector
Climate Change Act 2008	The Act sets out a legal framework to commit the Government to tackling climate change and climate change adaptation is also covered in the Act as it provides a legal framework for adaptation policy. The Act sets out a target of net zero by 2050 based on 1990 levels.
Climate Change and the Historic Environment, English Heritage (2008)	The statement recognises the climate change impacts the UK is facing and how this poses a risk to the historic environment.
Climate change approaches in water resources planning – Overview of new methods, Environment Agency (2013)	The water resources management and planning framework used in England and Wales has developed considerably over the past decade. Methods for incorporating climate change into the analysis have become more advanced over this time, at a cost of time and complexity that may not always have been proportionate to the situation faced by individual water companies. This document is only relevant to England and Wales.
Conservation 21 - Natural England's Conservation Strategy for the 21st Century, Natural England (2016)	<p>The Strategy sets out how Natural England aim to contribute to the ambition set out the in Defra's strategy to 2020 and how they can work together with others to deliver this shared ambition. The Strategy is based on the following three principles:</p> <ul style="list-style-type: none"> Creating resilient landscapes and seas Putting people at the heart of the environment Growing natural capital
Countryside Council for Wales (CCW) (2003) Priority Habitats of Wales	Gives information about Wales' priority habitats, as identified by UK Biodiversity Action Plans.
Creating a better place: Our ambition to 2020 (2016)	This aims to protect and improve natural resources in the UK and sits alongside Defra's 25 Year Environment Plan. It sets out the Environment Agency's vision, principles and purpose until 2020 as well as how they aim to deliver against the 25 Year Environment Plan.

Document Name	Key Objectives, Requirements, and Guidance
<p>Creating a Great Place for Living: Defra's Strategy too 2020 (2016)</p>	<p>The Defra group sets out make air purer, water cleaner, land greener and food more sustainable, and their mission is to restore and enhance the environment for the next generation, and to leave the environment in a better state. There are 10 goals which underpin this mission and include:</p> <ol style="list-style-type: none"> 1. Sustainable farming and food 2. Pure air, clean rivers and a resilient water supply 3. Healthy seas and oceans 4. Beautiful landscapes, flourishing wildlife and native species 5. Thriving rural economies and communities 6. Efficient resource use and reduced waste 7. Protecting animals and plants from health risks 8. Resilient communities and economies 9. Great places for living for people and animals 10. Green global Britain.
<p>Defra (2015) The government's response to the Natural Capital Committee's third State of Natural Capital report</p>	<p>This provides a number of recommendations such as:</p> <ul style="list-style-type: none"> • Agreement for the development of a 25 year plan for a healthy natural economy. This includes helping organisations understand the economic, social and cultural value the impact their actions have on it and how to use the knowledge for better decisions; identify most important and threatened environmental assets; protection of designated areas; address outstanding monitoring and data issues to enable better decisions about strategic investments in natural capital. • Assigning institutional responsibility for monitoring the state of natural capital. • Organisations that manage land and water assets should create a register of natural capital for which they are responsible.

Document Name	Key Objectives, Requirements, and Guidance
Delivering a healthy natural environment. Ecosystem approach action plan, Defra (2010)	Known as the “Ecosystems Approach Action Plan” (EAAP)), it was first published in 2007 and was then updated in 2010. It sets out the concept and framework of ecosystem services, and describes how this could be translated into “an ecosystems approach” to policy and decision making that could be applied at all levels of Government.
Draft National Policy Statement for Water Resources (2017)	<p>Draft National Policy Statement for Water Resources (November 2017)</p> <p>The government recognises the need for a ‘twin track’ approach to improve the resilience of water supplies. This means further ambitious action to reduce the demand for water alongside new water resources. The government wants to make sure that where new large infrastructure is needed, it can be delivered in a timely manner to a high standard. To help achieve this, NPS will streamline the process of gaining planning consents for nationally significant water resource infrastructure projects.</p> <p>The government intends to support infrastructure that:</p> <ul style="list-style-type: none"> Secures long-term resilience to the impacts of drought and climate change as set out in the strategic policy statement (SPS)¹⁴ to Ofwat and supports the aims of the government’s national adaptation programme (NAP) on climate change Supports both an increase in population and economic growth across England, in line with the aims of the Industrial Strategy Supports the achievement of sustainability goals and enhances the environment, in line the Environment Agency’s water industry national environment programme (WINEP) and in a way that will be set out in the government’s 25-year environment plan Offers best value for customers so that water needs can be met in an affordable way both now and in the future, in line with the strategic objective set out in the SPS.
Draft National Policy Statement for Water Resources Infrastructure, Defra (2018)	The draft National Policy Statement for Water Resources Infrastructure (NPS) sets out the need and government’s policies for the development of nationally significant infrastructure projects relevant to water resources in England. It is aligned with the goal of clean and plentiful water as set out in the UK Government’s 25 Year Environment Plan and recognises that a twin track approach is required to secure resilient water supplies.

Document Name	Key Objectives, Requirements, and Guidance
Draft Water Resources Planning Guideline, Environment Agency (2020)	This document will be an updated version of the above row's 2016 guideline. Currently, it has just surpassed the consultation phase.
Drought response: our framework for England, Environment Agency (2017)	The document outlines the national framework for how drought is managed by the Environment Agency, the government and water companies to reduce the effects on the people, business and the environment. It sets out how drought affects different areas of England, who is involved in managing drought and how those stakeholders, and how drought is managed, monitored and reported on.
Environment Act 1995	The Act sets out provisions for the creation of a number of government agencies including the Environment Agency and the Scottish Environment Protection Agency (SEPA). It also sets out new standards for environmental protection.
Environment Agency (2014) Thames Catchment Abstraction Management Strategy	Sets out how much water is available for abstraction within the Thames catchment taking into account the needs of the environment and existing abstractors
Environment Agency Area Drought Plans (various)	Identifies the measures that will be taken by the Environment Agency to plan for and manage droughts.
Environment Agency Catchment Abstraction Management Strategies (CAMS)	<p>CAMS is the approach used by the Environment Agency to assess the amount of water available for further abstraction licensing taking account of the needs of the environment. The relevant Catchment Abstraction Management Strategies (CAMS) are:</p> <p>TWUL supply area:</p> <ul style="list-style-type: none"> • Arun and western streams • Bristol Avon, Axe and North Somerset Streams • Cherwell, Thame and Wye • Colne • Darent • Hampshire Avon • Kennet and Vale of White Horse • Upper Lee

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	<ul style="list-style-type: none"> • Loddon • London • Medway • Mole • Roding, Beam and Ingrebourne • Severn corridor • Severn Vale • Test and Itchen • Thames Corridor • Upper and Bedford Ouse • Warwickshire Avon • Wey • Cotswolds • Additional areas: • Shropshire Middle Severn • Worcestershire Middle Severn • Staffordshire Trent Valley • Tame Anker and Mease • Warwickshire Avon <p>The aims of the CAMS are to:</p> <ul style="list-style-type: none"> • make information on water resource availability and the catchment licensing strategy more readily available • provide a consistent and structured approach to local water resource management • recognise both the abstractor’s reasonable need for water and environmental needs • provide mechanisms to assess water resources availability • provide results which ensure the relevant Water Framework Directive objectives are met • provide tools to aid licensing decisions – particularly management of time limited licences.
Environment Agency National Framework (2017)	Sets out how the Environment Agency will work with the Department for Environment Food and Rural Affairs

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Environment Protection Act (1990)	The Act aims to set out provisions for the control of pollution to the environment (air, water and land) by regulating the management of waste and emissions. It places a duty of care on any business or person who produces waste to do so carefully and in line with requirements.
Environmental Assessment of Plans and Programmes Regulations 2004	The regulations transpose the SEA Directive into UK law which requires an assessment of the effects of certain plans and programmes on the environment. Article 3 (2b) states that SEA is required for plans and programmes which are prepared for water management, set the framework for development consents, and/or are likely to have a significant environmental effect
Environmental Protection Act 1990	The Environmental Protection Act 1990 establishes in England, Scotland and Wales businesses' legal responsibilities for the duty of care for waste, contaminated land and statutory nuisance.
Fixing the foundations: Creating a more prosperous nation, HM Government (2015)	<p>The reports sets out the importance of productivity and the Government's vision to delivering a UK economy which is the richest of all major economies by 2030. It includes two pillars for raising productivity:</p> <p>Encouraging long term investment in economic capital, including infrastructure, skills and knowledge</p> <p>Promoting a dynamic economy that encourages innovation and helps resources flow to their most productive use.</p>
Flood and Water Management Act 2010	The Act seeks to address the threat of flooding and water scarcity. The Act takes forward a number of recommendations from the Pitt Review into the 2007 floods and places new responsibilities on the Environment Agency, local authorities and others to manage the risk of flooding. Climate projections suggest extreme weather will happen more frequently in the future and this Act is central to reducing the flood risk associated with extreme weather.
FRA Climate Change Guidance – Flood risk assessments: climate change allowances (2016)	<p>This guidance is for local planning authorities preparing risk assessments and for developers and their agents preparing flood risk assessments for planning applications. The document provides guidance for:</p> <ul style="list-style-type: none"> • Climate change allowances • Peak river flow allowances • Sea level allowances • Offshore wind speed and wave height allowances.

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Future Water: The Government's Water Strategy for England (2008)	<p>The Strategy sets out how the Government wants the water sector to look by 2030 and the steps required to get there. The Vision for water policy and management is one where, by 2030 at the latest, the Government has:</p> <ul style="list-style-type: none"> • Improved the quality of our water environment and the ecology which it supports • Continued to provide high levels of drinking water quality from our taps • Sustainably managed risks from flooding and coastal erosion, with greater understanding and more effective management of surface water • Ensured a sustainable use of water resources, and implemented fair, affordable and cost reflective water charges • Cut greenhouse gas emissions • Embedded continuous adaptation to climate change and other pressures across the water industry and water users
Government Statement on the Historic Environment	<p>The historic environment is an asset of enormous cultural, social, economic and environmental value. It makes a very real contribution to our quality of life and the quality of our places. This document is intended to help government to realise its vision for the historic environment, and to assist us in working jointly with others to achieve our aims. In it we set out our understanding of the value of the historic environment, and the many roles that government and others can play.</p>
Groundwater protection technical guide, Environmental Agency (2017)	<p>If you're carrying out an activity that could lead to the input of substances to the ground, which could go on to affect the quality or quantity of groundwater, then you will need a permit. The Environment Agency will consider the geological characteristics of the location when assessing for a permit so this should be of importance to the permit application. This guide includes the discernability of hazardous substances and the geological formations that are permanently unsuitable for other purposes.</p>
Groundwater Protection: Policy and Practice (GP3) 2013	<p>Groundwater is important. It supplies about one third of mains drinking water in England and around three per cent in Wales. It also supports numerous private supplies. But pollution and demands for water puts the resource under pressure. The Environment Agency's core groundwater policy is: 'To protect and manage groundwater resources for present and future generations in ways that are appropriate for the risks that we identify'. Nine themes support this policy, with number four being: reducing flood risk. GP3 states that groundwater flooding is a significant but localised issue and in recent years, there has been considerable concern about the risk of flooding from groundwater. Groundwater flooding is a problem partly because it happens very infrequently. Memories or information about previous floods may have been lost. Developments may have taken place in areas susceptible to the break-out of new</p>

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	<p>springs or the appearance of lakes fed by groundwater. These 'new' groundwater features can flood property and land for many weeks because of the large storage potential of groundwater. Rising groundwater can also inundate sewers. This can cause serious problems for sewage treatment works, overloading their flow capacity and polluting surface water.</p> <p>The EA use a series of guiding principles to ensure a consistent approach to the assessment and management of groundwater. These are:</p> <ul style="list-style-type: none"> • To secure the proper use of water resources for all purposes, including environmental need • To protect the environment by: • Identifying a minimum flow or groundwater level below which abstraction may be curtailed or flows augmented • Protecting flow and water-level variability across the full range of seasonal regimes from low to high water flow/level conditions • Protecting the critical aspects of the water environment including, where relevant, habitats that are dependent upon river flows or water levels, and recognising that some watercourses or wetlands are more sensitive than others to the impact of flow or level changes • To ensure no reduction in existing protected rights • To protect the interests of other legitimate water users • To take account of existing and future local requirements that are currently not considered. These could be protecting or changing flows from rivers into estuaries in order to provide protection for the estuarine environment • To take account of water quality considerations throughout the catchment in both surface waters and groundwater
<p>Making Space for Nature - A review of England's Wildlife Sites and Ecological Network (2010)</p>	<p>The report aims to answer the following questions: Do England's wildlife sites comprise a coherent and resilient ecological network? If not, what needs to be done? The report concludes that the approaches required to achieve a coherent and resilient ecological network are varied, and 24 wide-ranging recommendations are presented. Five themes unite them:</p> <p>We need to continue the recent progress in improving the management and condition of wildlife sites, particularly our SSSIs. We also make recommendations for how these should be designated and managed in ways that enhance their resilience to climate change.</p>

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	<p>We need to properly plan ecological networks, including restoration areas. Restoration needs to take place throughout England. However, in some areas, both the scale of what can be delivered to enhance the network, and the ensuing</p> <p>There are a large number of surviving patches of important wildlife habitat scattered across England outside of SSSIs, for example in Local Wildlife Sites. We need to take steps to improve the protection and management of these remaining wildlife habitats. 'Protection' will usually be best achieved through incentive-based mechanisms, but at times may require designation.</p> <p>We need to become better at deriving multiple benefits from the ways we use and interact with our environment. There are many things that society has to do that may seem to have rather little to do with nature conservation, but could have, or even should have if we embrace more radical thinking; flood management by creating wetlands is an obvious example. We need to exploit these 'win-win' opportunities to the full. Being better at valuing a wider range of ecosystem services would help this process.</p> <p>We will not achieve a step-change in nature conservation in England without society accepting it to be necessary, desirable, and achievable. This will require strong leadership from government and significant improvements in collaboration between local authorities, local communities, statutory agencies, the voluntary and private sectors, farmers, landowners and other land-managers and individual citizens.</p>
<p>Making Space for Nature - A review of England's Wildlife Sites and Ecological Network (Lawton, 2010)</p>	<p>The report aims to answer the following questions: Do England's wildlife sites comprise a coherent and resilient ecological network? If not, what needs to be done?</p> <p>The report concludes that the approaches required to achieve a coherent and resilient ecological network are varied, and 24 wide-ranging recommendations are presented. Five themes unite them:</p> <p>We need to continue the recent progress in improving the management and condition of wildlife sites, particularly our SSSIs. We also make recommendations for how these should be designated and managed in ways that enhance their resilience to climate change</p> <p>We need to properly plan ecological networks, including restoration areas. Restoration needs to take place throughout England. However, in some areas, both the scale of what can be delivered to enhance the network, and the ensuing</p> <p>There are a large number of surviving patches of important wildlife habitat scattered across England outside of SSSIs, for example in Local Wildlife Sites. We need to take steps to improve the protection and management of these</p>

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	<p>remaining wildlife habitats. 'Protection' will usually be best achieved through incentive-based mechanisms, but at times may require designation</p> <p>We need to become better at deriving multiple benefits from the ways we use and interact with our environment. There are many things that society has to do that may seem to have rather little to do with nature conservation, but could have, or even should have if we embrace more radical thinking; flood management by creating wetlands is an obvious example. We need to exploit these 'win-win' opportunities to the full. Being better at valuing a wider range of ecosystem services would help this process</p> <p>We will not achieve a step-change in nature conservation in England without society accepting it to be necessary, desirable, and achievable. This will require strong leadership from government and significant improvements in collaboration between local authorities, local communities, statutory agencies, the voluntary and private sectors, farmers, landowners and other land-managers and individual citizens</p> <p>Recommendation 4 is relevant for Thames Water and states:</p> <ul style="list-style-type: none"> • 'Public bodies and statutory undertakers planning the management of water resources should: • Make space for water and wildlife along rivers and around wetlands • Restore natural processes in river catchments, including in ways that support climate change adaptation and mitigation • Accelerate the programme to reduce nutrient overload, particularly from diffuse pollution'
<p>Managing Water Abstraction, Environment Agency (2021)</p>	<p>This document explains how to make sure there is enough water for the future needs of people and the environment. The policy paper includes advice on river basin management, water abstraction plans, catchment abstraction management systems, the national framework, the EA drought plans, the water industry national environment programme, and water company plans.</p>
<p>Marine and Coastal Areas Access Act 2009</p>	<p>The Marina and Coastal Access Act 2009 gained Royal Assent on 12th November 2009 and provides the legal mechanism to help ensure clean, healthy, safe, productive and biologically diverse oceans and seas by putting in place a new system for improved management and protection of the marine and coastal environment. The Marine Act, which mainly affects England and Wales, comprised eight key elements: A Marine Management Organisation (MMO), a Strategic Marine Planning System, a Streamlined Marine Licensing System, Marine Nature Conservation,</p>

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	Fisheries Management and Marine Enforcement, Migratory and Freshwater Fisheries, Coastal Access, Coastal and Estuarine Management.
Marine Plans – South East Inshore, South Inshore, South Offshore (Marine Management Organisation)	<p>A marine plan:</p> <ul style="list-style-type: none"> • Sets out priorities and directions for future development within the plan area • Informs sustainable use of marine resources • Helps marine users understand the best locations for their activities, including where new developments may be appropriate. <p>Each of the 11 marine plan areas will have a marine plan with a long-term (20 years) view of activities and will be reviewed every three years. There will be ten marine plans as the North West will have a single plan following requests to have a single process and one plan for these areas. All marine plan areas are scheduled to have a plan by 2021.</p>
National Infrastructure Delivery Plan 2016-2021, Infrastructure and Projects Authority (HM Government) (2016)	<p>Sets out the Government’s plans for economic infrastructure over the next 5 years to support delivery of housing and social infrastructure. The Plan recognises that water services are likely to come under increasing pressure because of population growth and a changing climate. The Plan sets out the following key objectives for water:</p> <ul style="list-style-type: none"> • Start of construction on the Thames Tideway Tunnel • Reductions in average bills of about 5% in real terms • Further expenditure from 2020 with the start of Asset Management Period 7
National Parks and Access to the Countryside Act (1949)	<p>An Act to make provision for National Parks and the establishment of a National Parks Commission; to confer on the Nature Conservancy and local authorities powers for the establishment and maintenance of nature reserves; to make further provision for the recording, creation, maintenance and improvement of public paths and for securing access to open country, and to amend the law relating to rights of way; to confer further powers for preserving and enhancing natural beauty; and for matters connected with the purposes aforesaid.</p>
National Planning Policy Framework (NPPF) (updated July 2021)	<p>The updated NPPF sets out government's planning policies for England and how these are expected to be applied. Achieving sustainable development is at the heart of the NPPF whereby it has three overarching objectives in the social, economic and environmental spheres.</p>
National Policy Statement for Wastewater (2012)	<p>This National Policy Statement (NPS) sets out Government policy for the provision of major wastewater infrastructure. It will be used by the decision maker as the primary basis for deciding development consent applications for wastewater developments that fall within the definition of Nationally Significant Infrastructure Projects (NSIP) as</p>

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	defined in the Planning Act 2008. The policy set out in this NPS is, for the most part, intended to make existing policy and practice in consenting nationally significant wastewater infrastructure clearer and more transparent, rather than to change the underlying policies against which applications are assessed.
Natural Environment White Paper (2012)	<p>This White Paper recognises that a healthy, properly functioning natural environment is the foundation of sustained economic growth, prospering communities and personal well-being. It aims to mainstream the value of nature across society, including across government departments by:</p> <ul style="list-style-type: none"> • Facilitating greater local action to protect and improve nature • Creating a green economy, in which economic growth and the health of our natural resources sustain each other, and markets, business and Government better reflect the value of nature • Strengthening the connections between people and nature to the benefit of both • Showing leadership in the European Union and internationally, to protect and enhance natural assets globally
Natural Resources Wales, Drought Plan	Natural Resources Wales produces a drought plan – it describes indicators used to classify different stages of a drought.
Our Waste, Our Resources: A Strategy for England, HM Government (2018)	The Strategy recognises that natural capital is one of our most valuable assets and sets out how the Government plans to preserve the stock of material resources by minimising waste, promoting resource efficiency and moving towards a circular economy. They also set out how they aim to minimise damage to the natural environment and is aligned to the Government's 25 Year Environment Plan. This is our blueprint for eliminating avoidable plastic waste over the lifetime of the 25 Year Plan, doubling resource productivity, and eliminating avoidable waste of all kinds by 2050.
Planning (Listed Building & Conservation areas) Act 1990	An Act of Parliament that altered the laws on granting of planning permission for building works, notably including those of the listed building system in England and Wales
Planning Act (2008)	An Act to establish the Infrastructure Planning Commission and make provision about its functions; to make provision about, and about matters ancillary to, the authorisation of projects for the development of nationally significant infrastructure; to make provision about town and country planning; to make provision about the imposition of a Community Infrastructure Levy; and for connected purposes.
Preparing for a drier future: England's water infrastructure	Sets out the National Infrastructure Commission's advice on how to address England's water supply challenges and deliver the appropriate level of resilience for the long term. It recognises that water shortages is a risk in England and

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needs, National Infrastructure Commission (2018)	that climate change alongside an increasing population A (especially in the drier south and east) and the need to protect the environment will result in further challenges.
Protect groundwater and prevent groundwater pollution, Environment Agency (2017)	This guidance document aims to help one apply for a permit or licence to discharge or abstract from groundwater. The document explains what groundwater is, how to prevent groundwater pollution, how to prevent hazardous substances from entering groundwater, how to limit non-hazardous substances from entering groundwater, how to consider the geological characteristics of the location, groundwater vulnerability, the restrictions within groundwater sensitive locations, any sensitive groundwater locations, and saline intrusion.
Safeguarding our Soils – A strategy for England, Defra (2009)	The Strategy recognises that soil is fundamental resource and sets out a 2030 vision for the sustainable management of soil where degradation threats are tackled successfully. It aims to improve the quality of England's soils and safeguard their ability to provide essential services for future generations.
Salmon and Fresh Water Fisheries Act (1975)	The Act sets out the legal framework in which salmon and freshwater fisheries are regulated. It covers regulation on fishing methods and related offences, obstructions to fish passage, salmon and freshwater fisheries administration and law enforcement.
Securing the future – Delivering UK Sustainable Development Strategy (2005)	<p>The Strategy for sustainable development aims to ‘...enable all people throughout the world to satisfy their basic needs and enjoy a better quality of life without compromising the quality of life of future generations.’</p> <p>Guiding principles:</p> <ul style="list-style-type: none"> • Living within environmental limits • Ensuring a strong, healthy, and just society • Achieving a sustainable economy • Promoting good governance • Using sound science responsibly • UK priorities for immediate action: <ul style="list-style-type: none"> • Sustainable consumption and production • Climate change and energy • Natural resource protection and environmental enhancement • Sustainable communities

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<p>Site Improvement Plans for England's Natura (IPENS) 2000 sites: East, Natural England</p>	<p>Special Areas of Conservation (SAC) and Special Protection Areas (SPA) are collectively known as Natura 2000 sites and are protected under European legislation for their important wildlife and habitats. In England there are 338 sites covering 2,076,875 hectares. A wide range of organisations and individuals own, manage or have an interest in Natura 2000 sites. This includes government agencies, voluntary bodies, private companies and individuals who collectively have a wealth of knowledge and experience. The improvement programme for England's Natura 2000 sites (IPENS) is working with these partners, and other stakeholders to develop a strategic approach to achieving favourable condition on these sites by reviewing:</p> <ul style="list-style-type: none"> • The risks and issues that are impacting on and/or threatening the condition of the site • Which actions and measures could be used to address them • How much it will cost and where the money could come from • This will be the first time that this information will have been drawn together for all of England's Natura 2000 sites. • It will provide Natural England and our partners with: <ul style="list-style-type: none"> • An improved understanding of the issues affecting the sites and how to address them • A clear plan of action for improving their condition and how much it may cost • Recommendations to improve gaps in funding and evidence.
<p>Standing Advice on Protected Species, Natural England (2022)</p>	<p>Provides guidance on reviewing planning applications which might have an affected on protected species.</p>
<p>State of Natural Capital Annual Report 2020. Natural Capital Committee (2020)</p>	<p>The Nature Capital Committee's seventh annual report on the state of natural capital. The report recognises the importance that nature-based interventions will have on achieving net zero by 2050 targets. The report makes recommendations for the Government to take forward and outlines key points for inclusion within the Environment Bill.</p>
<p>Strategic Environmental Assessment, Sustainability Appraisal and the Historic Environment, Historic Environment (2016)</p>	<p>This advice note aims to support all those involved in assessing the effects of certain plans on the historic environment. It offers advice on heritage considerations during the Sustainability Appraisal and Strategic Environmental Assessment Process, and on implementing historic environment legislation, the relevant National Planning Policy Framework and the related guidance given in the Planning Practice Guidance as well as the Marine Policy Statement. This advice note supersedes the 2013 publication on the same matter.</p>

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Sustainable Farming and Food Strategy – Forward Look (2006)	<p>The Strategy sets out the Government’s priorities for delivering a sustainable farming and food sector. It is structured around five priority themes, which are closely inter-related. The themes are:</p> <ul style="list-style-type: none"> • Succeeding in the market • Improving the environmental performance of farming • Sustainable consumption and production • Climate change and agriculture • Animal health and welfare.
The Ancient Monuments and Archaeological Areas Act 1979	This Act is concerned with the provisioning, investigation, recording and the preservation and protection of archaeological sites and ancient monuments.
The Conservation of Habitats and Species (Amendment) (EU Exit) (Regulations 2019)	This instrument provides changes to those parts of the 2017 conservation of habitats and species regulations which would no longer work when the UK leaves the EU.
The Conservation of Habitats and Species Regulations (2010) (amended 2011)	The Conservation of Habitats and Species Regulations 2010 apply in the terrestrial environment and in territorial waters out to 12 nautical miles. The EU Habitats and Wild Birds Directives are transposed in UK offshore waters by separate regulations. The new regulations do not make any substantive changes to existing policies and procedures other than the establishment of the Marine Management Organisation. The Marine Management Organisation takes on certain licensing functions from Natural England to ensure consistency with the approach in the Marine and Coastal Access Act 2009. The objective of the Habitats Directive is to protect biodiversity through the conservation of natural habitats and species of wild fauna and flora. The Directive lays down rules for the protection, management and exploitation of such habitats and species.
The Countryside and Rights of Way (CROW) Act 2000	The Act was introduced in 2000 with the intention to give greater freedom for people to explore open countryside and contains provisions to introduce a new statutory right of access for open-air recreation to mountain, moor, heath, down and registered common land. It also includes a power to extend the right to coastal land by order and enables landowners voluntarily to dedicate irrevocably any land to public access.
The draft Environment Bill 2020	The Bill was first introduced to parliament in October 2019 and then reintroduced in January 2020. The Bill is currently under review by a Public Bill Committee. The Environment Bill will support the 25 Year Environment Plan and brings about urgent and meaningful action to combat the environmental issues that the UK is facing. It sets out a requirement

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	<p>for biodiversity net gain which includes at least a 10% improvement in biodiversity value for new development. It also includes details on:</p> <ul style="list-style-type: none"> • Creating a new governance framework for the environment • A new direction for resources and waste management • Improving air quality • Securing our water services • Enhancing our green spaces • Updating laws on chemicals (REACH)
The Eels (England and Wales) Regulations 2009 (as amended)	Transposed from the European Directive (1100/2007) into UK law, the Regulations aim to establish measures for the recovery of the stock of European eel. The Regulations will help implement delivery Eel Management Plans.
The Environment Act 2021	This Act comprises of two halves: a legal framework for environmental governance, and the provision of making specific improvement of the environment. They key need for this Act was to redesign the environmental elements of law post the UK's EU exit, thus fulfilling a legal obligation set out in section 16 of the European Union Withdrawal Act 2018. The measures published at that time related only to environmental principles and governance and placing the previous government's 25 Year Plan on statutory footing. The Environment Act was carried over from the 2019-21 Parliamentary sessions into the following session due to the COVID-19 pandemic.
The Environment Agency's approach to groundwater protection, Environment Agency (2018)	This document updates the 'Groundwater Protection: Principles and Practice'. It contains position statements which provide information about the Environment Agency's approach to managing and protecting groundwater. This document will be of interest to developers, planners, environmental permit applicants and holders, abstractors, operators and anyone whose current or proposed activities have an impact on or are affected by groundwater. Each section is focused on different activities or sectors.
The Environmental Assessment of Plans and Programmes Regulations 2004 (also known as the SEA Regulations)	These regulations implement Directive 2001/42/EC on the assessment of effects of certain plans and programmes on the environment as regards plans and programmes relating solely to any part of England it also implements Council Directive 85/337/EC which is to be referred to as the SEA Directive.

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The Environmental Damage (Prevention and Remediation) (England) Regulations 2015	The Regulations seek to ensure action is taken put any environmental damage right and are based on the 'polluter pays principle'. It transposes the European Commission Environmental Liability Directive into UK law. The Regulations require action in response to the most significant cases, covering specific types of: damage to species and habitats; damage to water; or risks to human health from contamination of land
The Great Britain Invasive Non-Native Species Strategy, Defra (2015)	The Strategy builds on the first which was published in 2008 and sets out a series of aims and objectives to underpin action until 2020. It aims to address the issues of INNS in the UK to protect biodiversity, quality of life and economic interests.
The Invasive Alien Species (Enforcement and Permitting) Order 2019	The Order brings into force the EU Invasive Alien Species Regulation (1143/2014) on the prevention and management of invasive alien plant and animal species in England and Wales, including the relevant licenses, permits and rules for keeping invasive alien species
The National Adaptation Programme and the Third Strategy for Climate Adaptation Reporting, Defra (2018)	This is the second National Adaptation Programme (NAP) and sets out the Government's response to the second Climate Change Risk Assessment (CCRA). It also outlines the actions that will be taken to address the climate change issues identified in the CCRA across the following key sectors: Natural environment; Infrastructure; People and the built environment; Business and industry; and Local government.
The Natural Choice: Securing the Value of Nature, Defra (2011)	The White Paper outlines the Government's vision for the natural environment for the next 50 years
The Natural Environment and Communities Act 2006 (NERC Act)	The Natural Environment and Rural Communities Act is designed to help achieve a rich and diverse natural environment and thriving rural communities through modernised and simplified arrangements for delivering Government policy. It is about conserving and enhancing places and nature and helping people to enjoy them – taking a wider view, pursuing environmental management which encompasses access and recreation, and aiming where possible to achieve economic and social outcomes alongside conservation goals.
The Setting of Heritage Assets, Historic Environment Good Practice Advice in	Sets out guidance on managing change within the settings of heritage assets, including archaeological remains and historic buildings, sites, areas, and landscapes, against the backdrop of the NPPF. It gives general advice on understanding setting, and how it may contribute to the significance of heritage assets and allow that significance to be appreciated, as well as advice on how views contribute to setting.

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Planning 3 Second Edition, Historic Environment (2017)	
The UK's shared framework for sustainable development (2005)	<p>The priority areas for immediate action, shared across the UK are:</p> <p>Sustainable Consumption and Production – Sustainable consumption and production is about achieving more with less. This means not only looking at how goods and services are produced, but also the impacts of products and materials across their whole lifecycle and building on people's awareness of social and environmental concerns. This includes reducing the inefficient use of resources, which is a drag on the economy, so helping boost business competitiveness and to break the link between economic growth and environmental degradation.</p> <p>Climate Change and Energy –The effects of a changing climate can already be seen. Temperatures and sea levels are rising, ice and snow cover are declining, and the consequences could be catastrophic for the natural world and society. Scientific evidence points to the release of greenhouse gases – such as carbon dioxide and methane – into the atmosphere by human activity as the primary cause of climatic change. We will seek to secure a profound change in the way we generate and use energy, and in other activities that release these gases. We must set a good example and will encourage others to follow it.</p> <p>Natural Resource Protection and Environmental Enhancement – Natural resources are vital to our existence and that of communities throughout the world. We need a better understanding of environmental limits, environmental enhancement and recovery where the environment is most degraded to ensure a decent environment for everyone, and a more integrated policy framework.</p> <p>Sustainable Communities – Our aim is to create sustainable communities that embody the principles of sustainable development at the local level. This will involve working to give communities more power and say in the decisions that affect them; and working in partnership at the right level to get things done. The UK uses the same principles of engagement, partnership, and programmes of aid in order to tackle poverty and environmental degradation and to ensure good governance in overseas communities.</p>
The Water Environment (Water Framework Directive) (England and Wales) Regulations 2003	<p>The Regulations transpose the EC WFD in UK law. They will help implement the WFD requirement in England and Wales. They aim to protect and enhance the quality of:</p> <ul style="list-style-type: none"> • Surface freshwater (including lakes, streams, and rivers) • Groundwaters

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	<ul style="list-style-type: none"> • Groundwater dependant ecosystems • Estuaries • Coastal waters out to one mile from low-water
The Wildlife and Countryside Act 1981 (as amended)	The Wildlife and Countryside Act is the main Act which protects animals, plants and habitats in the UK. It implements the Bern Convention and the Birds Directive and contains details of European and national designated sites, protection for designated species.
UK Climate Change Risk Assessment, Defra (2017)	<p>Identifies the key climate change risks and opportunities for the UK which are as follows:</p> <ul style="list-style-type: none"> • Flooding and coastal change risks to communities, businesses and infrastructure • Risks to health, well-being and productivity from high temperatures • Risks of shortages in the public water supply for agriculture, energy generation and industry • Risks to natural capital including terrestrial, coastal, marine and freshwater ecosystems, soils and biodiversity • Risks to domestic and international food production and trade • New and emerging pests and diseases and invasive non-native species affecting people, plants and animals.
UK Climate Projections 18, Met Office (2018)	This document is primarily intended to underpin messages for the interested public and media. It also serves as a summary for users of UKCP18 including the guidance and science reports expected to get more detailed information from other sources, including the UKCP18 website. The UK Climate Predictions 2018 are based on the latest developments in climate science and were subject to an independent peer review to assess the science that underpins it.
UK Flood risk and coastal erosion Policy Statement (2020)	<p>This policy statement sets out the government’s long-term ambition to create a nation more resilient to future flood and coastal erosion risk. This means to reduce the risk of harm to people, the environment, and the economy. This policy statement forms part of the government’s wider commitment to tackle climate change. It has been informed by the Environment Agency’s consultation exercise on the updated National Flood and Coastal Erosion Risk Management Strategy, the results of the government’s Call of Evidence 2019, and advice from the National Infrastructure Commission and the Committee on Climate Change. The Policy Statement sets out 5 areas to drive this:</p> <ul style="list-style-type: none"> • Upgrading and expanding our national flood defences • Managing the flow of water more effectively • Harnessing the power of nature to reduce flood and coastal erosion risk and achieve multiple benefits • Better preparing our communities

Document Name	Key Objectives, Requirements, and Guidance
	<ul style="list-style-type: none"> • Enabling more resilient places through a catchment-based approach.
UK Marine Policy Statement (2011)	<p>This Marine Policy Statement (MPS) is the framework for preparing Marine Plans and taking decisions affecting the marine environment. It will contribute to the achievement of sustainable development in the United Kingdom marine area. It has been prepared and adopted for the purposes of section 44 of the Marine and Coastal Access Act 2009.</p> <p>The MPS will facilitate and support the formulation of Marine Plans, ensuring that marine resources are used in a sustainable way in line with the high-level marine objectives and thereby:</p> <ul style="list-style-type: none"> • Promote sustainable economic development • Enable the UK's move towards a low-carbon economy, in order to mitigate the causes of climate change and ocean acidification and adapt to their effects • Ensure a sustainable marine environment which promotes healthy, functioning marine ecosystems and protects marine habitats, species and our heritage assets • Contribute to the societal benefits of the marine area, including the sustainable use of marine resources to address local social and economic issues
UK National Ecosystem Assessment Follow-on Reports (2014)	<p>The 2011 UK National Ecosystem Assessment (UK NEA) which identified that the natural world and its ecosystems are important to our well-being and economic prosperity, however they are consistently undervalued. This follow on provides new information and tools to help decision makers integrate the value of ecosystems into decision making.</p>
UK Post-2010 Biodiversity Framework (2012)	<p>The purpose of the Framework is to set a broad enabling structure for action across the UK between now and 2020:</p> <ul style="list-style-type: none"> • To set out a shared vision and priorities for UK-scale activities, in a framework jointly owned by the four countries, and to which their own strategies will contribute • To identify priority work at a UK level which will be needed to help deliver the Aichi targets and the EU Biodiversity Strategy • To facilitate the aggregation and collation of information on activity and outcomes across all countries of the UK, where the four countries agree this will bring benefits compared to individual country work • To streamline governance arrangements for UK-scale activity
UK Post-2010 Biodiversity Framework, JNCC and Defra (2012)	<p>The purpose of the Framework is to set a broad enabling structure for action across the UK between now and 2020:</p> <ul style="list-style-type: none"> • To set out a shared vision and priorities for UK-scale activities, in a framework jointly owned by the four countries, and to which their own strategies will contribute

Document Name	Key Objectives, Requirements, and Guidance
	<ul style="list-style-type: none"> • To identify priority work at a UK level which will be needed to help deliver the Aichi targets and the EU Biodiversity Strategy • To facilitate the aggregation and collation of information on activity and outcomes across all countries of the UK, where the four countries agree this will bring benefits compared to individual country work • To streamline governance arrangements for UK-scale activity.
<p>Understanding the Risks, Empowering Communities, Building Resilience: The National Flood and Coastal Erosion Risk Management Strategy for England (2011)</p>	<p>The Strategy's overall aim is to: '...ensure that flooding and coastal erosion risks are well managed and coordinated, so that their impacts are minimised'. The Strategy was published by the Environment Agency and the Department for Environment, Food, and Rural Affairs (Defra) to ensure that government, the Environment Agency, local authorities, water companies, internal drainage boards and other organisations that have a role in flood and coastal erosion risk management (FCERM) understand each other's roles and co-ordinate how they manage these risks.</p> <p>The Strategy states that these organisations will work together with communities to:</p> <ul style="list-style-type: none"> • Manage the risk of flooding and coastal erosion to people and their property. Over time, the Government will be able, where possible, to improve standards of protection • Help householders, businesses and communities better understand and manage the flood and coastal erosion risks they face • Respond better to flood incidents and during recovery, and to coastal erosion • Move the focus from national government-funded activities towards a new approach that gives more power to local people, either at an individual, community or local authority level. Local innovations and solutions will be encouraged, too • Invest in actions that benefit communities who face the greatest risk, but who are least able to afford to help themselves • Put sustainability at the heart of the actions we take, so that we work with nature and benefit the environment, people and the economy
<p>Water Act 2003 (as amended)</p>	<p>The Act amends the Water Resources Act and Regulations 1991 and the Water Industry Act 1991. The Act has the following four broad aims:</p> <ul style="list-style-type: none"> • The sustainable use of water resources • Strengthening the voice of consumers • A measured increase in competition

Document Name	Key Objectives, Requirements, and Guidance
	<ul style="list-style-type: none"> <li data-bbox="667 256 1178 288">• The promotion of water conservation
Water for Life White Paper, Defra (2011)	This White Paper sets out a vision for future water management in which the water sector is resilient; water companies are more efficient and customer focused; and water is valued as the precious and finite resource it is. It explains that everyone has a part to play in the realisation of this vision. It sets out the principles and timetable for an overhaul of the abstraction regime, which governs how and when water can be taken from the environment for use by business, agriculture and the public; and explains how improved interconnections between water catchments will allow water to be moved more easily around the country to areas of need. It details Government policy on charging for water and providing help to those who struggle to afford their bills.
Water Industry Act 1991	The Act sets out the main powers and duties of the water and sewerage companies, thus replacing those set out in the Water Act 1989, and defined the powers of the Director General of Water Services (now the Water Services Regulation Authority (Ofwat)).
Water industry strategic environmental requirements (WISER) (2022)	A strategic steer to water companies on the environment, resilience, and flood risk for business planning purposes.
Water Resources Act 1991	The Act sets out the functions of National Rivers Authority (now the Environment Agency) and introduced water quality classifications and objectives for the first time.
Water Resources Management Plan Regulations 2007	The National Assembly for Wales in relation to water undertakers whose areas are wholly or mainly in Wales, and the Secretary of State in relation to all other water undertakers, in exercise of the powers conferred upon them by sections 37B(3)(a) and (c), (5), (6) and (8)(a), 213(2)(e) and (f) and 219 of the Water Industry Act 1991, and after consultation with each other to make the WRMP regulations.
Water Resources Planning Framework (2015-2065), Water UK (2016)	In accordance with the Water Industry Act 1991, each water company must produce a Water Resources Management Plan (WRMP). These plans are updated every 5 years with the aim of ensuring that there is a sufficient supply of water to meet the anticipated demands of its customers over a minimum 25-year planning period, even under conditions where water supplies are stressed, that is, under dry conditions where supplies are stretched and demand for water tends to be higher than normal. Water companies are also required to produce Drought Plans. These demonstrate how each water company would manage the security of supplies in the event of impending or actual drought events, which are normally of short duration (typically affecting water supplies over a period of one to two years). The Drought

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	Plan describes the company's tactical and operational responses during a drought event, whereas the WRMP is a strategic plan setting out the planned investments required over a 25-year period.
Water Resources Planning Guideline, Environment Agency (2016)	This Planning Guideline is relevant to England and Wales and those producing regional plans. Your WRMP sets out how you intend to achieve a secure supply of water for your customers and a protected and enhanced environment. This guideline recommends using adaptive planning within the preferred planning. A preferred programme is reference to the most likely future and the pathway through it. This guideline instructs on how to write a plan that complies with all the relevant statutory requirements and government policy.
Water Supply (Water Quality) Regulations 2016 (as amended)	The regulations consolidate legislation concerning the quality of water supplies for human consumption in England. They also apply in Wales where the water undertaker or licensee is primarily based in England.
Water White Paper (2011)	This White Paper sets out a vision for future water management in which the water sector is resilient; water companies are more efficient and customer focused; and water is valued as the precious and finite resource it is. It explains that everyone has a part to play in the realisation of this vision.
Well-being of Future Generations (Wales) Act 2015	<ul style="list-style-type: none"> • This puts in place a sustainable development principle and places a well-being duty on public bodies. Public bodies will set and publish wellbeing objectives. • There are seven well-being goals: • A prosperous Wales; An innovative, productive and low carbon society which recognises the limits of the global environment and therefore uses resources efficiently and proportionately (including acting on climate change); and which develops a skilled and well-educated population in an economy which generates wealth and provides employment opportunities, allowing people to take advantage of the wealth generated through securing decent work. • A resilient Wales; A nation which maintains and enhances a biodiverse natural environment with healthy functioning ecosystems that support social, economic and ecological resilience and the capacity to adapt to change (for example climate change). • A healthier Wales; A society in which people's physical and mental well-being is maximised and in which choices and behaviours that benefit future health are understood. • A more equal Wales; A society that enables people to fulfil their potential no matter what their background or circumstances (including their socio economic background and circumstances). • A Wales of cohesive communities; Attractive, viable, safe and well-connected communities.

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	<ul style="list-style-type: none"> • A Wales of vibrant culture and thriving Welsh language; A society that promotes and protects culture, heritage and the Welsh language, and which encourages people to participate in the arts, and sports and recreation. • A globally responsible Wales. A nation which, when doing anything to improve the economic, social, environmental and cultural well-being of Wales, takes account of whether doing such a thing may make a positive contribution to global well-being.
Wildlife and Countryside Act 1981 (as amended)	The Act makes it an offence (subject to exceptions) to intentionally kill, injure, or take, possess, or trade in any wild animal listed in Schedule 5, and prohibits interference with places used for shelter or protection, or intentionally disturbing animals occupying such places. The Act also prohibits certain methods of killing, injuring, or taking wild animals. The Act requires surveying authorities to maintain up to date definitive maps and statements, for the purpose of clarifying public rights of way.
Regional	
Welsh Government, (2015) A Water Strategy for Wales	<p>This strategy sets out the strategic direction for water policy in Wales for the next 20 years and beyond.</p> <p>Key themes are:</p> <ul style="list-style-type: none"> • Water for nature, people and business – how quality and quantity of water resources will be sustainably managed, meeting society’s needs and offering opportunities for green growth whilst protecting and enhancing the natural environment. • Improving the way we plan and manage our water services – ensuring water services remain robust, sustainable and support high quality services now and in the future. • Delivering excellent services to customers – ensure people and businesses have access to affordable water and sewerage services that are sustainable, safe, secure and dependable. • Protecting and improving drinking water quality – ensuring compliance with the Drinking Water Directive and ensuring that any quality problems are effectively dealt with. • 21st century sewerage and drainage system – both waste water and surface water managed in a sustainable way. • Supporting delivery. <p>Under each theme is a range of actions to address the challenges set out in the strategy and to assist in meeting wellbeing goals and sustainable development principle.</p>

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Welsh Assembly Government (2014) National Strategy for Flood and Coastal Erosion Risk Management	<p>The objectives are:</p> <ul style="list-style-type: none"> • Reducing the consequences for individuals, communities, businesses and the environment from flooding and coastal erosion. • Raising awareness of and engaging people on flood and coastal erosion risk. • Providing an effective and sustained response to flood and coastal erosion events • Prioritising investment in the most at risk categories.
Welsh Assembly Government (consultation document 2012), Sustaining a Living Wales: a green paper on a new approach to natural resource management	<p>This consultation document sought views on proposed changes to the governance and delivery of the management and regulation of the environment in Wales based on the ecosystem approach.</p>
Welsh Assembly Government (2012), State of the Environment Report – Wales	<p>This bulletin presents an overview of progress against the Welsh Assembly Government’s Environment Strategy. It summarises the latest information on the indicators monitoring the progress. The results for individual indicators are presented in a series of electronic reports.</p>
Welsh Assembly Government (2008) Wales Spatial Plan	<p>The Wales Spatial Plan provides the framework for future collaborative action between the Welsh Assembly Government and its partners to achieve sustainable economic growth across the whole of Wales. The plan emphasises the need for coordinated action at national, regional and local levels. The Spatial plan sets out a range of objectives under five headings:</p> <ul style="list-style-type: none"> • Building sustainable communities • Promoting a sustainable economy • Valuing our environment • Achieving sustainable accessibility • Respecting distinctiveness
Welsh Assembly Government (2009) One Wales: One Planet – a new sustainable	<p>One Wales One Planet sets out proposals to promote sustainable development and how WAG will make sustainable development a reality for people in Wales, and outlines the benefits that people will see from this, particularly in less well-off communities.</p>

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development scheme for Wales	
Welsh Assembly Government (2010) Climate Change Strategy for Wales	<p>Climate Change Strategy and associated Delivery Plans confirm WAG's commitment to tackling issues of future climate change. Strategy addresses:</p> <ul style="list-style-type: none"> • The vision for 2050, and how this Strategy supports our Sustainable Development Scheme, One Wales: One Planet. • Key target to cut greenhouse gas emissions by 3% per year in areas of devolved competence • Climate change impacts for Wales. • How to tackle Wales's climate vulnerability.
Welsh Assembly Government (2011) Strategic Policy Position Statement on Water	<p>In March 2009, the first Strategic Policy Position Statement on Water was published. The Policy Statement outlined WAG priorities for water. The Statement contained key issues and actions to be taken. This revised Statement updates the current position. It reflects developments that have happened and highlights future priorities in relation to water policy in Wales.</p>
Welsh Assembly Government (2009) Technical Advice Note 5. Nature Conservation and Planning	<p>The TAN provides advice for local planning authorities on:</p> <ul style="list-style-type: none"> • The key principles of positive planning for nature conservation • Nature conservation and Local Development Plans • Nature conservation in development management procedures • Development affecting protected internationally and nationally designated sites and habitats • Development affecting protected and priority habitats and species
Welsh Assembly Government (2010), Technical Advice Note 6: Planning for Sustainable Rural Communities	<p>Technical Advice Note (TAN) 6 supports national planning policy on sustainable rural communities. This guidance provides advice on:</p> <ul style="list-style-type: none"> • Sustainable rural communities • Sustainable rural economies • Rural affordable housing • Rural enterprise dwellings • One Planet Developments • Sustainable rural services

Document Name	Key Objectives, Requirements, and Guidance
	<ul style="list-style-type: none"> • Sustainable agriculture
Welsh Assembly Government (1997), Technical Advice Note 13: Tourism	<p>The Technical Advice Note (Wales) (TAN) should be read in conjunction with Planning Guidance (Wales): Planning Policy. Planning Guidance. This TAN provides advice on:</p> <ul style="list-style-type: none"> • Hotel development; • Holiday and touring caravans; • Seasonal and holiday occupancy conditions.
Welsh Assembly Government (2004), Technical Advice Note 15: Development and Flood Risk	<p>Technical Advice Note (TAN) 15 provides technical guidance which supplements the policy set out in Planning Policy Wales in relation to development and flooding. Advice is given on:</p> <ul style="list-style-type: none"> • Development advice maps • Nature of development or land use • Justifying the location of built development • Assessing flooding consequences • Surface water run-off from new development • Action through Development Plans • Development Control
Welsh Assembly Government (2009), Technical Advice Note 16: Sport, Recreation and Open Space	<p>This revised TAN provides advice for communities, developers and local planning authorities in Wales preparing local development plans and taking decisions about planning applications. The Note contains advice about:</p> <ul style="list-style-type: none"> • Preparing Open Space Assessments • Keeping existing facilities • The provision of new facilities • Topics related to water based recreation, off- road recreational vehicles, allotments and spaces for children's and young people's play
Welsh Assembly Government (2006) Environment Strategy for Wales	<p>Purpose is to provide the framework within which to achieve an environment which is clean, healthy, biologically diverse and valued.</p> <ul style="list-style-type: none"> • Focuses on key environmental themes:

Document Name	Key Objectives, Requirements, and Guidance
	<ul style="list-style-type: none"> • Addressing climate change - mitigation and adaptation, including reduced emissions, improved resilience, managing increased flood risk on key assets such as schools, hospitals, housing stock, businesses, land management • Sustainable resource use - covers materials consumption and waste, water, soils, minerals aggregates. Waste generation should be minimised. Reduce, reuse, recycle to become universally accepted. Water resources should be effectively managed. Soil functionality should be recognised, including carbon sequestration and flood risk management. • Distinctive biodiversity landscapes and seascapes - covers biodiversity, the marine environment, landscapes and seascapes, and their historic component. To involve sustainable land/sea use and management to ensure they can support environmental social and economic needs while maintaining ecosystem function. Aim to halt biodiversity loss and recover from losses that have occurred. Focus will include habitat fragmentation effects, and increased habitat extent/connectivity. • Local environment - built environment and access to green space, environmental nuisances, walkability in urban areas and access to the countryside and coast, and flood risk management. Focus on the distinctiveness of buildings in Wales. Recognises the spectrum which must contribute to flood risk management - land management, development control, emergency planning, improved property resilience. • Environmental hazards - pollution, chemicals and radioactivity. Recognises the importance of WFD standards <p>The associated action plan will address impacts of increased flood risk on key assets</p>
Welsh Assembly Government (2013) Wales Marine and Fisheries Strategic Action Plan	This plan aims to provide a framework for clean, healthy, safe, productive and biologically diverse areas.
Welsh Assembly Government (2010), Low Carbon Revolution – The Welsh Assembly Government Energy Policy Statement	This statement explains what WAG will do and what they want others to do to make the ambition for low carbon energy a reality. Aim will be to renewably generate up to twice as much electricity annually by 2025 as we use today. By 2050, at the latest, we want to meet almost all of our local energy needs, whether for heat, electrical power or vehicle transport, by low carbon electricity production.

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Welsh Assembly Government Planning Policy Wales (2016) Edition 8	<p>National land use policies for local authorities to take into account when compiling their LDPs. Section 12 Infrastructure and Services addresses water supply. Objectives include:</p> <ul style="list-style-type: none"> To protect and improve water resources through increased efficiency and demand management of water, particularly in those areas where additional water resources may not be available.
Cannock Chase Area of Outstanding Natural Beauty Management Plan 2014-2019	<p>To achieve the vision by 2034, high level objectives are identified including:</p> <ul style="list-style-type: none"> Develop the AONB as a special, peaceful and tranquil place for everyone who lives in, works within or visits the area; Conserve and enhance the distinctive and nationally important landscape of the AONB and the locally, nationally and internationally important biodiversity and geodiversity it supports, ensuring links between habitats within the AONB and surrounding landscape; Ensure a safe, clean and tranquil environment that can contribute to a high and sustainable quality of life; Support a balance between a working landscape where prosperity and opportunity increase, biodiversity flourishes and pressure upon natural resources is diminished; Create a place of enjoyment for everyone, providing opportunities for quiet recreation and maintaining ecosystems that contribute positively to physical and mental wellbeing.
Cotswolds AONB Management Plan 2013-2018	Objectives include those associated with conserving and enhancing the AONB.
Kent Downs AONB Management Plan 2014-2019	The areas covered by the plan include the overall management of the AONB, sustainable development, landform and landscape character, biodiversity, farmed landscape, woodland and trees, historic and cultural heritage, heritage coast, geology and natural resources, vibrant communities and access, enjoyment and understanding.
The North Wessex Downs AONB Management Plan 2014-2019	The objectives of the plan come under the broad headings of Landscape, Land Management; Biodiversity; Historic environment; Natural resources; Development; Communities and Leisure and Tourism
Surrey Hills AONB Management Plan 2014-2019	Policies include those for farming, woodland, biodiversity, historic and cultural heritage, recreation and tourism, land use planning, traffic and transport and community development and the local economy

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Chiltern Hills AONB Management Plan 2014-2019	Objectives are under the headings of conserving and enhancing natural beauty, landscape, farming, forestry and other land management, biodiversity, water environment, historic environment and development.
Malvern Hills Area of Outstanding Natural Beauty Management Plan 2014-2019	<p>Objectives of the management plan include:</p> <ul style="list-style-type: none"> • Conserve and enhance the distinctive landscape elements and features of the AONB, particularly those that are most sensitive or have little capacity for change; • Protect important geological and geomorphological sites; • Establish and maintain coherent and resilient ecological networks across the AONB and beyond; • Conserve and enhance the historic environment and cultural heritage of the AONB through appropriate funding, management and awareness raising.
Shropshire Hills Area of Outstanding Natural Beauty (2014) Management Plan 2014 to 2019	<p>Six delivery priorities have been established for the plan period:</p> <ul style="list-style-type: none"> • Joining up the conservation effort • Valuing the AONB in planning and decisions • Encouraging a sustainable land management economy • Supporting enjoyment and a visitor economy in harmony with the AONB • Raising awareness and participation, especially among young people • Local working with communities
Snowdonia National Park, Snowdonia National Park Management Plan 2010 - 2015	<p>This sets out the vision for the condition of the national park by 2035. To achieve this vision, aims to be facilitated by the National Park and its partners include:</p> <ul style="list-style-type: none"> • A rich and varied landscape, exemplifying aesthetic qualities and notable regional landscape characters. Deliver a landscape responsive to climate change. • A hub in the regional ecological framework, essential for National Park and surroundings to adapt to climate change. To include enhancement of designated sites under UK and European legislation. • Recreational opportunities for residents and visitors. These activities are not to harm the special qualities and effective management to provide opportunities for those wishing to improve their health and wellbeing. • Cultural heritage which is better protected and understood. • A varied and robust economy founded on environmental goods and services.

Document Name	Key Objectives, Requirements, and Guidance
Local Authority Plans	
AONB Management Plans (various)	<p>Producing an area management plan is a statutory requirement for every AONB. Its purpose is to:</p> <ul style="list-style-type: none"> • Highlight the special qualities and significance of the AONB • Present a vision for the future of the AONB • Set out objectives and policies to secure the vision • Identify what needs to be done, by whom and when • State the condition of the AONB and how the effectiveness of its management will be monitored • Reflect the views and aspirations of a wide range of AONB stakeholders and parties with an interest in it • Co-ordinate the work of different partner organisations. <p>Every AONB will have a different management plan, and these could vary quite significantly.</p>
Catchment Flood Management Plans (CFMPs), Defra and Environment Agency (2016)	<p>CFMPs consider all types of inland flooding from rivers, groundwater, surface water and tidal flooding. Shoreline management plans consider flooding from the sea – these are mentioned above. CFMPs include:</p> <ul style="list-style-type: none"> • The likely impacts of climate change • The effects of how we use and manage the land • How areas could be developed to meet our present day needs without compromising the ability for future generations to meet their own needs. <p>CFMPs help the Environment Agency and their partners to plan and agree the most effective way to manage flood risk in the future. CFMPs are grouped by river basin district.</p>
Catchment Management Strategies (various)	<p>A catchment is the area of land drained by a river and its tributaries. The waters within a catchment:</p> <ul style="list-style-type: none"> • Closely reflect in their quality and quantity a wide range of natural processes and human activities across the catchment • Are connected • Provide a range of benefits or ‘ecosystem services’ to society. <p>Catchment management is an environmentally friendly and potentially low-carbon method of influencing water quality at its source. Collectively addressing issues affecting our rivers and reservoirs can also help build better relationships with farmers, while preventing pollution and reducing the risk of flooding. Catchment management strategies are the</p>

Document Name	Key Objectives, Requirements, and Guidance
	most sustainable way to protect the water resources within the UK whilst also putting communities at the heart of protecting and managing their local environment.
Local Nature Recovery Strategies (various, emerging)	Local Nature Recovery Strategies (LNRSs) are a new, England-wide system of spatial strategies that will establish priorities and map proposals for specific actions to drive nature's recovery and provide wider environmental benefits. The requirement for there to be Local Natural Recovery Strategies, what they are and how they will generally work is outlined within the Environment Act 2021. The area covered by each Strategy Plan will be set out by Defra's Secretary of State who will be able to produce regulations on the process for preparing, publishing, reviewing and republication of a LNRS and any guidance on what they should contain.
Natural Character Area Profiles (various)	Areas defined at the national level (which describe the geographical, ecological and historical variations in landscape character) make one area different from another. Their boundaries follow natural lines in the landscape rather than administrative boundaries making them a good decision-making framework for the natural environment. NCAs divide England into 159 distinct natural areas.
River Basin Management Plans (RBMPs), Defra and Environment Agency (2022)	<p>RBMPs set out how organisations, stakeholders and communities will work together to improve the water environment. RBMPs are used when you need:</p> <ul style="list-style-type: none"> • Information on the plan for the protection and improvement of the water environment • To know how future plans may affect an industry sector and its obligations • To ensure a development proposal considers the requirements of the RBMP • To contribute to the delivery of the plan or maximise potential funding for a project. <p>The Environment Agency must review and update RBMPs every 6 years.</p>
Environment Agency and Defra, (2022) Thames River Basin District River Basin Management Plan	<p>Updated as 2015 plans superseded by 2022 plans.</p> <p>Reference is made to the environmental objectives of the WFD are:</p> <ul style="list-style-type: none"> • To prevent deterioration of the status of surface waters and groundwater • To achieve objectives and standards for protected areas • To aim to achieve good status for all water bodies or, for heavily modified water bodies and artificial water bodies, good ecological potential and good surface water chemical status • To reverse any significant and sustained upward trends in pollutant concentrations in groundwater • The cessation of discharges, emissions and losses of priority hazardous substances into surface waters

Document Name	Key Objectives, Requirements, and Guidance
	<ul style="list-style-type: none"> Progressively reduce the pollution of groundwater and prevent or limit the entry of pollutants. <p>Environmental objectives are set for each of the protected areas and water bodies in the river basin district.</p>
<p>Environment Agency and Natural Resources Wales (2022) Severn River Basin District, River Basin Management Plan</p>	<p>Updated as 2015 plans superseded by 2022 plans.</p> <p>Reference is made to the environmental objectives of the WFD are:</p> <ul style="list-style-type: none"> To prevent deterioration of the status of surface waters and groundwater To achieve objectives and standards for protected areas To aim to achieve good status for all water bodies or, for heavily modified water bodies and artificial water bodies, good ecological potential and good surface water chemical status To reverse any significant and sustained upward trends in pollutant concentrations in groundwater The cessation of discharges, emissions and losses of priority hazardous substances into surface waters Progressively reduce the pollution of groundwater and prevent or limit the entry of pollutants <p>Environmental objectives are set for each of the protected areas and water bodies in the river basin district.</p>
<p>Environment Agency (2022) Humber River Basin District: River Basin Management Plan</p>	<p>Updated as 2015 plans superseded by 2022 plans.</p> <p>Reference is made to the environmental objectives of the WFD are:</p> <ul style="list-style-type: none"> To prevent deterioration of the status of surface waters and groundwater To achieve objectives and standards for protected areas To aim to achieve good status for all water bodies or, for heavily modified water bodies and artificial water bodies, good ecological potential and good surface water chemical status To reverse any significant and sustained upward trends in pollutant concentrations in groundwater The cessation of discharges, emissions and losses of priority hazardous substances into surface waters Progressively reduce the pollution of groundwater and prevent or limit the entry of pollutants. <p>Environmental objectives are set for each of the protected areas and water bodies in the river basin district.</p>
<p>Environment Agency and Natural Resources Wales (2016) Severn River Basin</p>	<p>Objectives include:</p> <ul style="list-style-type: none"> Manage flood and coastal erosion risks, taking account of the needs of communities, businesses and the environment and working with natural solutions where possible.

Document Name	Key Objectives, Requirements, and Guidance
District: Flood Risk Management Plan 2015-2021	<ul style="list-style-type: none"> • Reduce the risk of flooding to people and households. • Reduce the risk of flooding from reservoirs to people, property, infrastructure and the environment
Environment Agency (2016) Humber River Basin District Flood Risk Management Plan 2015-2021	<p>The objectives include:</p> <ul style="list-style-type: none"> • Minimise the impact of flooding to community services and critical infrastructure such as education and health facilities, emergency services, significant transport network and domestic infrastructure taking into account the potential implications of climate change scenarios. • Reduce flood risk and avoid loss of life to people and existing residential properties. • Reduce the economic damage of flooding to non-residential properties. • Minimise the risk of flooding to key transport links within the river basin such as railway lines, motorways, primary roads and trunk roads. • Consider the value of agricultural land and the damage that can occur as a result of flooding within the economic appraisal of maintenance and investment options for flood risk management. • Minimise the negative impacts of flooding to designated nature conservation sites throughout the district wherever possible contributing to the enhancement of such sites. • Minimise the negative impacts of flooding to heritage assets and landscape value wherever possible enhancing such assets. • Avoid loss of life and reduce the risk of flooding from reservoirs to people, property, infrastructure and the environment.
Environment Agency (2016) Thames River Basin District Flood Risk Management Plan 2015-2021	<p>The objectives include:</p> <ul style="list-style-type: none"> • Reduce the risk of flooding to communities where possible. • Enhance recreation and general amenity across the river basin. • Ensure development and redevelopment in areas at risk of flooding is appropriate, does not increase flood risk and reduces risk wherever possible. • Promote the use of sustainable drainage systems in development to help reduce pressure on existing drainage networks. • Protect and enhance biodiversity through flood risk management schemes. • Restore naturally functioning river systems where possible.

Document Name	Key Objectives, Requirements, and Guidance
	<ul style="list-style-type: none"> Promote sustainable land use management to land owners across the catchment to achieve reductions in flood risk.
<p>Environment Agency, Thames Region Water Industry National Environment Programme (WINEP) (unpublished) 2017</p>	<p>The Water Industry National Environment Programme (WINEP) is the mechanism by which the Environment Agency sets out the measures that it would like water companies to implement to improve the water environment. The WINEP covers both water and wastewater services and the detail in the WINEP enables water companies to include specific measures in their business plans for submission to Ofwat so that the environmental improvements can be funded and delivered in the following Asset Planning Period (AMP). In relation to Water Resources Management Plan 2019, the WINEP sets out a series of investigations for Thames Water to carry out to assess the sustainability of some of its existing water sources and also provides an indication of potential changes to abstraction licence conditions to reduce the reliable supply of water to help protect the water environment (termed “sustainability reductions” in the Water Resources Management Plan 2019).</p>
<p>South East Biodiversity Strategy (2009) South East England Biodiversity Forum</p>	<p>The strategy aims to be a clear, coherent and inspiring vision and framework that guides and supports all those who can impact biodiversity in the south east region.</p> <p>The South East Biodiversity Strategy aims to:</p> <ul style="list-style-type: none"> Be a clear, coherent and inspiring vision for the south east Provide a framework for the delivery of biodiversity targets that guide and support all those who have an impact on biodiversity in the region Embed a landscape scale approach to restoring whole ecosystems in the working practices and policies of all partners Create the space needed for wildlife to respond to climate change Enable all organisations in the south east to support and improve biodiversity across the region Be a core element within the strategies and delivery plans of organisations across the south east region.
<p>Environment Agency (2006) River Thames Alliance: Thames Waterway Plan 2006-2011</p>	<p>The strategy aims to plan and promote water-related sport and recreation to achieve the maximum economic, social and environmental benefits. The main objectives are based on creating opportunities for recreation on or near our inland and coastal waters:</p> <ol style="list-style-type: none"> 1. Creating a better place to play by improving the environment

Document Name	Key Objectives, Requirements, and Guidance
	2. Improving access for all 3. Making recreation sustainable 4. Promoting the outdoors
Environment Agency (2007) Water for the Future - Managing Water in the South East of England.	A short paper explaining why water resources are going to become an increasingly important issue in the south east of England due to Government proposed development, climate change, available resources and usage patterns. Promotes consumer management of water resources by changing behaviour, and suggests this may preclude the need for some development schemes which have environmental impacts. Mentions a number of ways by which water companies can reduce water demand, including: <ul style="list-style-type: none"> • leakage reduction • installation of water meters • new tariffs to encourage efficient water use • retrofitting water saving devices to existing homes and businesses, designing new homes to be water-efficient • sharing of resources by water companies
Environment Agency (2006) Thames Regional Fisheries Strategy: A Bright Future for Our Fish 2006 – 2011.	The regional Fisheries strategy outlines the main issues and pressures for Fisheries across the Thames region and outlines actions to address these issues.
Environment Agency (2011) Enjoying Water - Strategic Priorities for Water Related Recreation in London and South East England	The strategic priorities are designed to: <ul style="list-style-type: none"> • Encourage action by a range of interested parties and individuals • deliver well managed, new and better opportunities for more people to enjoy water environments • Tackle some of the issues that arise from changes in the demand for recreation, the supply of water bodies and gaps in provision • Ensure everyone can enjoy water environments.

Document Name	Key Objectives, Requirements, and Guidance
	<p>The Steering Group have developed a programme for implementation with measures of success for each of the strategic priorities and related actions. The implementation of the priorities will require local actions by local organisations and communities.</p>
<p>South Downs National Park (2013) Partnership Management Plan, Shaping the future of your south downs national park 2014-2019.</p>	<p>This is the five year strategy for the management of the South Downs National Park. It provides a framework for the park wide local plan.</p> <p>Outcomes are under three headings:</p> <ul style="list-style-type: none"> • A thriving living landscape • People connected with places • Towards a sustainable future <p>One of the outcomes requires -'More responsibility and action is taken by visitors, residents and businesses to conserve and enhance the special qualities and use resources more wisely.</p>
<p>South East Marine Plan (forthcoming) Marine Management Organisation</p>	<p>The purpose of the Marine Plan is to set out how the UK Marine Policy Statement will be implemented in the South East. Marine plan will cover a 20 year period and will be reviewed regularly. It will provide greater coherence in policy and a forward looking, proactive and spatial planning approach to the management of the marine area, its resources and the activities and interactions that take place within it. They will also seek to take account of social, economic and environmental factors that affect the plan and the communities that have an interest in them.</p>
<p>Thames Waterways Plan 2015 – 2021, EA for the River Thames Alliance (2015)</p>	<p>Developed by the EA in consultation with members of the River Thames Alliance (RTA). The objectives include:</p> <ul style="list-style-type: none"> • To ensure that the best possible flood risk management procedures are being followed and that resources are sufficient. • To conserve, improve and restore a natural and biodiverse river environment wherever possible for the benefit both nature and people, as well as maintaining the character of the urban landscapes and countryside within the River Thames corridor. • The River Thames and its corridor should be promoted effectively as a visitor destination for the benefit of visitors and the regional economy. • To ensure that the non-tidal River Thames remains as navigable as possible for commercial and recreational boats, that the rules around navigation are enforced, that the supporting infrastructure and facilities are fit for purpose and adequate staff are available.

Document Name	Key Objectives, Requirements, and Guidance
	<ul style="list-style-type: none"> To increase the use of the Thames for water-based sport and physical recreation, focussing particularly on better access for people for whom current provision is less readily available.
Environment Agency (2004) Thames Salmon Action Plan (SAP)	<p>The Plan details a 5 year programme of work. Eight targets are identified. Which includes:</p> <ul style="list-style-type: none"> An average of 250 adult salmon returning to the river each year Fish passes to be open throughout the fish migration period and operate at greater than 95% efficiency
Thames Water Biodiversity Action Plan	<p>Thames Water's BAP was first published in 1999. Progress is reported each year in the Corporate Responsibility Report. The Plan has four parts:</p> <ul style="list-style-type: none"> Action for land and water holdings Our activities and water management Partners in biodiversity Corporate responsibility
Thames Landscape Strategy, 2012 , Our Guidance Document: The Thames Landscape Strategy Review 2012	<p>Focussed on the river corridor between Hampton and Kew. The purpose of the Action Plan is to set out how the aims of the Thames Landscape Strategy partnership (TLS) will be achieved. The Thames Landscape Strategy Partnership objectives include:</p> <ul style="list-style-type: none"> To protect and enhance the natural and man-made landscape of the area To protect and improve sites of nature conservation value and create new opportunities for biodiversity and flood risk management in the implementation of the Thames Landscape Strategy. To protect and enhance historic buildings, historic parks and gardens, landscapes and ancient monuments. To encourage and maintain a high level of community commitment to the Thames Landscape Strategy vision and encourage community involvement and action to help realise the Thames Landscape Strategy. To facilitate the creation of partnerships between the public, private
Public Rights of Way Improvement Plans (ROWIP)	<p>These plans are prepared by local authorities to describe how improvements to the public rights of way network will be undertaken to provide a better experience for a range of users. ROWIPs are reviewed every ten years.</p>
The Port of London Act 1968	<p>The Port Authority maintains the Richmond works and the sluices forming part thereof so as to hold the water upstream of the works to a certain height.</p>

Document Name	Key Objectives, Requirements, and Guidance
London Infrastructure Plan 2050	Water is a key element of this plan. A variety of demand and supply-side measures will be required.
London Biodiversity Partnership (2009) London Biodiversity Action Plan.	The London BAP has 26 action plans for habitats and species that are important in London. Of these, key habitats of relevance are Rivers and Streams, Reedbeds and Tidal Thames. The London BAP contains targets to improve the condition and increase the extent of a selected number of habitats found in the capital by 2015.
The London Plan (2016): Spatial Development Strategy for London Consolidated with Alterations since 2011	<p>The London Plan is a Spatial Development Strategy for London and is the responsibility of the Mayor to produce and keep under review. It replaces government’s strategic guidance, and borough’s development plan documents must be in ‘general conformity’ with it. The GLA Act 1999 requires that the Plan deals only with matters that are of strategic importance to Greater London, and that it deals with three cross-cutting themes. The overall strategic plan for London, setting out an integrated economic, environmental, transport and social framework for the development of London over the next 20–25 years. The plan brings together the geographic and locational aspects of the Mayor’s other strategies – including those dealing with: transport, economic development, housing, culture a range of social issues such as children and young people, health inequalities and food a range of environmental issues such as climate change (adaptation and mitigation), air quality, noise and waste.</p> <p>Mayor has put forward a vision for the sustainable development of London over the period covered by this Plan (to 2031) requiring London to “excel among global cities – expanding opportunities for all its people and enterprises, achieving the highest environmental standards and quality of life and leading the world in its approach to tackling the urban challenges of the 21st century, particularly that of climate change”.</p>
Mayor of London (2011) Managing Risks and Increasing Resilience The Mayor’s Climate Change Adaptation Strategy	<p>This refers to ‘security of supply’ that is met by withdrawing more water from the environment that can be sustained. Less summer rainfall, greater demand for water and greater restrictions on the amount of water removed from the environment in the future threatens the security of supply. Without action, there will be increased frequency of drought management measures in London.</p> <p>London should have a secure supply of water that is affordable and safeguards the environment. Improvements to the sustainability of London’s water supply and demand balance to make it more robust to drought by :</p> <ul style="list-style-type: none"> • Promoting measures to enable and sustain long term improvement in water efficiency • Lobbying government to integrate water efficiency into housing retrofitting programmes • Promoting capturing and using rainwater for non-consumptive purposes

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	<ul style="list-style-type: none"> Improving response to drought.
<p>Mayor of London (2011) Securing London's Water Future The Mayor's Water Strategy</p>	<p>This sets out the water challenges for London and actions needed to manage them. It calls for organisations involved in the city's water management to invest in a water management and sewerage infrastructure system that's suitable for a world class city this includes:</p> <ul style="list-style-type: none"> support and encourage people to take practical actions to save water, save energy and save money off utility bills work in partnership to manage flood risk <p>Demand for water will increase due to population increases and higher seasonal rainfall and hotter summers mean water availability will decreased when required the most. London's supply-demand balance will become increasingly unsustainable and therefore action is required to balance supply and demand.</p>
<p>Environment Agency (2011) Water Resources Strategy – A Regional Action Plan for Thames Region.</p>	<p>Explains how the aims of the Environment Agency national strategy will be progressed by regional teams. Brings a sustainable approach to water management, taking into account regional challenges.</p> <p>This plan takes the aims and objectives of the strategy and identifies regional actions that will enable:</p> <ul style="list-style-type: none"> water to be abstracted, supplied and used efficiently the water environment to be restored, protected and improved so that habitats and species can better adapt to climate change supplies to be more resilient to the impact of climate change, including droughts and floods; water to be shared more effectively between abstractors improved water efficiency in new and existing buildings water to be valued, and for prices to act as an incentive for efficient use, while safeguarding vulnerable sectors of society additional resources to be developed where and when they are needed in the context of a twin-track approach with demand management sustainable, low-carbon solutions to be adopted stronger integration of water resources management with land, energy, food and waste

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Shoreline Management Plans (various)	Shoreline management plans in England and Wales are developed by the Coastal Groups with members of the Environment Agency. They identify the most sustainable approach to managing the flood and coastal erosion risks to the coastline in the short-term (0-20 years) medium-term (20-50 years), and long-term (50-100 years).
WRE Regional Water Resources Plan (in draft, expected publication 2023)	<p>The RWRP will have 4 key components:</p> <ul style="list-style-type: none"> • Demand management – leakage per capita consumption reduction with multi-sector water efficiency measures • Large infrastructure options >10MI/d that have a whole regional or national significance • ‘Local’ non-water company and smaller (<10MI/d) water company infrastructure projects and schemes which requires the specialist, local knowledge of WRE members • Supporting, facilitating or overseeing water innovations and exemplars in Eastern England which push the ‘art of the possible’. • Producing this document by 2023 will require many trade-offs and compromises.
Local Development Plans and Core Strategies (various)	<p>A development plan includes local, and neighbourhood plans, and any spatial development strategies produced by the local authority. LDPs should plan for infrastructure, homes, and jobs for residents. The land use policies contained within the LDP are used when making decisions on planning applications. They help us decide where to allocate land for residential use. At a distance the LDP will:</p> <ul style="list-style-type: none"> • Guide local development within the borough • Set out the long-term future for the borough • Outline how that growth will be delivered • Outline how the growth will take into account the needs of the local communities. <p>To be effective plans need to be kept up-to-date. The NPPF states policies in local plans and spatial development strategies, should be reviewed to assess whether they need updating at least once every 5 years, and should then be updated as necessary. Under regulation 10A of the Town and Country Planning (Local Planning) (England) Regulations 2012 (as amended) local planning authorities must review local plans, and Statements of Community Involvement at least once every 5 years from their adoption date to ensure that policies remain relevant and effectively address the needs of the local community. Therefore planning policy and local development plans should be regularly reviewed to ensure up to date and relevant policy is considered in relation to development and proposed Schemes.</p>

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<p>Central Bedfordshire Council Local Plan (adopted 2021)</p>	<p>The Central Bedfordshire Council Local Plan (2015-2035) will guide and support the delivery of new infrastructure, homes and jobs. It sets out the long-term vision and objectives for the area, what is going to happen, where, and how this will be achieved and delivered over the 20 year span. The following policies have been highlighted for their relevance to this SEA:</p> <p>Policy EE5: Landscape Character and Value: All major development proposals will be required to demonstrate how they incorporate landscape enhancement, in accordance with the guidelines in the LCA, the Central Bedfordshire Design Guide and other relevant documents for specific areas. This includes the Chilterns AONB, Forest of Marston Vale and the Greensand Ridge Nature Improvement Area. Landscape and visual appraisal will be expected to support planning applications and include the assessment of local landscape character and views.</p> <p>Policy CC1: Climate Change and Sustainability: The Council requires that all new development is designed to: 1. Increase its resilience to impacts of climate change; 2. Take full advantage of opportunities to incorporate renewable energy technologies; 3. Reduce carbon emissions; and 4. Achieve the higher water efficiency standard of 110 litres per person per day.</p> <p>Policy CC6: Water Supply and Sewage Infrastructure: There is a need to ensure adequate water supply is available, or can be provided, in time to serve the development and existing water resources, and will be safeguarded from the potential impacts of development.</p>
<p>Luton Borough Council Local Plan (adopted 2017)</p>	<p>The Luton Borough Council (2011-2031) sets out a set of policies, development allocations and actions to meet the environmental, social and economic challenges facing the area over the 20-year plan period and out a set of policies, development allocations and actions to meet the environmental, social and economic challenges facing the area over the 20-year plan period. The following policies have been highlighted for their relevance to this SEA:</p> <p>Policy LLP28: Biodiversity and Nature Conservation: The Council will work with partner organisations to positively assess, manage, and designate sites and ecological networks including giving support to development proposals that add to the net stock of wildlife habitats or where they help to deliver a net gain in the conservation and enhancement of such sites. The protection given will be commensurate with their status, giving appropriate weight to their importance and the contribution they make to ecological networks.</p> <p>Policy LLP36: Flood Risk: The risk and impact of flooding will be minimised through: directing new development to areas with the lowest probability of flooding; ensuring that all new development addresses flood resilience, the effective management of flood risk including opportunities for appropriate dry access for emergency vehicles; ensuring</p>

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	<p>that development does not increase the risk of flooding elsewhere, including cumulative impact on adjoining and surrounding land and in the wider catchment; and ensuring wider environmental benefits of development in relation to flood risk and contribute towards delivering "good ecological status".</p> <p>Policy LLP38: Pollution and Contamination: Evidence on the impacts of development will need to demonstrate whether the scheme (individually or cumulatively with other proposals) will result in any significantly adverse effects with regard to air, land or water on neighbouring development, adjoining land, or the wider environment. Where adverse impacts are identified, appropriate mitigation will be required. This policy covers chemical, biological, and radiological contamination and the effects of noise, vibration, light, heat, fluid leakage, dust, fumes, smoke, gaseous emissions, odour, explosion, litter, and pests.</p>
<p>Royal Borough of Windsor & Maidenhead Local Plan (adopted 2022)</p>	<p>The Royal Borough of Windsor & Maidenhead Local Plan (2013-2033) provides the framework to guide the future development of the Royal Borough of Windsor and Maidenhead. It sets out a spatial strategy and policies for managing development and infrastructure to meet the environmental, social and economic opportunities and challenges facing the area up to 2033. The following policies have been highlighted for their relevance to this SEA:</p> <p>Policy SP2: Climate Change: All developments will demonstrate how they have been designed to incorporate measures to adapt to and mitigate climate change. All development shall minimise the impact of surface water runoff from the development in the design of the drainage system, and where possible incorporate mitigation and resilience measures for any increases in river flooding levels as a result of climate change.</p> <p>Policy NR1: Managing Flood Risk and Waterways: Flood zones are defined in the National Planning Practice Guidance and the Council's Strategic Flood Risk Assessment (Level 1). Within designated Flood Zones 2 and 3 (and also in Flood Zone 1 on sites of 1 hectare or more in size and other circumstances as set out in the NPPF) development proposals will only be supported where an appropriate flood risk assessment has been carried out and it has been demonstrated that development is located and designed to ensure that flood risk from all sources of flooding is acceptable in planning terms.</p> <p>Policy EP1: Environmental Protection: Development proposals will only be supported where it can be shown that either individually or cumulatively in combination with other schemes, they do not have an unacceptable effect on environmental quality or landscape, both during the construction phase or when completed. Development proposals should seek to conserve, enhance and maintain existing environmental quality in the locality, including areas of</p>

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	ecological value (land and water based), and improve quality where possible, both during construction and upon completion. Opportunities for such improvements should be incorporated at the design stage and through operation.
South Bucks District Local Plan (Adopted 1999)	<p>At the time of writing, the new combined Local Plan for Chiltern and South Bucks is in development therefore the previous Local Plan has been referenced here. The South Bucks District Local Plan (1999-2011) sets out set out above the Council has devised the following aims for planning in the District</p> <ol style="list-style-type: none"> 1. To balance the need to protect the environment, especially the Green Belt, for current and future generations whilst meeting local needs over the plan period. 2. To enhance the quality of life for the District's residents. 3. To maintain a strong and healthy local economy as a source of jobs and prosperity. 4. To protect, care for and enhance the District's landscape, heritage and character. 5. To make the best use of land and other resources. The following policies have been highlighted for their relevance to this SEA: <p>Policy GB1: Green Belt Boundaries and the Control over Development in the Green Belt: Within the Green Belt, planning permission will not be granted for development other than for the change of use of existing buildings or land or the construction of new buildings or extensions to existing buildings which fall into defined criteria.</p> <p>Policy C1: Development within a Conservation Area: development within a Conservation Area that fails to preserve or enhance its character or appearance will not be permitted. Development will only be permitted where:- a) the proposal would preserve or enhance important features which contribute to the character or appearance of the Conservation Area including:- i) views into or out of the Conservation Area, ii) hedges or trees, iii) walls and other means of enclosure, iv) spaces between buildings, v) roofscape;</p> <p>Policy EP4: Landscaping: Development proposals will be expected to:- (a) incorporate appropriate hard and soft landscaping as an integral part of the development proposal; and (b) take account of, and retain, existing planting and landscape features, which are or may become important elements in the character and appearance of the site or the wider area.</p>

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Chiltern District Local Plan (adopted 1997)	<p>At the time of writing, the new combined Local Plan for Chiltern and South Bucks is in development therefore the previous Local Plan has been referenced here. The Chiltern District Local Plan (1997-2011) will aim to regulate these pressures, so as to conserve the attractive characteristics of the District whilst maintaining the local economy and also ensuring adequate provision, as far as practicable, for the needs of local residents and businesses in terms of housing, employment opportunities, transport and various community facilities and services. The following policies have been highlighted for their relevance to this SEA:</p> <p>Policy CA2: Views within, out of, or into Conservation Areas: Any proposed development which does not preserve or enhance the important views within, looking out of, or into a Conservation Area, will be refused. Where development proposals are acceptable in accordance with this Policy, the proposals should also comply with other Policies in this Local Plan.</p> <p>Policy TW6: Resistance to Loss of Woodland Throughout the District: Planning permission for development which results in the loss of woodland will be refused. Woodland of good quality, or landscape significance, or amenity value will be expected to be retained even where this will restrict or prevent development. This Policy applies throughout the District.</p> <p>Policy: NC1: Safeguarding of Nature Conservation Interests Throughout the District: Planning permission for development will be refused where it will significantly harm an acknowledged nature conservation interest of established importance. These interests are:- (i) Statutorily protected sites which are of international or national importance. These include Ramsar Sites, designated or proposed Special Protection Areas, Special Areas of Conservation, National Nature Reserves and Sites of Special Scientific Interest. These will be subject to special scrutiny. and (ii) Sites which are of local or regional importance.</p>
Brentwood Borough Council Local Plan (adopted 2022)	<p>The Brentwood Borough Council Local Plan (2016-2033) sets out the aim to conserve the attractive characteristics of the District whilst maintaining the local economy and also ensuring adequate provision, as far as practicable, for the needs of local residents and businesses in terms of housing, employment opportunities, transport and various community facilities and services. The following policies have been highlighted for their relevance to this SEA:</p> <p>Policy BE02: Water Efficiency and Management: All development proposals should have regard to the Water Cycle Study and seek to improve water quality; not cause deterioration in the quality of a water course or groundwater; not lead to adverse impacts on the natural functioning of the watercourse, including quantity, flow, river continuity,</p>

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	<p>groundwater connectivity, or biodiversity impacts; where development is likely to have an impact, proposals must set out how impacts will be mitigated.</p> <p>Policy NE03: Trees, Woodlands, Hedgerows: Development proposals that would result in the deterioration or loss of irreplaceable ancient woodland and ancient and veteran trees will not be permitted other than in wholly exceptional circumstances and only if the proposals include a suitable compensation strategy. In all other cases, proposals should, so far as possible and practicable, seek to retain existing trees, woodlands and hedgerows where they make a positive contribution to the local landscape and/or biodiversity or which have significant amenity value.</p> <p>Policy NE09: Flood Risk: New development will be required to avoid areas of flood risk by applying the Sequential and, where necessary, the Exception Tests in accordance with national policy and guidance. 2. A site specific Flood Risk Assessment must assess all sources of flooding. It should demonstrate how flood risk will be managed over the development's lifetime, taking climate change into account.</p>
Colchester Borough Council Local Plan (adopted 2022)	<p>The Colchester Borough Council Local Plan (2017-2033) sets out the vision for North Essex, which will be area of significant growth over the period to 2033 and beyond, embracing positively the need to build well-designed new homes, create jobs and improve and develop infrastructure for the benefit of existing and new communities. It will continue to be an attractive and vibrant area in which to live and work, making the most of its rich heritage, town centres, natural environment, coastal resorts, excellent educational facilities and strategic transport links which provide access to the ports, Stansted Airport, London and beyond. Rural and urban communities will be encouraged to thrive and prosper and will be supported by adequate community infrastructure. The following policies have been highlighted for their relevance to this SEA:</p> <p>Policy ENV1: Environment: The Local Planning Authority will conserve and enhance Colchester's natural and historic environment, countryside and coastline. The Local Planning Authority will safeguard the Borough's biodiversity, geology, history and archaeology, which help define the landscape character of the Borough, through the protection and enhancement of sites of international, national, regional and local importance. The Local Planning Authority will require development to be in compliance with, and contribute positively towards, delivering the aims and objectives of the Anglian River Basin Management Plan.</p> <p>Policy ENV3: Green Infrastructure: The Local Planning Authority will aim to protect, enhance and deliver a comprehensive green infrastructure network comprising strategic green links between the rural hinterland, urban Colchester, river corridors and open spaces across the Borough. It will seek to protect and enhance the existing</p>

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	<p>network of green and blue infrastructure features and to secure the delivery of new green infrastructure where deficiencies and gaps are identified that will benefit communities, wildlife and the environment.</p> <p>Policy ENV5: Pollution and Contaminated Land: Proposals will be supported that will not result in an unacceptable risk to public health or safety, the environment, general amenity, or existing uses due to the potential of air pollution, noise nuisance, surface / groundwater sources or land pollution.</p>
Epping Forest District Council Local Plan (adopted 2008)	<p>The Epping Forest District Council Local Plan (2008) set out the Council's policies for the control of development (and hence guide most planning decisions) and make proposals for the development and use of land, and allocate land for specific purposes. The following policies have been highlighted for their relevance to this SEA:</p> <p>Policy HC7: Development within Conservation Areas: Within conservation areas, all development and materials will be required to be of a particularly high standard to reflect the quality of the environment. Development should be sympathetic to the character and appearance of the conservation area in terms of scale, density, massing, height, layout, building line, landscape and access.</p> <p>Policy NC4: Protection of Established Habitat: Development proposals will be expected to make adequate provision for the protection, enhancement and suitable management of established habitats of local significance for wildlife. Such provision may be more stringent when there are known to be protected species either on the site or likely to be affected by the development.</p> <p>Policy RP3: Water Quality: The Council, after consultation with the Environment Agency, and, as appropriate, British Waterways and Thames Water, will refuse permission for developments or activities which present an undue risk to the quality and quantity of: groundwater; or water in rivers, canals, lakes, ponds or other water courses.</p>
Harlow Council Local Plan (adopted 2020)	<p>The Harlow Council Local Plan (2013-2033) sets out a long-term vision for Harlow, identifying land where development will be acceptable and where it will be unacceptable. It contains policies which ensure future development is sustainable by meeting the needs of residents, businesses and visitors, while providing the required infrastructure and protecting environmental assets. These policies are material considerations in the determination of planning applications. The following policies have been highlighted for their relevance to this SEA:</p> <p>Policy PL9: Biodiversity and Geodiversity Assets: Development should contribute to and enhance biodiversity or geodiversity assets, to ensure a net gain in biodiversity. The potential harm caused by development on these assets and their surroundings will be assessed based on the harm caused by the development. The greater the significance</p>

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	<p>of the asset, the greater the weight that is given to the asset's protection. Distinction will be made between the hierarchy of international, national and locally designated and non-designated sites so that the level of protection afforded is consistent with their status.</p> <p>Policy PL10: Pollution and Contamination: All development proposals must minimise and, where possible, reduce all forms of pollution and contamination. For air quality, the acceptability or otherwise of a proposal will be determined with reference to the relevant limit values or National Air Quality Objectives as they relate to human health or biodiversity.</p> <p>Policy PL11: Water Quality, Water Management, Flooding and Sustainable Drainage Systems: All development proposals will be considered against national policies (including application of the sequential test and, if necessary, the exception test) and against the European Water Framework Directive (or any subsequent equivalent). Development must not cause deterioration to water quality, including quality of waterways and other bodies of water, identified Source Protection Zones (SPZ), Aquifers and all other groundwater. Development must aim to improve such water quality.</p>
Uttlesford District Council Local Plan (adopted 2005)	<p>At the time of writing, the New Local Plan for Uttlesford District Council is in development therefore the previous Local Plan has been referenced here. The Uttlesford District Council Local Plan (2005) seeks to maintain and improve on Uttlesford's positive attributes. It will preserve the quality of life in the towns and villages. Its policies will help to address concerns within the community about facilities for young people, crime, housing needs, preserving the environment, public transport and access to services, in so far as these can be addressed through the planning system. It will protect the district's environment from inappropriate development, reduce and control noise and air pollution, reduce waste and increase recycling. It will help secure the provision of appropriate high quality leisure facilities and other infrastructure needed to support the level of development proposed in the plan. It will seek to prevent the loss of village shops and post offices. It will seek to ensure that good, affordable housing is available to all residents, especially young people and low paid workers from the District. It will help local companies to grow within appropriate development constraints, creating more jobs locally.</p> <p>The following policies have been highlighted for their relevance to this SEA:</p> <p>Policy ENV5: Protection of Agricultural Land: Development of the best and most versatile agricultural land will only be permitted where opportunities have been assessed for accommodating development on previously developed sites or</p>

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	<p>within existing development limits. Where development of agricultural land is required, developers should seek to use areas of poorer quality except where other sustainability considerations suggest otherwise.</p> <p>Policy ENV7: The Protection of the Natural Environment - Designated Sites: Development proposals that adversely affect areas of nationally important nature conservation concern, such as Sites of Special Scientific Interest and National Nature Reserves, will not be permitted unless the need for the development outweighs the particular importance of the nature conservation value of site or reserve. Development proposals likely to affect local areas of nature conservation significance, such as County Wildlife sites, ancient woodlands, wildlife habitats, sites of ecological interest and Regionally Important Geological/ Geomorphological Sites, will not be permitted unless the need for the development outweighs the local significance of the site to the biodiversity of the District. Where development is permitted the authority will consider the use of conditions or planning obligations to ensure the protection and enhancement of the site's conservation interest.</p> <p>Policy ENV12: Protection of Water Resources: Development that would be liable to cause contamination of groundwater particularly in the protection zones shown on the proposals map, or contamination of surface water, will not be permitted unless effective safeguards are provided.</p>
Tendring District Council Local Plan (adopted 2022)	<p>The Tendring District Council Local Plan (2013-2033) is the statutory development plan for Tendring District up to 2033. The National Planning Policy Framework (NPPF) requires all Local Planning Authorities in England and Wales to prepare a Local Plan and ensure it is kept up to date. Without an up-to-date plan, the Council would have limited power to influence the scale, location and quality of new development in the District, making it difficult to bring about the positive changes that the area needs and difficult to resist inappropriate development proposals that will have a detrimental effect on our area. The following policies have been highlighted for their relevance to this SEA:</p> <p>Policy HP1: Improving Health and Wellbeing: The Council will work to improve the health and wellbeing of residents in Tendring, including working with stakeholders on projects that provide better service integration, locating services where access can be improved, particularly for vulnerable groups and communities and ensuring increased contact with nature and access to the District's open spaces and offering opportunities for physical activities through the Haven Gateway Green Infrastructure and Open Space Strategies.</p> <p>Policy HP3: Green Infrastructure: Green Infrastructure will be used as a way of adapting to, and mitigating the effects of, climate change, through the management and enhancement of existing spaces and habitats and the creation of new spaces and habitats, helping to provide shade during higher temperatures, flood mitigation and benefits to</p>

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	<p>biodiversity, along with increased access. All new development must be designed to include and protect and enhance existing Green Infrastructure in the local area, as appropriate.</p> <p>Policy PPL5: Water Conservation, Drainage and Sewerage: Proposals for development must demonstrate that adequate provision exists, or can be provided in time, for sewage disposal to a public sewer and water recycling centre (sewage treatment works).-</p>
<p>Dacorum Borough Council Core Strategy (adopted 2013)</p>	<p>The Dacorum Borough Council Core Strategy (2006-2031) has the main purpose to anticipate and manage change in Dacorum over the years to 2031. It needs to balance the need for new development and infrastructure against the need to maintain the environmental assets and unique character of the borough. It is also one of the key tools to help maximise and coordinate new investment in Dacorum and help promote economic regeneration. The following policies have been highlighted for their relevance to this SEA:</p> <p>Policy CS5: Green Belt: The Council will apply national Green Belt policy to protect the openness and character of the Green Belt, local distinctiveness and the physical separation of settlements. There will be no general review of the Green Belt boundary through the Site Allocations DPD, although local allocations will be permitted.</p> <p>Policy CS24: The Chilterns Area of Outstanding Natural Beauty: The special qualities of the Chilterns Area of Outstanding Natural Beauty will be conserved. The scarp slope will be protected from development that would have a negative impact upon its skyline. Development will have regard to the policies and actions set out in the Chilterns Conservation Board's Management Plan and support the principles set out within the Chilterns Buildings Design Guide and associated technical notes.</p> <p>Policy CS31: Water Management: Water will be retained in the natural environment as far as possible. Measures to restore natural flows in the river systems and the water environment will be supported. Supply to the Grand Union Canal will be maintained.</p>
<p>East Hertfordshire District Council Local Plan (adopted 2018)</p>	<p>The East Hertfordshire District Council Local Plan (2011-2033) sets out the overall strategic vision for development in East Herts over the Plan period to 2033. Residents in East Herts enjoy one of the highest qualities of life in rural Britain. In particular residents in East Herts enjoy a good level of health and life expectancy. Educational attainment is also high with students performing better in East Herts than the wider region. The following policies have been highlighted for their relevance to this SEA:</p>

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	<p>Policy NE3: Species and Habitats: Development should always seek to enhance biodiversity and to create opportunities for wildlife and development which would result in the loss or significant damage to trees, hedgerows or ancient woodland sites will not be permitted. Proposals will be expected to protect and enhance locally important biodiversity sites and other notable ecological features of conservation value and reduce disturbance to a minimum.</p> <p>Policy CCS: Climate Change Mitigation: Carbon reduction should be met on-site unless it can be demonstrated that this is not feasible or viable. In such cases effective offsetting measures to reduce on-site carbon emissions will be accepted as allowable solutions.</p> <p>Policy EQ1: Contaminated Land and Land Instability: The District Council will encourage the remediation of contaminated land to ensure that land is brought back into use, subject to the requirements of this policy. The Council will require evidence, as part of any application, to show that unacceptable risks from contamination and land instability will be successfully addressed through remediation without undue environmental impact during and following the development. In particular, the developer shall carry out an adequate investigation to inform a risk assessment.</p>
Hertsmere Borough Council Local Plan (adopted 2013)	<p>The Hertsmere Borough Council Local Plan (2012-2027) sets out our vision for development in Hertsmere until 2027, addressing national and regional policy requirements, as well as local community needs. The document seeks to strike a balance between the borough's housing and economic development needs, social welfare and protection of the environment. It sets the framework for more detailed planning policies and provides the foundation for decisions on planning applications and development proposals. The following policies have been highlighted for their relevance to this SEA:</p> <p>Policy CS12: The enhancement of the natural environment: All development proposals must conserve and enhance the natural environment of the Borough, including biodiversity, habitats, protected trees, landscape character, and sites of ecological and geological value, in order to maintain and improve environmental quality, and contribute to the objectives of the adopted Greenways Strategy and the Hertsmere Green Infrastructure Plan. Proposals should provide opportunities for habitat creation and enhancement throughout the life of a development. In the case of the highest quality agricultural land (Grades 1, 2 and 3a) and Preferred Areas of mineral extraction, proposals will only be permitted where there is no likelihood of the land being sterilised for future agriculture or mineral extraction.</p> <p>Policy CS14: Promotion or enhancement of historic heritage assets: All development proposals must conserve or enhance the historic environment of the Borough in order to maintain and where possible improve local environmental quality. Development proposals should be sensitively designed to a high quality and not cause harm to identified,</p>

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	<p>protected sites, buildings or locations of heritage or archaeological value including Conservation Areas, Listed Buildings, Historic Parks and Gardens, Scheduled Ancient Monuments or their setting, and identified and as yet unidentified Archaeological Remains.</p> <p>Policy CS17: Energy and CO2 reductions: The Council will further encourage all new development or major refurbishment to incorporate energy from decentralised and renewable or low carbon sources. All large scale development will be required to incorporate on-site renewable energy generation, unless it is not feasible or viable or alternative decentralised and renewable, low carbon sources can be identified.</p>
<p>North Hertfordshire Council Proposed Local Plan (adopted 2016)</p>	<p>The North Hertfordshire Council Proposed Local Plan (2011-2031) seeks to address the key issues facing North Hertfordshire and will set a strategic vision and spatial strategy for the District over the period 2011 to 2031. It sets out the spatial strategy and vision for the future of the District and links this to the strategic policies which provide the guidance on the main issues that the Plan seeks to address. The following policies have been highlighted for their relevance to this SEA:</p> <p>Policy SP5: Countryside and Green Belt: Support the principles of the Green Belt and recognise the intrinsic value of the countryside and will only permit development proposals in the Green Belt where they would not result in inappropriate development.</p> <p>Policy SP10: Healthy Communities: Provide and maintain healthy, inclusive communities for our residents, such as support the retention of existing community, cultural, leisure or recreation facilities and protect, enhance and create new physical and green infrastructure to foster healthy lifestyles.</p> <p>Policy SP11: Natural and Historic Environment: Meet the challenges of climate change and flooding, through: supporting proposals for renewable and low carbon energy development in appropriate locations; taking a risk based approach to development and flood risk, directing development to areas at lowest risk in accordance with the NPPF and ensuring the provision of Sustainable Drainage Systems (SuDS) and other appropriate measures; supporting the principles of the Water Framework Directive and seek to protect, enhance and manage the water environment; and giving consideration to the potential or actual impact of land contamination and support proposals that involve the remediation of contaminated land.</p>
<p>Three Rivers District Council Core Strategy (adopted 2011)</p>	<p>The Three Rivers District Council Core Strategy (2011-2026) is the vision for Three Rivers over the next 15 years or so. In seeking to deliver this vision, the Council is preparing a new type of development plan for the District called the Local Development Framework. This will replace the existing Local Plan with a suite of new planning documents, the</p>

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	<p>first of which is the Core Strategy. It will link with other strategies such as the Sustainable Community Strategy and set out the long term vision for Three Rivers, along with the spatial strategy and policies to deliver the vision. The Core Strategy sets out in broad terms how we plan to deliver new homes, jobs and infrastructure over the period to 2026 and how we can manage development effectively. The following policies have been highlighted for their relevance to this SEA:</p> <p>Policy DM2: Green Belt: Within the Green Belt, except in very special circumstances, approval will not be given for new buildings other than those specified in national policy and other relevant guidance. Further guidance on the factors that will be considered in assessing applications for agricultural or forestry dwellings in the Green Belt.</p> <p>Policy DM6: Biodiversity, Trees, Woodland and Landscaping: Development that would affect a Site of Special Scientific Interest, Local Nature Reserve, Local Wildlife Site or protected species under UK or European law, or identified as being in need of conservation by the UK Biodiversity Action Plan or the Hertfordshire Biodiversity Action Plan , will not be permitted where there is an adverse impact on the ecological, geological or biodiversity interests of the site, unless it can be demonstrated that: i) The need for the development would outweigh the need to safeguard the biodiversity of the site, and where alternative wildlife habitat provision can be made in order to maintain local biodiversity; and ii) Adverse effects can be satisfactorily minimised through mitigation and compensation measures to maintain the level of biodiversity in the area.</p> <p>Policy DM8: Flood Risk and Water Resources: Development will only be permitted where it would not be subject to unacceptable risk of flooding; and would not unacceptably exacerbate risk of flooding elsewhere. Where practicable existing flood risks should be reduced. New development will not be permitted in Flood Zone 3b, as defined by the SFRA. Redevelopment of existing built development in that Zone will only be permitted if the proposals are of a compatible use class and would not increase flood risk elsewhere.</p>
Watford Borough Council Local Plan (adopted 2013)	<p>The Watford Borough Council Local Plan (2006-2013) sets out sets out the key elements of the council's planning vision and spatial strategy for the borough. The Core Strategy is the central part of the Local Plan, and establishes the direction for other documents that will set out our planning strategy and policies in more detail. The following policies have been highlighted for their relevance to this SEA:</p> <p>Policy SD2: Water and Wastewater: The council aims to minimise water consumption, surface water run-off and non-fluvial flooding whilst also protecting water quality.</p>

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	<p>Policy SD3: Climate Change: All new developments (and associated infrastructure) will maximise the use of energy efficiency and energy conservation measures in their design, layout and orientation to reduce the overall energy demand and; reduce CO2 emissions. mitigate climate change. adapt to the effects of climate change. maximise the use of previously developed land and the efficient use of land.</p> <p>Policy GI3: Biodiversity: Proposals must seek to conserve and enhance the unique natural landscape, biodiversity and habitat in and around the town, including the protection of County Wildlife Sites and the appropriate management and expansion of wildlife corridors, such as along water courses and railway lines. Proposals for new development should protect, maintain and enhance the quality of biodiversity habitat and improve access to important biodiversity areas in Watford and the surrounding area.</p>
<p>Welwyn Hatfield Borough District Plan (adopted 2005)</p>	<p>At the time of writing, the New Local Plan for Welwyn Hatfield Borough is in development therefore the previous District Plan has been referenced here. The Welwyn Hatfield Borough District Plan (2005-2011) The overall aim of the District Plan is to improve quality of life in the district by providing for sustainable development. This is now the central theme of national and strategic planning policy and it has been identified as a key issue in Welwyn Hatfield through consultation with the community in preparing the Plan. The concept of sustainable development is fundamental to the future of people's lives. It is concerned with ensuring a better quality of life for everyone, both now and for generations to come. The following policies have been highlighted for their relevance to this SEA:</p> <p>Policy GBSP3 - Area Of Special Restraint and Structural Landscape Area: The area of land at Panshanger Aerodrome in Welwyn Garden City, as defined on the Proposals Map, will be safeguarded against potential future growth needs beyond the period of this Plan. Any release of this land for development, in whole or in part, will be a matter for determination in future reviews of this Plan. In addition, no development should take place until structural landscaping has been provided within the area defined for that purpose on the Proposals Map.</p> <p>Policy RA1: Development in the Green Belt: in very special circumstances, permission will only be given for development for the following purposes: Agriculture, forestry or mineral extraction; Small scale essential facilities for outdoor sport and outdoor recreation or for cemeteries and for other uses of the land which preserve the openness of the Green Belt and which do not conflict with the purposes of including land within it.</p> <p>Policy RA10: Landscape Regions and Character Areas: Proposals for development in the rural areas will be expected to contribute, as appropriate, to the conservation, maintenance and enhancement of the local landscape character of the area in which they are located, as defined in the Welwyn Hatfield Landscape Character Assessment.</p>

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<p>Barnet Council Local Plan (adopted 2012)</p>	<p>The Barnet Council Local Plan will contribute to achieving the vision and objectives of Barnet’s Sustainable Community Strategy and will help our partners and other organisations to deliver relevant parts of their programmes. It will cover the physical aspects of location and land use traditionally covered by planning. It also addresses other factors that make places attractive and distinctive as well as sustainable and successful. It will help to shape the kind of place that Barnet will be in the future, balancing the needs of residents, businesses and future generations.</p> <p>The following policies have been highlighted for their relevance to this SEA:</p> <p>Policy DM06: Barnet’s heritage and conservation: All heritage assets will be protected in line with their significance and all development will have regard to the local historic context. b. Development proposals must preserve or enhance the character and appearance of 16 Conservation Areas in Barnet.</p> <p>Policy DM15: Green Belt and open spaces:</p> <p>Policy DM16: Biodiversity:</p>
<p>Brent Council Local Plan (adopted 2022)</p>	<p>The Bent Local Plan (2019-2014) sets the vision for Brent’s development. It includes London Borough of Brent’s policies towards housing, town centres, open space, employment, community facilities, the built and natural environment and transport – all of which contribute to making Brent a vibrant place to live and work. The following policies have been highlighted for their relevance to this SEA:</p> <p>Policy BHC1: Brent’s Heritage Assets: Including demonstrating a clear understanding of the archaeological, architectural or historic significance and its wider context and providing a detailed analysis and justification of the potential impact (including incremental and cumulative) of the development on the heritage asset and its context as well as any public benefit.</p> <p>Policy BGI2: Trees and Woodlands: Including in the case of major development to make provision for the planting and retention of trees on site. Where retention is agreed to not be possible, developers shall provide new trees to achieve equivalent canopy cover or a financial contribution for off-site tree planting of equivalent canopy cover will be sought and in the case of minor development which results in the loss of trees provision of appropriate replacements on site;</p> <p>Policy BUI3: Managing Flood Risk: Proposals requiring a Flood Risk Assessment must demonstrate that the development will be resistant and resilient to all relevant sources of flooding including surface water. Proposed development must pass the sequential and exceptions test as required by national policy.</p>

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<p>Ealing Council Local Plan (adopted 2012)</p>	<p>The Ealing Council Local Plan (2011-2026) sets out how Ealing will be a borough of opportunity where people enjoy:</p> <ul style="list-style-type: none"> • Health – improving public health and supporting those with specific needs to achieve well-being and independence. • Safety – working with communities to ensure that everyone is safe and has the support they need. • Prosperity – securing Ealing as a place where people are able, and want, to live and work. • High quality of life – making Ealing a place where people enjoy a high quality of life in clean, green and cohesive neighbourhoods. <p>The following policies have been highlighted for their relevance to this SEA:</p> <p>Policy 5.1: Protect and Enhance Metropolitan Green Belt: he council in seeking to enhance the network of Green Belt in the borough. In addition to projects and management matters referred to above, all Green Belt sites will be managed for informal recreation uses, the protection of nature conservation interests and the council will seek to enhance pedestrian and cycle links.</p> <p>Policy 5.4: Protect the Natural Environment – Biodiversity and Geodiversity: To protect and promote the network of Nature Conservation sites in the borough, through enhancing the natural value of existing sites, and improving access particularly in areas of deficiency. Biodiversity will be considered in the management of all green spaces and the network of waterways, including parks, gardens, private amenity space, cemeteries, green corridors and other incidental areas, and where development is proposed in or adjacent to such spaces.</p> <p>Policy 6.1: Physical Infrastructure: The Infrastructure Delivery Plan will identify and promote improvements in the following categories of physical infrastructure required to support the planned development of the borough to 2026.</p>
<p>Harrow Council Local Plan (adopted 2012)</p>	<p>The Harrow Council Local Plan (2011-20226) sets out the long-term vision of how Harrow, and the places within it, should develop by 2026 and sets out the Council’s strategy for achieving that vision. In particular, it identifies the broad locations for delivering housing and other strategic development needs such as employment, retail, leisure, community facilities and other uses. The following policies have been highlighted for their relevance to this SEA:</p> <p>Policy CS1 C: Proposals that would harm identified views or impede access to public viewpoints will be resisted.</p> <p>Policy CS1 D: Proposals that would harm the significance of heritage assets including their setting will be resisted. The enhancement of heritage assets will be supported and encouraged.</p> <p>Policy CS1 U: Development will be managed to achieve an overall reduction in flood risk and increase resilience to flood events. The capacity of the functional flood plain within greenfield sites will be maintained and opportunities to</p>

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	enhance or re-instate the functional floodplain on previously-developed sites will be sought. Proposals which risk contaminating groundwater will be resisted
Hillingdon Council Local Plan (adopted 2012)	<p>The Hillingdon Council Local Plan (2012-2026) is the key strategic planning document for Hillingdon and will support the delivery of the spatial elements of the Sustainable Community Strategy. It sets out the long-term vision and objectives for the Borough, what is going to happen, where, and how this will be achieved. The Hillingdon Local Plan is consistent with the Sustainable Community Strategy, which focuses on three key components that together make up Hillingdon now and in the future: People, Place and Prosperity. Emerging from these three components are the six priority themes of the Sustainable Community Strategy, i.e. improving health and wellbeing; strong and active communities; protecting and enhancing the environment; making Hillingdon safer; a thriving economy; and improving aspiration through education and learning. The following policies have been highlighted for their relevance to this SEA:</p> <p>Policy DMHP 1: Historic Assets: The Council will expect development proposals to avoid harm to the historic environment. Development that has an effect on heritage assets will only be supported where: i) it sustains and enhances the significance of the heritage asset and puts them into viable uses consistent with their conservation; ii) it will not lead to a loss of significance or harm to an asset, unless it can be demonstrated that it will provide public benefit that would outweigh the harm or loss, in accordance with the NPPF; iii) it makes a positive contribution to the local character and distinctiveness of the area; iv) any extensions or alterations are designed in sympathy, without detracting from or competing with the heritage asset.</p> <p>Policy DMEI 2: Reducing Carbon Emissions: All developments are required to make the fullest contribution to minimising carbon dioxide emissions in accordance with London Plan targets.</p> <p>Policy DEMI 7: Biodiversity Protection and Enhancement: The design and layout of new development should retain and enhance any existing features of biodiversity or geological value within the site. Where loss of a significant existing feature of biodiversity is unavoidable, replacement features of equivalent biodiversity value should be provided on-site. Where development is constrained and cannot provide high quality biodiversity enhancements on-site, then appropriate contributions will be sought to deliver off-site improvements through a legal agreement.</p>
Elmbridge Borough Council Local Plan (adopted 2011)	The Elmbridge Borough Council Local Plan (2011-2026) sets out a plan for the future development of the Borough in the period 2011 to 2026. Its role is to provide a delivery strategy to deal with particular challenges and issues that have been identified as being of local importance. The Core Strategy co-ordinates the delivery of development and accompanying infrastructure. It is a key Council document where big decisions have been made in order to deliver a high quality of life in the most sustainable way possible. Its role is to set out what sort of changes we need to plan for,

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	<p>where they should take place, when they should happen and how they will be delivered. Importantly, given the current economic climate, it also addresses the 'what if' scenario should development and infrastructure delivery fail to come forward as predicted. The following policies have been highlighted for their relevance to this SEA:</p> <p>Policy CS14: Green Infrastructure: The Council will protect, enhance and manage a diverse network of accessible multi-functional green infrastructure by: 1. Continuing to give a high level of protection to and improving the Borough's green infrastructure assets including Suitable Accessible Natural Greenspace (SANG) and those sites designated for their biodiversity value. Ensuring new development protects and enhances local landscape character (2), strategic views and key landmarks, and takes account of their setting, intrinsic character and amenity value</p> <p>Policy CS15: Biodiversity: The Council will seek to avoid loss and contribute to a net gain in biodiversity across the region by The Council will seek to avoid loss and contribute to a net gain in biodiversity across the region Support the implementation of the Regional Forestry and Woodland Framework and managing and maintaining a mosaic of habitats and rich variety of wildlife across the Council's landholdings in accordance with the Elmbridge Countryside Strategy.</p> <p>Policy CS26: Flooding: Development must be located, designed and laid out to ensure that it is safe; the risk from flooding is minimised whilst not increasing the risk of flooding elsewhere; and that residual risks are safely managed.</p>
<p>Guildford Borough Council Local Plan (adopted 2019)</p>	<p>The Guildford Borough Council Local Plan (2015-2034) sets out a plan which makes provision to meet the identified growth needs of the borough in terms of housing, employment, and retail and leisure. This is achieved by maintaining the extent and function of the Green Belt in such a way as to protect the existing character of the borough through maintaining the clear distinction between urban and rural areas and safeguarding the natural, built and historic environment. All new development will be of exemplary design and bring with it the necessary infrastructure and services required to enable future and existing communities to live sustainable lives. The following policies have been highlighted for their relevance to this SEA:</p> <p>Policy P4: Flooding, flood risk and groundwater protection zones: All development proposals are required to demonstrate that land drainage will be adequate and that they will not result in an increase in surface water run-off. Development proposals in the 'developed' flood zone 3b will also only be approved where the footprint of the proposed building(s) is not greater than that of the existing building(s) and there will be no increase in development vulnerability. Proposals within these areas should facilitate greater floodwater storage.</p>

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	<p>Policy D2: Climate change, sustainable design, construction and energy: The energy and waste hierarchies should be followed except where it can be demonstrated that greater sustainability can be achieved by utilising measures further down the hierarchy. All developments should be fit for purpose and remain so into the future. Proposals for major development are required to set out in a sustainability statement how they have incorporated adaptations for a changing climate and changing weather patterns in order to avoid increased vulnerability and offer high levels of resilience to the full range of expected impacts.</p> <p>Policy ID4: Green and blue infrastructure: Permission will not be granted for development proposals unless it can be demonstrated that doing so would not give rise to adverse effects on the integrity of European sites, whether alone or in combination with other development. Any development with a potential impact on SPA or SAC sites will be subject to a Habitats Regulations Assessment. Permission will only be granted for development proposals within or adjacent to national sites where it can be demonstrated that doing so would not be harmful to the nature conservation interests of the site and its function as an ecological unit.</p>
Runnymede Borough Council Local Plan (adopted 2020)	<p>The Runnymede Borough Council Local Plan (2020-2030) is the key document that provides the framework to guide the future development in the Borough of Runnymede. It sets out an ambitious vision and objectives, followed by a clear and focussed spatial strategy. It includes policies for managing development and infrastructure to meet the identified social, environmental, and economic challenges facing the area up to 2030 which will ensure that the Local Plan's vision is met. Ultimately, the Runnymede 2030 Local Plan is used to make decisions on planning applications. The following policies have been highlighted for their relevance to this SEA:</p> <p>Policy EE2: Environmental protection: Covering the following environmental topics: air quality, noise, land contamination, light, integrating development with existing uses and construction management.</p> <p>Policy EE3: Strategic Heritage Policy: Development that affects Runnymede's heritage assets should be designed to protect, conserve and enhance the significance and value of these assets and their settings in accordance with national legislation, policy and guidance and any supplementary planning documents which the council may produce. Development proposals likely to affect the significance of a heritage asset, including the contribution made by its setting, should be accompanied by a description of its significance in sufficient detail to allow the potential impacts to be adequately assessed.</p> <p>Policy EE13: Managing Flood Risk: New development will be guided to areas of lowest flood risk from all sources of flooding through the application of the sequential test. A sequential approach to the layout on individual development</p>

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	sites will also be expected to be followed to minimise flood risk. The exception test will continue to be applied where national planning policy advises that this is necessary.
Spelthorne Borough Council draft Local Plan (2020)	<p>The Spelthorne Borough Council draft Local Plan (2022-2037) has been prepared by the Council in consultation with the community, and sets out the policies and allocations that will guide how new development and infrastructure comes forward in the Borough for the next 15 years. The Local Plan supports the sustainable growth of Spelthorne in a planned way, which benefits our communities, environment and economy. The following policies have been highlighted for their relevance to this SEA:</p> <p>Policy E2: Biodiversity: The Council will support development proposals which restore, maintain and enhance habitat connectivity and will seek opportunities for habitat creation particularly within Biodiversity Opportunity Areas. Development proposals will be expected to contribute to biodiversity through clearly demonstrating improvements when submitting a planning application as part of securing biodiversity net-gain.</p> <p>Policy E3: Managing Flood Risk: To reduce the overall and local flood risk and manage water resources development must be located, designed and laid out to ensure that it is safe, the risk from flooding is minimised (whilst not increasing flooding risk elsewhere) and that residual risks are safely managed.</p> <p>Policy E4: Environmental Protection: Covering the following environmental topics: air quality, water quality, noise, light, development of land affected by contamination.</p>
Surrey Heath Borough Council Local Plan (adopted 2012)	<p>The Surrey Heath Borough Council Local Plan (2011-2028) sets out how by 2028 residents will continue to enjoy a prosperous and high quality of life based around sustainable growth and a strong economy supporting a healthy, safe and diverse society that enjoys a high quality environment in which the natural heathland environment and character of towns and villages (with their green areas) is protected and enhanced. New development will be climate change resilient and continue to be well designed and of a high quality. This will include housing that meets the needs and aspirations of all sectors of the local community. The community will continue to have good access to high quality employment, healthcare and education. Rates of economic activity will remain high, the local community will be more active with improved access to leisure and recreational facilities and a network of green infrastructure. The following policies have been highlighted for their relevance to this SEA:</p> <p>Policy CP14: Biodiversity and Nature Conservation: The Borough Council will seek to conserve and enhance biodiversity within Surrey Heath. Working with partners, new opportunities for habitat creation and protection will be</p>

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	<p>explored in particular on biodiversity opportunity areas. Development that results in harm to or loss of features of interest for biodiversity will not be permitted.</p> <p>Policy DM8: Stand Alone Decentralised, Renewable and Low Carbon Energy Schemes: Proposals for standalone decentralised, renewable and low-carbon schemes will be supported unless the social, economic and environmental benefits are outweighed by adverse impacts to the immediate and wider environment.</p> <p>Policy DM10: Development & Flood Risk: In order to manage flood risk, the Borough Council will take a sequential approach to the allocation of sites in a Site Allocation DPD and to determining planning applications. Development within flood risk zones 2 & 3 or on sites of 1ha or greater in zone 1 and sites at medium or high risk from other sources of flooding as identified by the Borough Council's SFRA unless certain conditions are met.</p>
<p>Woking Borough Council Core Strategy (adopted 2012)</p>	<p>The Woking Borough Council Core Strategy (2012-2027) provides a clear vision of what the area will look like by 2027 and the means to achieve that. It responds to the key issues that residents, businesses and visitors have said they want the Council to address, including: the provision of well-designed homes to meet the needs of all sections of the community, the creation of high quality jobs for a sustainable economy and the provision of shops and facilities to meet the day-to-day needs of the community. The Core Strategy also includes policies to address pockets of deprivation in the borough and at the same time, it sets out a robust defence for the protection of the physical and natural environment and the heritage assets of the Borough.</p> <p>The following policies have been highlighted for their relevance to this SEA:</p> <p>Policy CS6: Green Belt: To ensure the Green Belt continues to serve its fundamental aim and purpose, and maintains its essential characteristics, it will be protected from harmful development. Within its boundaries strict control will continue to apply over inappropriate development, as defined by Government policy currently outlined in the NPPF.</p> <p>Policy CS7: Biodiversity and nature conservation: The Council is committed to conserving and protecting existing biodiversity assets within the Borough. It will require development proposals to contribute to the enhancement of existing biodiversity and geodiversity features and also explore opportunities to create and manage new ones where it is appropriate. This will include those habitats and species listed in the Surrey Biodiversity Action Plan (BAP). Any development that will be anticipated to have a potentially harmful effect or lead to a loss of features of interest for biodiversity will be refused.</p>

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	<p>Policy CS20: Heritage and conservation: New development must respect and enhance the character and appearance of the area in which it is proposed whilst making the best use of the land available. New development should also make a positive contribution to the character, distinctiveness and significance of the historic environment, including heritage assets at risk through neglect, decay or other threats.</p>
<p>Canterbury City Council Local Plan (adopted 2017)</p>	<p>The Canterbury City Council Local Plan (2017-2031) has several functions: To set out a strategy for fulfilling the Government's policy towards land use planning at a District level, including its objective of securing sustainable development; To give an opportunity and invitation to participate in the planning process, through giving people the chance to express their views on local planning issues; To set out objectives to ensure the District is an excellent location in which to live, invest, work, learn and visit; To take into account the principal social, economic and environmental influences on the District in the Plan against which planning applications for development will be assessed; by identifying sites for particular purposes, by defining areas to which policies apply and by setting out details of these policies in terms of standards and criteria. The following policies have been highlighted for their relevance to this SEA:</p> <p>Policy CC2: Reducing Carbon Emissions from New Development: Development in the Canterbury District should include proportionate measures to reduce carbon and greenhouse gas emissions. As well as incorporating measures to reduce carbon emissions development proposals shall show how they have taken account of landform, layout, building orientation, massing and landscaping to minimise energy consumption.</p> <p>Policy CC4: Flood Risk: Development proposals within Flood Zones 2 and 3 and sites larger than 1 ha in Flood Zone 1 shall be subject to a Flood Risk Assessment. The Flood Risk Assessment shall be in accordance with the Council's Drainage Impact Assessment Guidance Note and Strategic Flood Risk Assessment, including the requirement for a contribution towards any necessary new flood defence or mitigation measures. Where relevant, the assessment should also address the risk of flooding from surface water, groundwater and ordinary watercourses. Where there is evidence that water from these sources ponds or flows over the proposed site the assessment should state how this will be managed and what the impact on neighbouring sites will be.</p> <p>Policy HE1: Historic Environment and Heritage Assets: The City Council will support proposals which protect, conserve and enhance the historic environment and the contribution it makes to local distinctiveness and sense of place. Proposals that make sensitive use of historic assets through regeneration and reuse, particularly where these bring redundant or under-used buildings and areas into an appropriate use, will be encouraged. Development must conserve and enhance, or reveal, the significance of heritage assets and their settings. Development will not be</p>

Document Name	Key Objectives, Requirements, and Guidance
	permitted where it is likely to cause substantial harm to the significance of heritage assets or their setting unless it is necessary to achieve substantial public benefit that would outweigh the harm or loss.
Dover District Council Local Development Framework (adopted 2010)	<p>The Dover District Council Local Development Framework (2010-2026) sets out how "No change" is not an option. Economic, social and environmental change is part of everyday life. What is considered through the Core Strategy is the degree and type of change that is appropriate, where and when it should happen and how it is to be delivered. The factors that need to be taken into account to help decide this are, the characteristics and potential of the District, and the objectives and policies of other relevant plans and strategies, taking account of Dover's National Growth Point designation in 2008. The following policies have been highlighted for their relevance to this SEA:</p> <p>Policy DM15: Protection of the Countryside: Development which would result in the loss of, or adversely affect the character or appearance, of the countryside will only be permitted if it is: i. In accordance with allocations made in Development Plan Documents, or ii. justified by the needs of agriculture; or iii. justified by a need to sustain the rural economy or a rural community; iv. it cannot be accommodated elsewhere; and v. it does not result in the loss of ecological habitats.</p> <p>Policy DM16: Landscape Character: Development that would harm the character of the landscape, as identified through the process of landscape character assessment will only be permitted if: i. It is in accordance with allocations made in Development Plan Documents and incorporates any necessary avoidance and mitigation measures; or ii. It can be sited to avoid or reduce the harm and/or incorporate design measures to mitigate the impacts to an acceptable level.</p> <p>Policy DM19: Historic Park and Gardens: Permission will not be given for development proposals that would adversely affect the character, fabric, features, setting, or views to and from the District's Historic Parks and Gardens.</p>
Folkestone & Hythe District Council draft Core Strategy Review (adopted 2020)	<p>The Folkestone & Hythe District Council draft Core Strategy Review will help guide the district through changing pressures. Some of these forces are readily apparent or widely recognised, be it for action to regenerate towns such as Folkestone, or for protection of countryside assets. Yet to plan for the long-term, consideration is needed of the context for development now and in the future. 1.26 Environmental, social and economic change is occurring with increasing rapidity. Places and communities will continue to face pressures, much of which is driven by major structural shifts impacting widely on places and settlements indifferent localities and regions. Whether positive or negative, many of the trends have origins in major national and global transitions. The following policies have been highlighted for their relevance to this SEA:</p>

Document Name	Key Objectives, Requirements, and Guidance
	<p>Policy SS8: Sustainability and Health New Town Principles: Water efficiency, and demand management measures to be implemented to minimise water use and maximise the recycling and reuse of water resources (i.e. through the use of 'grey' water) across the settlement, utilising integrated water management solutions.</p> <p>Policy CSD4: Green Infrastructure of Natural Networks, Open Spaces and Recreation: Improvements in green infrastructure (GI) assets in the district will be actively encouraged as will an increase in the quantity of GI delivered by the council working with partners and developers in and around the sub-region, including through pursuing opportunities to secure net gains in biodiversity, and positive management of areas of high landscape quality or high coastal/recreational potential.</p> <p>Policy CSD5: Water and Coastal Environmental Management: Development should contribute to sustainable water resource management which maintains or improves the quality and quantity of surface and groundwater bodies, and where applicable, the quality of the coastal environment and bathing waters.</p>

Annex D: Baseline Review

D.1 Introduction

The current environment and socio-economic baseline were reviewed for the WRSE region, during the WRSE Scoping Consultation. Many of the Thames Water options, particularly the SROs are located close to other water company regions. As such, the baseline information from the region has been presented.

Thames Water specific baseline information has also been included, as relevant for the assessment. This environmental baseline review was first produced in September 2020, with updates and used throughout the SEA process. The baseline has also been updated in June 2023 following the consultation and prior to publication of the Environmental Report.

Furthermore, the baseline information is presented under the SEA Directive topics and provides an evidence base which environmental issues or opportunities resulting from the Thames WRMP24 can be predicted and assessed. Maps showing key spatial baseline information are presented in Annex C and referenced within this Section. The baseline summarised in this Section is a high-level overview of the baseline conditions for the region. More detailed location specific baseline information has been developed in a GIS database and has been used as part of the options assessment process to identify the effects of each option.

The baseline information in this Section was collected from published sources as referenced in the text below, including but not limited to the following sources:

- Office for National Statistics (ONS)
- Local Authority Health Profiles (Public Health England, 2018)
- Department for Transport
- UK Climate Projections 2018 (UKCP18)
- Historic England
- Natural England
- Department for Environment, Food and Rural Affairs (Defra)
- Environment Agency
- Thames Water WRMP-19 Environmental Report

D.2 Baseline information

Biodiversity

The River Thames basin includes a variety of sites that are designated at a European, national or local level as important for biodiversity, flora and fauna (see Figure D.1 and D.2) including:

- 5 Ramsar Sites⁵ (South west London waterbodies, Lee Valley, Thursley & Ockley Bogs, Benfleet and Southend Marshes, and Thames Estuary & Marshes)
- 7 Special Protection Areas (SPA)⁶

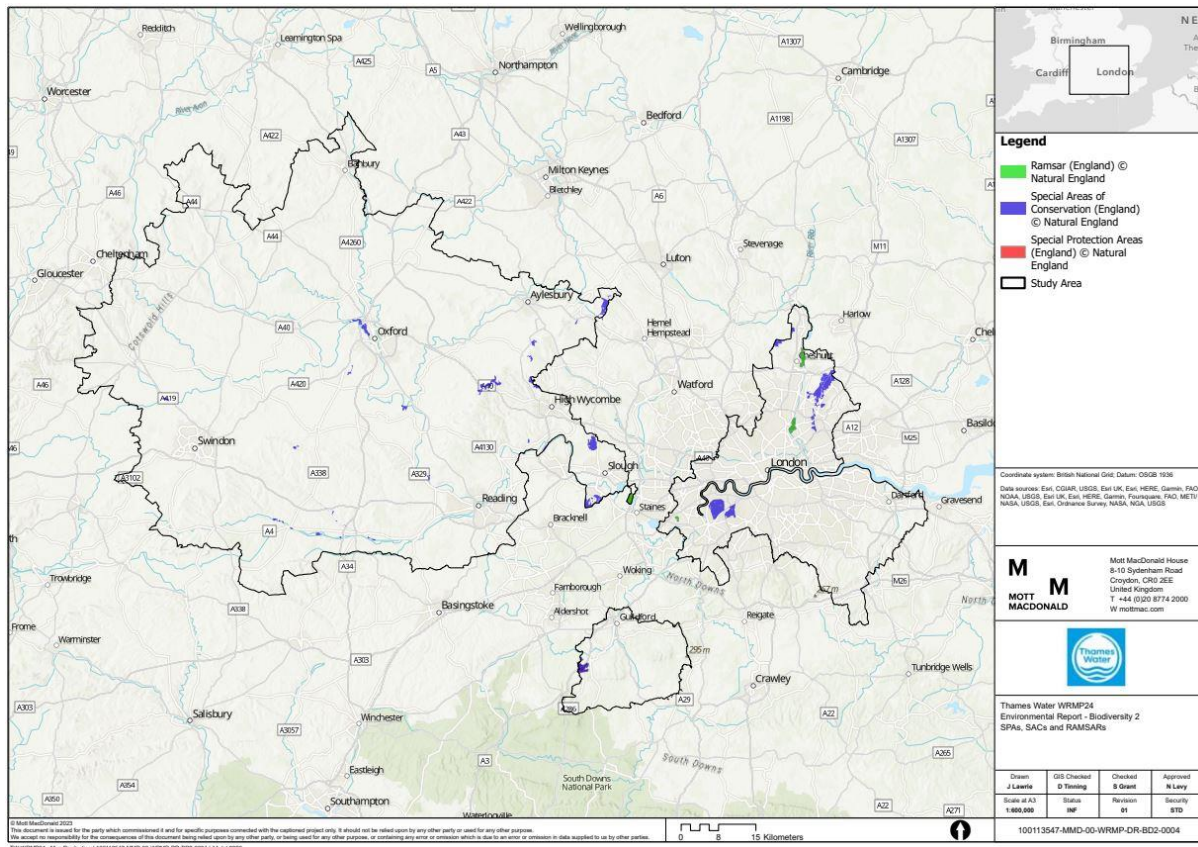
⁵ Ramsar sites are wetlands of international importance designated under the Ramsar Convention.

⁶ Special Protection Areas (SPAs) are strictly protected sites classified in accordance with Article 4 of the EC Directive on the conservation of wild birds (79/409/EEC), also known as the Birds Directive, which came into force in April 1979. They are classified for rare and vulnerable birds, listed in Annex I to the Birds Directive, and for regularly occurring migratory species. www.jncc.org.uk

- 23 Special Areas of Conservation (SAC)⁷
- 511 Sites of Special Scientific Interest (SSSI)⁸
- 19 National Nature Reserves (NNR)⁹
- 503 Local Nature Reserves (LNR)¹⁰

Marine Conservation Zones (MCZs) are designated to protect a range of nationally important marine wildlife, habitats, and geology and geomorphology.

Figure D.1: Habitats Sites



⁷ Special Areas of Conservation (SACs) are strictly protected sites designated under the EC Habitats Directive. Article 3 of the Habitats Directive requires the establishment of a European network of important high-quality conservation sites that will make a significant contribution to conserving the 189 habitat types and 788 species identified in Annexes I and II of the Directive (as amended).

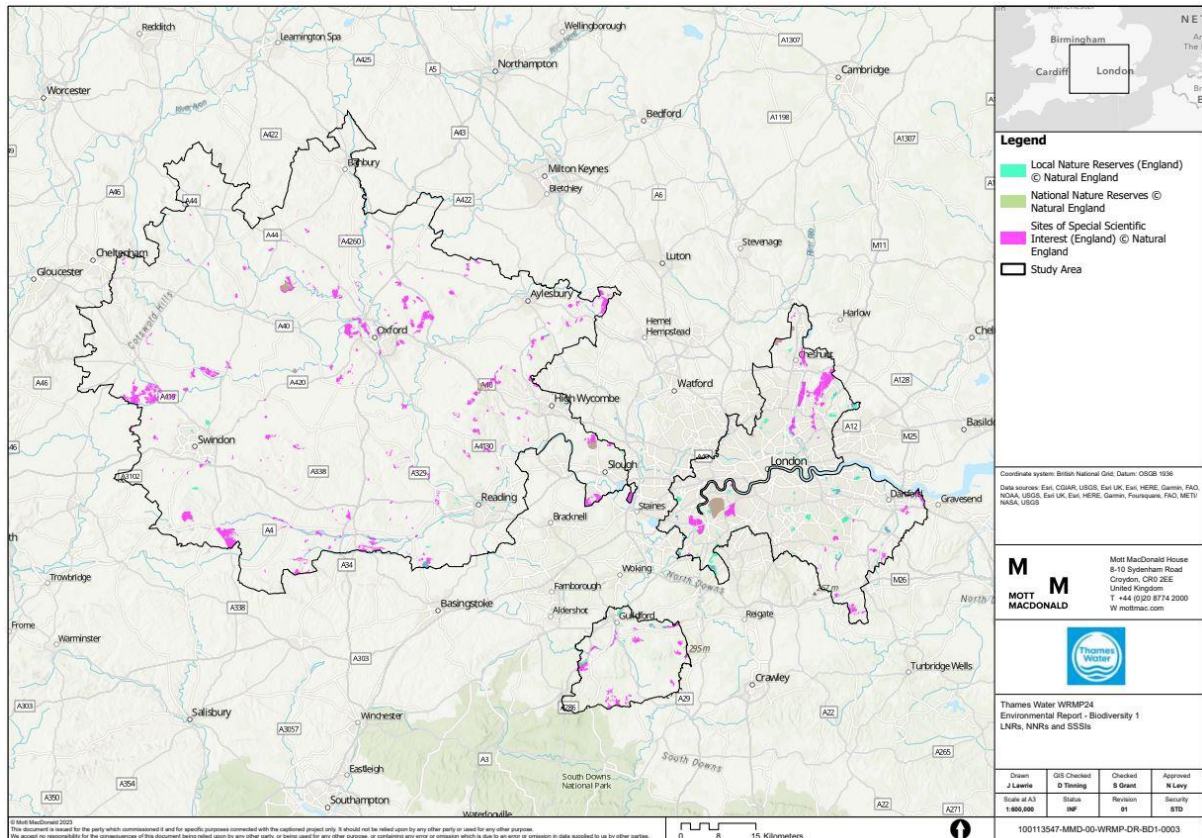
www.jncc.org.uk

⁸ Natural England now has responsibility for identifying and protecting the SSSIs in England under the Wildlife and Countryside Act 1981 (as amended by the Countryside and Rights of Way Act 2000).

⁹ NNRs are protected under Sections 16 to 29 of the National Parks and Access to the Countryside Act, 1949 and the Wildlife and Countryside Act, 1981.

¹⁰ LNRs – places with wildlife or geological features that are of special interest locally.

Figure D.1: Local and National Designated Sites



There are 18 habitats designated within the Natural Environmental and Rural Communities (NERC) Act within the Thames Corridor. These include rivers and streams (e.g. sensitive chalk rivers), reedbeds, fens and water meadows.

The WFD ecological status classification considers the condition of biological quality elements (e.g. aquatic invertebrates, plants and fish), the morphology of the habitat available in each water body (e.g. a defined stretch of river), and concentrations of supporting physico-chemical elements (e.g. oxygen or ammonia and concentrations of specific pollutants). See the ‘Water’ topic for details on water quality, and Table D.4 for the ecological condition of surface water bodies.

Water abstraction and associated infrastructure can sometimes result in adverse effects on water-related sites. Impacts on biodiversity may include the drying out of wetland habitats, lower water levels and slower flows in watercourse, deterioration in water quality, change in water temperature, or the transfer or proliferation of invasive species. The WFD Thames River Basin District River Basin Management Plan (RBMP) identifies barriers to fish passage as one of the major issues affecting the ecology of rivers in the Thames River Basin District, some of which are relate to abstraction impacts on migratory flow conditions and/or abstraction infrastructure (e.g. intakes or weirs).

Ancient woodlands in England and Wales are important habitats that should be protected. An ancient woodland is any wooded area that has contained woodland continuously since at least 1600 AD. They tend to be more ecologically diverse and of a higher nature conservation value

than those developed recently, or where cover on the site has been intermittent. They often also have cultural importance.

The WRSE region contains numerous European, National and local designated sites. The number and type of ecological sites across the WRSE region is presented in Table D.1.

Table D.1: Ecological sites in the WRSE Region

Designated Site	Total Number
SAC	298
SPA	196
Ramsar	126
SSSI	1,661
NNR	86
LNR	480
MPA	1
MCZ	14

The WRSE region is rich in species and habitat diversity. Under the Natural Environment and Rural Communities (NERC) Act 2006, WRSE has a duty to have regard to the conservation of biodiversity in exercising its function. The duties relate to habitats and species of principal importance, some which may be designed Local Wildlife Sites (LWS).

Priority habitats make up 16.6% of the WRSE region equating to a total of 39,5109ha¹¹. Deciduous woodland accounts for the highest percentage of priority habitat in the region. The split of the priority habitat by type across the region is shown in Table D.2. The region also contains 1611.2 km of Chalk rivers and streams.

Table D.2: Priority habitats in the WRSE Region

Priority Habitat Type	Hectares (ha)	Percentage
Coastal and floodplain grazing marsh	36,775.01	1.55%
Coastal saltmarsh	1,532.99	0.06%
Coastal sand dunes	721.64	0.03%
Coastal vegetated shingle	969.85	0.04%
Deciduous woodland	246,956.09	10.41%
Good quality semi-improved grassland	22,653.33	0.96%
Lowland calcareous grassland	14,550.19	0.61%
Lowland dry acid grassland	2,163.03	0.09%
Lowland fens	2,923.69	0.12%
Lowland heathland	12,490.14	0.53%
Lowland meadows	4,483.36	0.19%
Maritime cliff and slope	1,235.04	0.05%
Mudflats	9,832.43	0.41%
No main habitat but additional habitats present	33,286.60	1.40%

¹¹ Natural England (2020). Priority Habitat Inventory. Available at: <https://data.gov.uk/dataset/4b6ddab7-6c0f-4407-946e-d6499f19fcd/priority-habitat-inventory-england>

Purple moor grass and rush pastures	415.03	0.02%
Reedbeds	563.45	0.02%
Saline lagoons	364.60	0.02%
Traditional orchard	3,193.23	0.13%

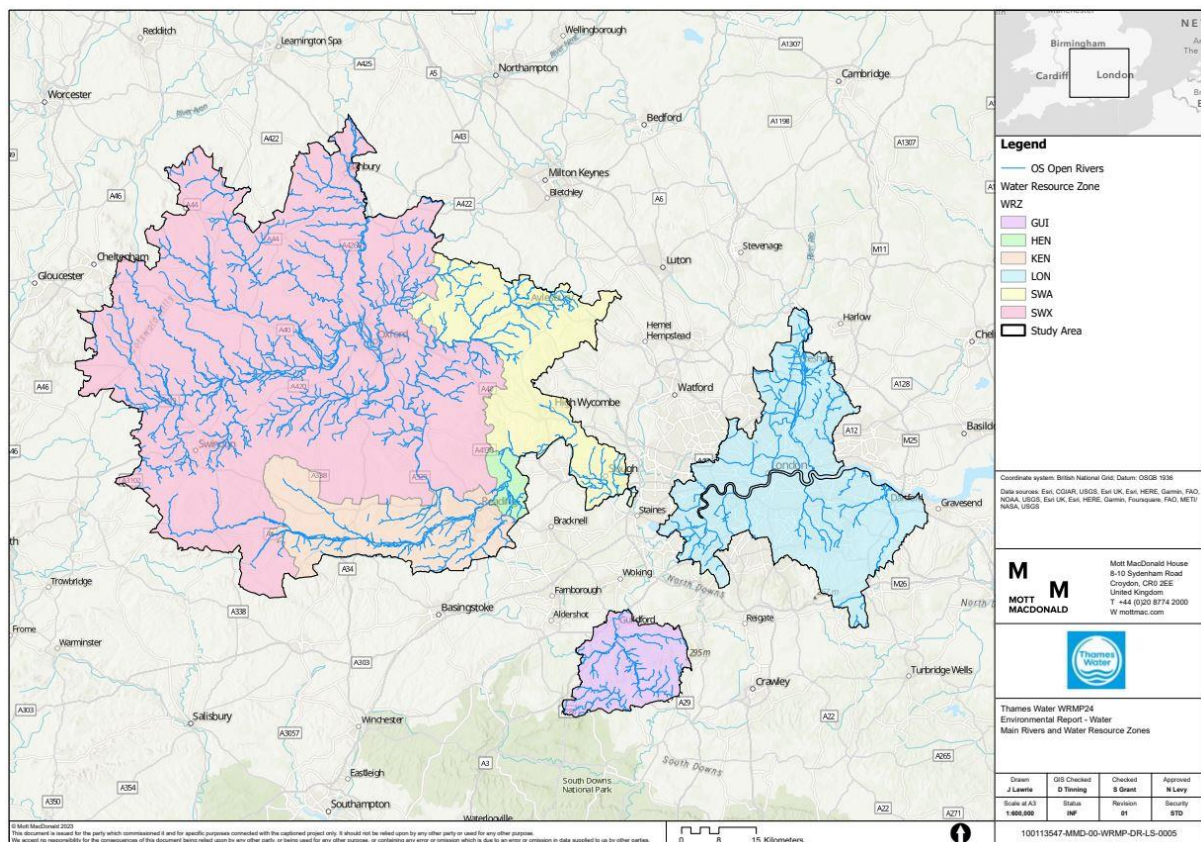
Water

Surface Waters: Rivers and Canals

Thames Water's supply area (see figure number: 100113547-MMD-00-WRMP-DR-LS-0005) lies almost entirely within the catchment of the River Thames and Thames Tideway. The River Thames rises to the west as springs from the limestone of the Cotswolds and flows eastwards to the sea downstream of London. Water Resource Zones (WRZ) within the Thames Valley (SWOX, Kennet Valley, SWA and Henley) encompass the major River Thames tributaries: Rivers Cherwell, Kennet, Loddon, Thame and Windrush and the Kennet and Avon Canal. The London WRZ, centred on metropolitan London, includes the lower freshwater River Thames up to its tidal limit at Teddington weir as well as a number of smaller river systems that discharge to the inner Thames estuary (Thames Tideway). These include the River Lee and the River Darent. The Guildford WRZ is based on the upper River Wey.

The WRZs and main rivers across the Thames Water region are shown in Figure D.3.

Figure D.3: Main Rivers



Surface Waters

There are no significant natural lakes within River Thames basin. However there are a series of off-line reservoirs for a variety of purposes and a significant number of flooded former gravel excavations, for example in the River Lee valley and to the west of London. Grimsbury and Farmoor Reservoirs are within the SWOX WRZ. There are also the Lower Thames Reservoirs (in west London) and the Lee Valley Reservoirs (in north London), both within the London WRZ.

The Thames Tideway (or estuary) is one of the most ecologically diverse estuaries in England and Wales. The Thames River Basin District includes 11 estuarine ('transitional waters'). The Thames Tideway is classified as hypereutrophic but there is little evidence of ecological damage as a result of the high nutrient status. Natural turbidity resulting in a reduction of light penetration limits adverse impacts. The Thames Tideway does suffer from the impacts of discharges of storm sewage: this is being addressed through the current construction of Thames Tideway Scheme, which is designed to intercept combined sewer overflows.

Groundwater

Thames Water's supplies are derived from a mixture of surface water abstraction (mostly from large storage reservoirs supplied from the River Thames and River Lee) and groundwater abstraction. However, as for most of south east England, during periods of prolonged low rainfall leading to a serious drought water supply is largely sustained by the utilisation of reservoir storage, groundwater abstraction and baseflow within rivers, the latter being derived from the outflow of groundwater from the major aquifers within the catchment. Thames Water also have a desalination water treatment works on the River Thames (Tideway) that can supplement water supplies at times of high demand and/or during drought conditions.

The Environment Agency considers that licensed groundwater abstraction is fully utilised over much of the Thames river basin. Both the quantity and quality of groundwater is extremely important in maintaining these resources. Groundwater is vulnerable to pollution from surface activities since aquifers underlie up to two-thirds of the land surface in this densely populated area. Groundwater quality issues include high nitrate levels in some aquifers.

Under the WFD there are two separate classifications for groundwater bodies: chemical status and quantitative status. A groundwater body will be classified as having poor quantitative status in the following circumstances¹²: where low groundwater levels are responsible for an adverse impact on rivers¹³ and wetlands¹⁴ normally reliant on groundwater; where abstraction of groundwater has led to saline intrusion¹⁵; where it is possible that the amount of groundwater abstracted will not be replaced each year by rainfall¹⁶. For a groundwater body to be at good status overall, both chemical status and quantitative status must be good. In addition to assessing status, there is also a requirement to identify and report where the quality of groundwater is deteriorating as a result of pollution and which may lead to a future deterioration in status.

¹² UK Technical Advisory Group on the Water Framework Directive (2012) Paper 11b(ii): Groundwater Quantitative Classification for the purposes of the Water Framework Directive.
https://www.wfduk.org/sites/default/files/Media/Assessing%20the%20status%20of%20the%20water%20environment/UKTAG%20Paper%2011b%28ii%29%20-%20Guidance%20on%20Groundwater%20Quantitative%20Classification_FINAL_280212%20v2.pdf

¹³ The surface water dependent test for Groundwater Water Quantitative Status

¹⁴ Groundwater Water Quantitative Status (Groundwater Water Dependent Terrestrial Ecosystems - Wetlands Test)

¹⁵ The Groundwater Quantitative Risk (Saline or other intrusions Test)

¹⁶ Groundwater Quantitative Risk (Groundwater Water Resource Balance Test)

Source Protection Zones (SPZ) provide additional protection to safeguard drinking water quality. This is achieved through constraining the proximity of an activity that may impact upon drinking water abstraction. They are defined around large and public potable groundwater abstraction sites, and the groundwater travel time to an abstraction.

Monitoring

Thames Water, other water companies and the Environment Agency monitor the ongoing water resources situation in all parts of the Thames catchment using a hydrometric network from which an accurate assessment of the ongoing water resources situation in all parts of the Thames catchment can be established and reliable forecasts undertaken. For Thames Water’s supply area the essential data requirements are fulfilled by:

- Daily measurements of total reservoir storage in the London Reservoirs and Farmoor Reservoir.
- River flow at key locations related to abstractions to principal reservoirs – key measurement points are the River Thames above Teddington Weir (limit of freshwater Thames) and the River Thames at Farmoor (see Table D.3).
- Levels of key groundwater sources/key aquifer monitoring boreholes.
- Demand for each water resource zone.

Key hydrological variables are monitored throughout the catchment such as river flows at a wide range of locations, groundwater levels, rainfall and soil moisture deficits (SMDs).

At the most downstream flow gauge on the River Thames, at Kingston in the London WRZ, long term average (median 1883-2015) flow is recorded as 3,516 MI/d. This flow gauge is downstream of all abstractions made from the river, including those for potable supply, agriculture and industrial use; and downstream of all discharges including returns from wastewater treatment works and industrial cooling water returns. Table D.3 indicates the main influences on river flows in the catchments upstream of the listed river flow gauge.

Table D.3 - Measured long term water flows in selected parts of the River Thames catchment

WRZ	Flow gauge	Influences on flow	Measured long-term flow (MI/d)		
			Q10 (high flow)	Mean flow	Q95 (low flow)
SWOX	Thames at Days Weir (Lowest gauge on Thames in SWOX WRZ)	River flow reduced by abstraction for public water supply and industrial/ agricultural abstraction; increased by effluent returns. River levels affected by lock movements and gates.	5,961	1,451	286
Kennet Valley	Kennet at Theale (Lowest)	A mainly pervious catchment (80% Chalk). High baseflow component but responsive	1,512	698	328

WRZ	Flow gauge	Influences on flow	Measured long-term flow (Ml/d)		
			Q10 (high flow)	Mean flow	Q95 (low flow)
	gauge on Kennet)	contribution from the River Enbourne. Flows influenced by groundwater abstraction/recharge (West Berkshire Groundwater Scheme). Abstraction for industrial/agricultural purposes. Minor contribution to the Kennet & Avon Canal. Little net impact of abstractions and discharges.			
Henley	Thames at Bray Weir (Downstream of Henley WRZ)	Baseflow sustained mainly from the Chalk and the Oolites. Reservoirs in catchment affect runoff. Regulation from surface water and/or ground water. Riverflow reduced by abstraction for public water supply and industrial/ agricultural uses; also influenced by groundwater abstraction/recharge. Runoff increased by effluent returns.	10,972	1,651	1,318
London	Thames at Kingston (Lowest gauge on freshwater Thames)	Baseflow sustained mainly from the Chalk and the Oolites. Reservoirs in catchment affect runoff. Regulation from surface water and/or ground water. Riverflow reduced by abstraction for public water supply and industrial/ agricultural uses; also influenced by groundwater abstraction/recharge. Runoff increased by effluent returns.	13,910	3,516	669
Guildford	Wey at Weybridge (Upstream of confluence with Thames (only gauge on lower Wey))	Largely permeable upper catchment (Chalk and Upper Greensand of the North Downs).	1,175	440	204

Note: SWA WRZ not included as is groundwater-dependent and does not contain any principal catchments or surface water abstractions.

High flow included is the Q10 flow statistic. River flow at the river flow gauge is equal to or greater than the listed flow for 10% of the time.

Average flow included is the median flow statistic, Q50. River flow at the river flow gauge is both greater than and less than the listed flow for 50% of the time.

Low flow included is the Q95 flow statistic. River flow at the river flow gauge is equal to or less than the listed flow for 5% of the time.

Water Quality

Water quality is classified according to several quality elements in line with the requirements of the WFD.

For surface waters, there are two separate status classifications for water bodies: ecological and chemical. For a water body to be in overall 'good' status both ecological and chemical status must be at least 'good'. Biological status classification considers the condition of biological quality elements, e.g. aquatic invertebrates, plants and fish, the morphology of the habitat available, concentrations of supporting physico-chemical elements e.g. oxygen or ammonia and concentrations of specific pollutants.

The Thames river basin district covers an area of 16,200km² and includes 20 management catchments which range from chalk streams and aquifers to tidal and coastal marshes¹⁷. These support a rich diversity of species and habitats some of which are of national or European importance. Of the 501 surface water bodies within the Thames River Basin District, with regard to their ecological status or potential 4% were classified as 'bad', 23% as 'poor', 67% as 'moderate', 6% as 'good' and 0% as 'high'. For the chemical status, 100% were classified as 'bad' (see Table D.4).

Table D.4: Ecological and chemical 2015 classification for surface waters – Thames River Basin¹⁸

No. of water bodies	Ecological status or potential					Chemical Status	
	Bad	Poor	Mod	Good	High	Fail	Good
501	19	117	334	31	0	500 ¹⁹	0

For groundwater there are two separate classifications for groundwater bodies: chemical status and quantitative status. Each must be reported in addition to the overall groundwater body status. For a groundwater body to be at good status overall both chemical status and quantitative status must be good. In addition to assessing status, there is also a requirement to identify and report where the quality of groundwater is deteriorating as a result of pollution and which may lead to a future deterioration in status.

Out of 47 groundwater bodies in the Thames River Basin District, 17 of them are classified as good for quantitative status (36%) and 30 for chemical status (64%) (see Table D.5). The main

¹⁷ Defra and Environment Agency (2022). Thames River Basin District – River Basin Management Plan. Available at: <https://www.gov.uk/guidance/thames-river-basin-district-river-basin-management-plan-updated-2022>

¹⁸ Environment Agency and Defra (2022), Thames River Basin District River Basin Management Plan

¹⁹ Note: Data only references 500 surface water bodies under the chemical status table.

reasons for poor status were identified as high or rising nitrate concentrations, with some failures for pesticides and other chemicals. The main reason for poor quantitative status is that abstraction levels, mainly for public water supply, exceed the rate at which aquifers recharge²⁰.

Table D.5: Chemical and quantitative 2015 classification for groundwaters – Thames River Basin²¹

No. of water bodies	Quantitative status		Chemical status	
	Overall		Poor	Good
	Poor	Good		
47	17	30	29	18

The RBMPs for the Thames river basin district highlight significant water management issues which prevent the sustainable management of water within each river basin as presented in Table D.6. Physical modifications and pollution from wastewater affect the highest proportion of water bodies followed by pollution from towns, cities and transport.

Table D.6: Water management issues

Water management issues	Percentage of water bodies affected
Physical modifications	32%
Pollution from wastewater	26%
Pollution from towns, cities and transport	19%
Pollution from rural areas	17%
Changes to the natural flow and level of water	4%
Negative effects of invasive non-native species	1%

Source: Thames RBMP (2022)

Drinking Water Quality

Data relating to drinking water quality, pollution incidents and air quality, which may have indirect effects on amenity and human health are covered in separate sections of this Scoping Report. The Consumer Council for Water report (2021) on complaints and enquiries for the year 2020-21 shows that overall industry complaints increased by 11% compared to the previous year (from 84,649 to 93,758). This has been the third consecutive year of increasing annual industry complaints since 2017-18. Thames Water reported a 39,530 of written complaints in 2020-21; an increase of 17.2% from the previous year; making up for 42% of the overall industry complaints for 2020-21. However 73.3% of the total complaints in 2020-21 were billing and charges related with only 14.2% being water supply related.

²⁰ Environment Agency and Defra (2022), Thames River Basin District River Basin Management Plan

²¹ Environment Agency and Defra (2022), Thames River Basin District River Basin Management Plan

Flood risk

Flooding can result from rivers and the sea, directly from rainfall on the ground surface and rising groundwater, overwhelmed sewers and drainage systems, and from reservoirs, canals and lakes and other artificial sources. The Environment Agency's Flood Risk Maps available on its website show what is at risk of flooding, including people, economic activity and natural and historic environment²². Over 15 million people live within the Thames River Basin District where around 1.7 million people are at a risk of flooding from rivers and the sea and 2.3 million people are at risk of surface water flooding²³. The catchment-wide river flooding which occurs in the Thames River Basin District typically occurs following periods of heavy and prolonged rainfall events where the catchment is either frozen or saturated. This tends to take place between autumn and spring. The Thames River Basin District is made up of the following:

- 24 Flood Risk Areas (FRAs) at significant risk of flooding from main rivers and the sea
- 17 FRAs at significant risk of flooding from surface water
- Four Strategic Areas (SAs) as locally important areas

Saltmarsh is an important natural resource and ecosystem service. Through reducing wave energy close to tidal defences, it can provide demonstrable flood and coastal risk management benefits, as well as supporting wildlife habitats and species of national and international significance. Saltmarsh extent is conserved and enhanced through management measures driven in particular by the Habitats and Birds Directives and the WFD. The WRMP has the potential to affect saltmarsh extent if any of the following occur: sea level rise, change in drainage patterns, disruption to the estuarine processes and changes in land use on or adjacent to the marsh²⁴.

Flood risk across the WRSE region is diverse and can occur from a wide range of sources including rivers and the sea, groundwater, reservoir and surface water. Climate change, is projected to result in more extreme weather events which alongside projected increases in sea level is likely to have an impact on the future flood risk of the region.

Soil

Geological sites may be sensitive to changes in water quality, water levels (for example waterlogged deposits), pollution and land use practices. The River Thames river catchment is geologically diverse and includes a number of major aquifers. The Thames Valley includes areas of limestone in the Cotswolds as well as Chalk and drift deposits in the Thames floodplain. The London area includes major Chalk aquifers and to the south of London, there are Greensand aquifers (towards the North Downs).

Geological Conservation Review (GCR) sites have been highlighted, which relate to geological important sites, related to their scientific elements and understanding of earth sciences, which are important on a national and international level²⁵. GCRs are also designated as SSSIs. Several

²² Environment Agency (2013) Flood Risk Maps – Risk of Flooding from Surface water – Thames River Basin District: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/456969/LIT8979_FloodRiskMaps_Thames_SurfaceWater_v2.pdf

²³ Environment Agency (2022). Thames River Basin District Flood Risk Management Plan 2021 to 2027: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1120245/Thames-FRMP-2021-2027.pdf

²⁴ Environment Agency (2007) Saltmarsh management manual.

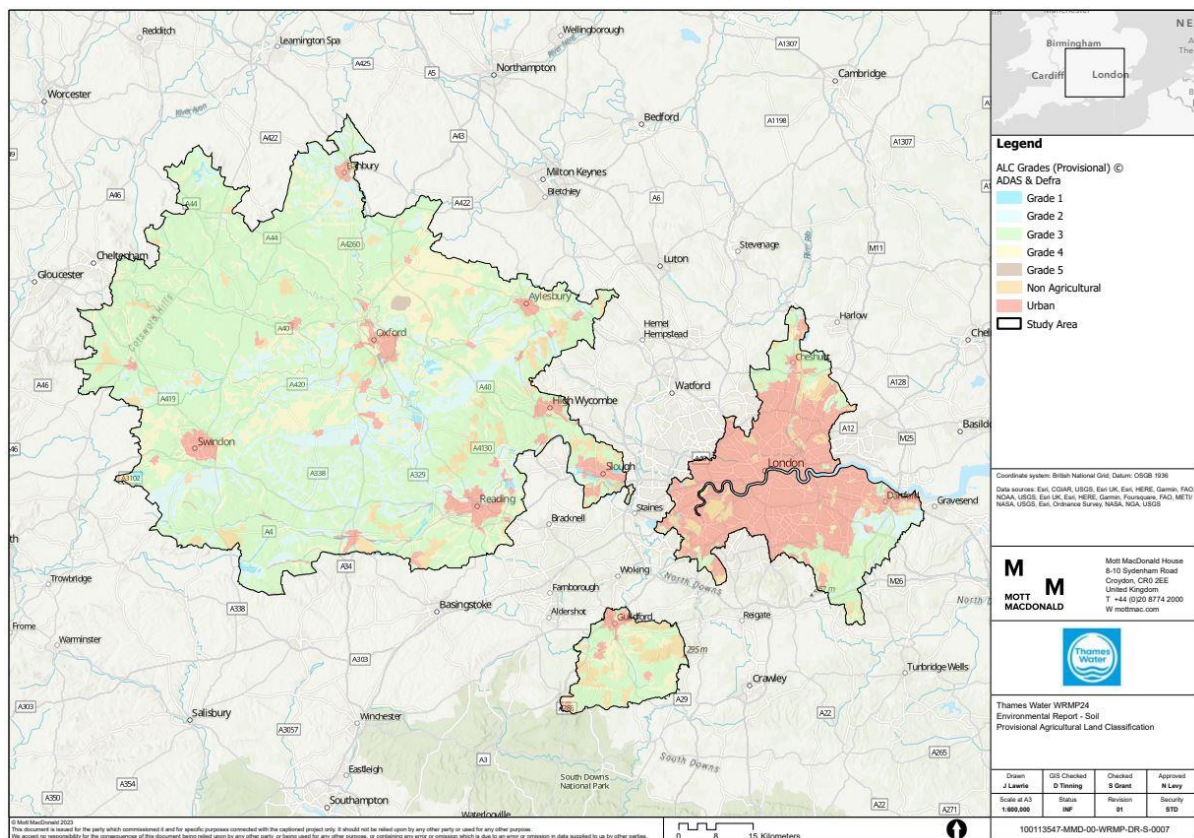
²⁵ <http://jncc.defra.gov.uk/page-2947>

geological SSSIs are found within the catchments, however some are not directly designated because of geology, although the geological variation does impact on the flora present. The main reason for a geological citation for an SSSI are related to disused quarries and geological important sites such as gravels used to reconstruct climate change.

The Soil Map of England and Wales identifies dominant soil subgroups and soilscaapes. In terms of agricultural land quality, planning policy seeks to protect best and most versatile agricultural land (defined as land in Grades 1, 2 and 3a of the Agricultural Land Classification).

The majority of land in the Thames river basin is farmed, and it is noted that agricultural practices have a major influence on soil quality. Good soil structure is beneficial to water retention and crop yield. Majority of agricultural land is classified as Grade 3 or higher (with the swathe of agricultural land in the Chilterns being of particularly high quality), see Figure D.4 for agricultural land classification across the Thames Water area. Soil quality and structure is affected by changes in land use, groundwater levels and farming practices. Soil quality can influence run-off rates and therefore flooding and water quality. The same area also contains pockets of broadleaved, mixed and yew woodland and improved grassland.

Figure D.4: Agricultural Land Classifications



The three main soils capes identified for the Thames river basin were very acid loamy upland soils with a wet peaty surface, slowly permeable seasonally wet slightly acid but base-rich loamy and clayey soils, shallow very acid peaty soils over rock with pockets of freely draining slightly acid but base-rich soils.

Contaminated land is defined as land where substances could cause significant harm to people or protected species; or significant pollution of surface waters or groundwaters. Some types of

contaminated land can be designated as special sites for a variety of reasons, including land that seriously affects drinking water, surface waters (e.g., lakes and rivers) and important groundwater sites. Data on contaminated land are compiled by the British Geological Society. Some of the main risks associated with agricultural land is the overflow from compacted and poached fields in the form of organic slurry, dirty water, fertiliser, pathogens and fine sediment all moving in suspension or solution.

Minerals Safeguarding Areas (MSAs) are designated by Mineral Planning Authorities for areas that include known deposits of minerals which are desired to be kept safeguarded from unnecessary sterilisation by non-mineral development.

The WRSE region is a hub for agriculture with cereal and livestock grazing being the most predominant type of farming²⁶. Agricultural land is classified on a scale of 1 to 5 where 1 is the highest quality and 5 is the lowest. The agricultural land classification of the region is predominately of Grade 2 and Grade 3 with pockets of urban and non-agricultural land. There are some areas with Grade 1, particularly around the south and south east coast.

The south east of England and London has the largest area of licensed landfill sites of anywhere else in the country²⁷. Currently, there are approximately 400 authorised landfill sites across the WRSE region²⁸.

Air

Options in the WRMP may require construction, the operation of abstraction and treatment operations in new locations and changes to the operation of such processes in existing locations. Therefore, there is the potential for negative effects on air quality through emissions associated with construction requirements or through the operation of the options.

The baseline situation can be best described through reference to the local authorities in the Thames Water WRZs that have declared Air Quality Management Areas (AQMA). A local authority declares an AQMA when UK National air quality objectives are unlikely to be met. The local authorities which have declared an AQMA within their boundaries are illustrated in Figure D32. There are 89 AQMAs in total within the Thames River Basin with the two main pollutants of concern being NO₂ and PM₁₀. The majority of the AQMAs in the UK have been declared as a result of emissions from road transport.

Climatic factors

Climate change

Current observations indicate that the UK is continuing to warm. There is evidence of increases in extreme maximum summer temperatures as reflected by the number of record extreme monthly temperature records being set in the UK in the most recent decade³. In July 2022,

26 Defra (2020). Agricultural facts: overview of agricultural activity in the South East (including London). Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/866815/regionalstatistics_southeast_20feb20.pdf

27 Environment Agency (2002). Dealing with contaminated land in England. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/313967/dealing_with_contaminated_land_i.pdf

28 Environment Agency (2020). Permitted Waste Sites - Authorised Landfill Site Boundaries. Available at: <https://data.gov.uk/dataset/ad695596-d71d-4cbb-8e32-99108371c0ee/permitted-waste-sites-authorised-landfill-site-boundaries>

temperatures in the UK reached over 40°C for the first time on record where 40.3°C was recorded in a village in Lincolnshire⁴. This surpasses the previous record of 38.7°C which was set in 2019 at the Cambridge Botanic Garden.

The decade between 2012 and 2021 has been on average 0.2°C warmer than the 1991-2020 average and 1.0°C warmer than 1961-1990²⁹. Annual precipitation has increased across the UK in the last few decades with 2021 seeing 95% more rainfall than the 1991-2020 average. For the most recent decade (2012-2021), summers have been 6% wetter on average than 1991-2020 and 15% wetter than 1961-1990. Winters have been 10% and 26% wetter than 1981-2010 and 1961-1990 respectively.

High-level climate observations for regions across the UK are publicly available from the Met Office for the 30-year period between 1981-2010³⁰. Those published for Southern England are presented in Table D.7.

Table D.7: Southern England climate observations

Climatic Condition	Climate Observation
Temperature	Mean annual temperatures range from around 11.5°C in central London and along the coast to around 9.5°C over higher ground inland. The coldest month is January where daily minimum temperatures range from over 3°C in London and along the coast to 0.5°C over the higher ground. July is the warmest month with daily mean maximum temperatures of 23.5°C, the highest in the UK. Extreme maximum temperatures can occur in July or August and are usually associated with heat waves lasting several days.
Precipitation	The wettest areas in Southern England are the South Downs and the higher parts of Dorset with an average of over 950mm per year. The Thames Valley, London and the north Kent coast usually receive less than 650mm per year and less than 550 around the Thames Estuary. Precipitation is generally well-distributed throughout the year in the region; however, an autumn/early winter maximum is more pronounced in the counties bordering the English Channel. In London and the Thames Valley there are also significant amounts in the summer associated with showery, convective rainfall. The region is susceptible to periods of prolonged rainfall which leads to widespread flooding, particularly in winter and early spring. However, the region can also be subject to dry periods, placing demands upon water supplies.
Sunshine	Southern England includes the sunniest places in the mainland UK. The coastal areas of Sussex and Hampshire and also the Isle of Wight features in the list of high sunshine averages. The average

²⁹ RMetS (2022). State of the UK Climate 2021.

³⁰ Met Office (2016). UK Regional Climates – Southern England. Available at: <https://www.metoffice.gov.uk/research/climate/maps-and-data/regional-climates/index>

Climatic Condition	Climate Observation
	annual sunshine durations on the coast can exceed 1800 hours, but 1550-1600 hours is typical of most of the region with a decrease towards the north.
Snowfall	The number of days with snow falling in the Southern England region is around 12-15 per year on average over the lower lying areas. On the higher ground areas of the Chilterns, North Downs and Weald, snow falling days can be around 20 per year on average. The least snow-prone places are those close to the English Channel, with less than 10 days. The number of days with snow lying has a similar distribution, with five days per year in most inland areas but over 10 days on the higher ground particularly to the east and north
Wind	Southern England is one of the most sheltered parts of the UK. The number of days where gale force winds are reached (mean speed of 34 knots) is typically one to two days per year over most inland areas, however exposed places along the coast experience around 10 days per year.

Source: Met Office 2016

The third UK Climate Change Risk Assessment (CCRA3) assesses the risks and opportunities from climate change for the UK and provides national summaries for each of the devolved nations³¹. For England, it is identified that risks from extreme heat are greater than elsewhere in the UK and is a particular risk for the South East of England. A summary of the risk identified which have a high future magnitude score and require action now to address them include, but are not limited to:

- The impacts of climate change on the natural environment, including terrestrial, freshwater, coastal and marine species, forests and agriculture.
- An increase in the range, quantities and consequences of pests, pathogens and invasive species, negatively affecting terrestrial, freshwater and marine priority habitats species, forestry and agriculture.
- The risk of climate change impacts, especially more frequent flooding and coastal erosion, causing damage to our infrastructure services, including energy, transport, water and Information and Communication Technologies (ICT).
- A reduction in public water supplies due to increasing periods of water scarcity.

The Met Office UK Climate Projections (UKCP) were updated for the first time since 2009 in December 2018 (UKCP18)³². The UKCP18 are largely the same as the previous projections

³¹ Climate Change Committee (CCC). Evidence for the third UK Climate Change Risk Assessment (CCRA3) – Summary for England. Available at: <https://www.ukclimaterisk.org/wp-content/uploads/2021/06/CCRA-Evidence-Report-England-Summary-Final.pdf>

³² Met Office UKCP18. Available at: <https://ukclimateprojections-ui.metoffice.gov.uk/>

where all areas of the UK are projected to be warmer, particularly during summer months. Rainfall is projected to vary seasonally and at a regional scale, however the UK is projected to have wetter winters and drier summers.

The projected changes in temperature and precipitation for the south east of England by the 2050s (2040-2069), under the RCP8.5 scenario (high emissions scenario) are detailed in D.8. The 1981-2010 baseline period and the central estimate, representing 'as likely as not' probability of change (50th percentile), was used for the following projections.

Table D.8: Future climate projects by the 2050s under the RCP8.5 scenario

Climatic Factor	Climate Projections
Temperature	Annual mean temperatures are projected to increase by 2.0°C. Summer temperatures are projected to see the largest increase by 2.6°C and winter temperatures by 1.7°C. Mean maximum summer temperatures are projected to increase by 2.9°C.
Precipitation	Annual mean precipitation is projected to decrease by 1.1%. Seasonal variability is projected with a 22.9% decrease in precipitation during summer months and an increase of 11.5% during winter months.

Source: Met Office UKCP18 using the central probability estimate for a RCP8.5 scenario

Emissions

The predominant greenhouse gas of interest is carbon dioxide (CO₂). National and regional CO₂ emissions totals are provided in D.9 and are apportioned to their source categories in Table D.10.

Table D.9 - Carbon dioxide emissions by area (2019)

Area	Options covered	Annual CO ₂ Emissions / million tonnes	Annual CO ₂ Emissions (% of UK total)
South East	Thames Warwickshire Avon	41.0	11.9%
South West	Thames River Severn River Wye	25.5	7.4%
East of England	Thames	33.5	9.7%
Greater London	Thames	41.2	11.9%

Area	Options covered	Annual CO ₂ Emissions / million tonnes	Annual CO ₂ Emissions (% of UK total)
East Midlands	River Severn Minworth Warwickshire Avon	29.0	8.4%
West Midlands	River Severn Vyrnwy Minworth Warwickshire Avon	30.0	8.7%
Wales	River Severn Vyrnwy River Wye	24.0	7.0%
UK		345	100%

Source: DECC (2021) Local Authority Carbon Dioxide Emissions Estimates 2019: Statistical Release

Table D.10 - Percentage contribution to carbon dioxide emissions by sector (2013)

Area	Options covered	Percentage Contribution by Source Sector			
		Industry & Commercial % (millions tonnes)	Domestic % (millions tonnes)	Road Transport % (millions tonnes)	Land Use Change % (millions tonnes)
South East	Thames Warwickshire Avon	23.2	32.02	46.04	-4.87
South West	Thames River Severn River Wye	26.2	29.4	44.1	-3.02
East of England	Thames	23.5	25.6	39.8	8.3
Greater London	Thames	27.0	36.9	30.0	-0.25
East Midlands	River Severn Minworth Warwickshire Avon	36.0	24.2	35.5	1.3
West Midlands	River Severn Vyrnwy	29.4	27.4	40.4	-0.82

Area	Options covered	Percentage Contribution by Source Sector			
		Industry & Commercial % (millions tonnes)	Domestic % (millions tonnes)	Road Transport % (millions tonnes)	Land Use Change % (millions tonnes)
	Minworth Warwickshire Avon				
Wales	River Severn Vyrnwy River Wye	52.2	20.3	26.3	-1.5
UK		32.6	27.4	36.1	0.35

Source: DECC (2019) Local Authority Carbon Dioxide Emissions Estimates 2019: Statistical Release

At 3.2 tonnes per person per year, London's CO₂ emissions are the lowest in the country (on a regional basis), well below the UK average of 5.5 tonnes. This is, in part, due to high usage of the public transport system compared to greater reliance on private cars outside the capital.

Thames Water's absolute GHG emissions in 2014/15 increased by 84.8kTCO₂e compared with 2013/14, an increase of 11.5%. Approximately two thirds of this increase was outside of Thames Waters control, due to unexpected rise in Defra's emission factor for grid electricity (increased 11% compared with 2013/14). The remaining increase was due to increased electricity consumption from new wastewater treatment works that were required to meet higher effluent quality standards.

Emissions associated with delivering a megalitre (MI) of drinking water and wastewater service in 2014/15 have both increased compared to 2013/14 - by 9.2% (295.9 kgCO₂e/MI) and 9.5% (298.4 kgCO₂e/MI) respectively compared to 2013/14. This increase is less than the 11.5% increase in grid emissions factor due to the delivery of energy efficiencies and renewable self-supply.

Forecast future climate change is likely to influence processes within the hydrological cycle such as runoff and evapotranspiration. The impact of climate change on the water environment and water-related infrastructure is summarised in Table D.11.

Table D.11 Potential impact of climate change on the water environment and water-related infrastructure

Sector	Impact
Water Resources (i) water supply	Reduction in yields, either in total or at certain times of the year. Increased evaporation losses from surface water stores Increased sediment and pollution runoff into watercourses. Increased risk of algal blooms and pollution in reservoirs.

(ii) water demand	Increase in demands in summer months leading to increase in average and peak requirements. Increased pressure on treatment and distribution system. Increased requirements for agriculture.
Flood management	Increased riverine storm occurrence and flood risk. Improvements and higher specifications required for flood defences, urban drainage and rainwater disposal.
Water quality management	Lowered water quality in lowland rivers, with implications for instream ecosystems and water abstractions. Altered potential for polluting incidents. Increased potential for combined sewer overflows due to an increase in extreme storm occurrences.
Navigation	Lower summer flows leading to reduced navigation opportunities in rivers and canals.
Aquatic ecosystems	Altered habitat potential, with species at their environmental margins most affected.
Water-based recreation	Impacts through changes in river flows and water quality.

Population and human health

Population

The greater South East region is a densely populated part of the UK. London has a population of approximately 8.8 million³³ and, as expected, is the most densely populated area with 5,596 people per square kilometre, compared to an average of 434 per square kilometre in England as a whole³⁴. Households in England are projected to increase by 10% between 2023 and 2043, from 24 million to 26.9 million³⁵.

Table D.12 describes the latest population statistics for the NUTS regions³⁶ covered by the River Thames basin.

The long-term issues relating to population growth and associated requirement for housing and water (and wastewater) infrastructure provision represent key issues for the strategies required within the long-term planning horizon of the WRMP. However, the result of the UK's recent referendum to leave the European Union (EU) may lead to greater short-term uncertainty regarding future population and housing growth.

³³ ONS (2022). London Region - 2021 Census Area Profile :

https://www.nomisweb.co.uk/sources/census_2021/report?compare=E12000007

³⁴ ONS (2022) Population estimates for the UK, England, Wales, Scotland and Northern Ireland: mid-2021:

<https://www.ons.gov.uk/peoplepopulationandcommunity/populationandmigration/populationestimates/bulletins/annual/midyearpopulationestimates/mid2021>

³⁵ ONS (2020) Household projections for England:

<https://www.ons.gov.uk/peoplepopulationandcommunity/populationandmigration/populationprojections/datasets/householdprojectionsforengland>

³⁶ Nomenclature of Territorial Units for Statistics (NUTS) areas

Table D.12 Population³⁷ statistics and projections (millions)

Region	Population 2018 (mid)	Population 2028 (mid)	% change
London	8.9	9.3	4.9%
South East	9.1	9.5	4.4%
South West	5.6	6.0	6.8%
East of England	6.2	6.5	5.0%
England	60	58.8	5.0%

Approximately 19 million people, equating to around 30% of the UK's total population, live within the WRSE region³⁸. Settlements within the region are diverse and range from large population centres such as London to small rural hamlets and seaside towns. Long-term population growth in the region is anticipated to be around four million³⁹.

The distribution of age amongst the population in the WRSE region is similar to the UK average where 20% are aged 15 and under, 66% are between 16 and 64, and 14% are over 65⁴⁰. Those aged 30 to 44 make up the largest proportion of the population at 23% followed by 45 to 59 at 18%.

Ethnicity in the WRSE region is predominately White. There are larger proportions of Black, Asian and Mixed ethnicities in the urban areas of the region compared to rural areas with respective populations of 13%, 8% and 4%⁴¹ across the WRSE region.

Human health

The WRMP has the potential to influence quality of life, including human health, well-being, amenity and community, through alterations to the operation of existing infrastructure, the construction and operation of new infrastructure, changes to the methods used for water charging, and the price of water. For example, emissions of pollutants to air from operations and transportation could affect respiratory health, whilst traffic, odour and noise could create nuisance and reduce quality of life.

Water resources management and planning is of critical importance in maintaining water reliable and safe water supplies for health and wellbeing of the population supplied by Thames Water. Some established water resource schemes (e.g. reservoirs) can also provide benefits to quality of life through the provision of recreational (passive or active) opportunities. Thames Water's customer research shows that safe and reliable provision of water (and wastewater) services and the need to plan for these services to be resilient in the future is customers' number one priority.

³⁷ ONS (2014) Subnational population projections for England: 2012-based - <http://www.ons.gov.uk/peoplepopulationandcommunity/populationandmigration/populationprojections/bulletins/subnationalpopulationprojectionsforengland/2014-05-29>

³⁸ Available at: <https://www.wrse.org.uk/the-challenge>

³⁹ WRSE (2020). Method Statements. Available at: <https://www.wrse.org.uk/media/jb5nwwx5/wrse-method-statements-summary-document.pdf>

⁴⁰ NOMIS (2011). Age structure (KS102EW) for South East and London. Available at: <https://www.nomisweb.co.uk/census/2011/ks102ew>

⁴¹ NOMIS (2011). Ethnic group (QS201EW) for South East and London. Available at: <https://www.nomisweb.co.uk/census/2011/qs201ew>

However, it is difficult to quantify the extent to which existing operations and facilities are, or are not, influencing the local environmental quality and hence human health. The SEA will assess the potential effects of each option, programme and plan on the local environmental quality and the potential implications (adverse or beneficial) on human health.

It has been shown that, in some cases, people in disadvantaged areas experience greater exposure to negative impacts on human health including air pollution, sea flooding, and proximity to large industrial and waste management sites⁴². The Index of Multiple Deprivation combines a number of indicators, chosen to cover a range of economic, social and housing issues⁴³, into a single deprivation score for each Lower Super Output Area⁴⁴ in the UK. This allows each area to be ranked relative to one another according to their level of deprivation. The Indices are used widely to analyse patterns of deprivation, identify areas that would benefit from special initiatives or programmes and as a tool to determine eligibility for specific funding streams. The English Index of Multiple Deprivation (2015)⁴⁵ and the Welsh Index of Multiple Deprivation (2014)⁴⁶ have been developed slightly differently and cannot be compared directly. Figure D.5 shows the Index of Multiple Deprivation across the WRZs and potential source areas.

It can be seen that many of the least deprived areas in the country lie within the Thames Water supply area. However, the London WRZ includes many areas facing high levels of deprivation. There are also smaller pockets of deprivation beyond London which should not be overlooked, for example in Swindon and Reading. The SEA will consider whether any of the WRMP options will influence deprivation, either positively or negatively.

⁴² Defra (2006) Air Quality and Social Deprivation in the UK: an environmental inequalities analysis

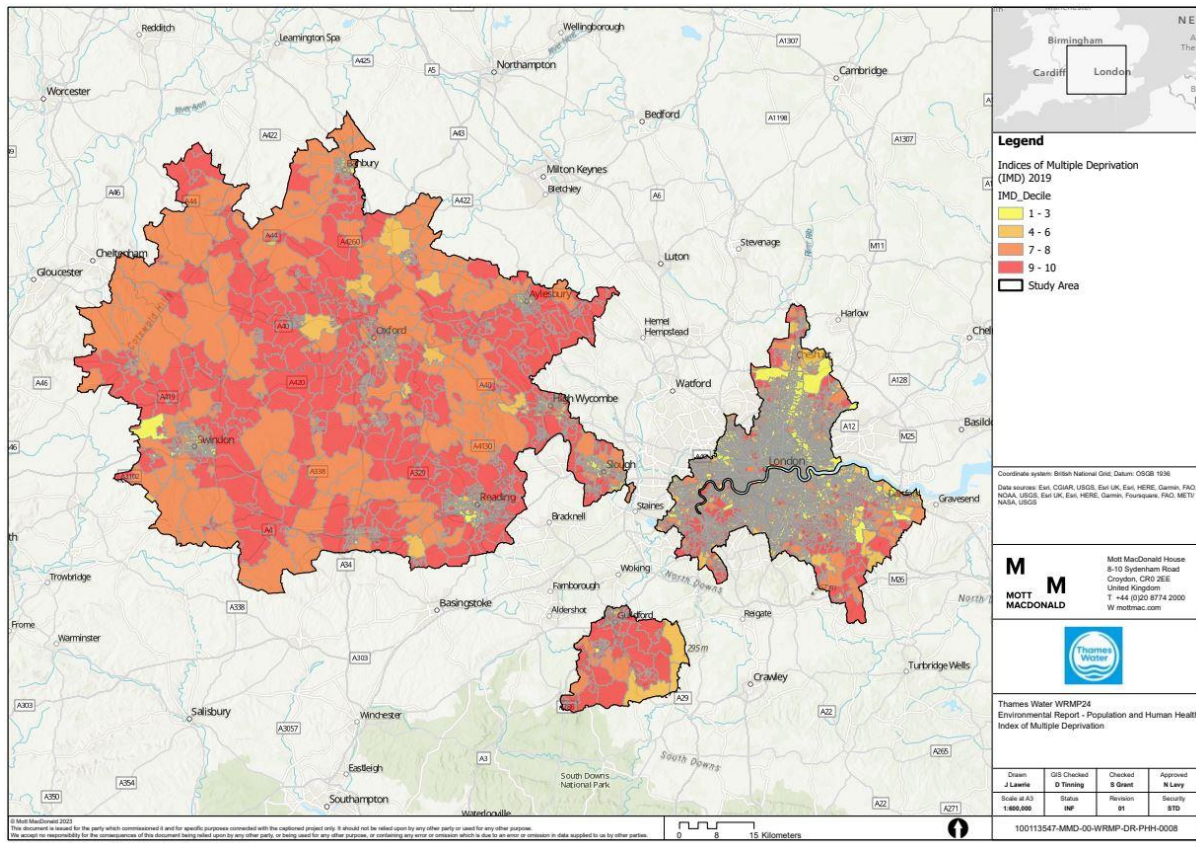
⁴³ Income Deprivation, Employment Deprivation, Health Deprivation and Disability, Education Skills and Training Deprivation, Barriers to Housing and Services, Living Environment Deprivation, and Crime.

⁴⁴ Super Output Areas (SOAs) are a set of geographical areas developed following the 2001 census. The aim was to produce a set of areas of consistent size, whose boundaries would not change, suitable for the publication of data such as the Indices of Deprivation. They are an aggregation of adjacent Output Areas with similar social characteristics. Lower Layer Super Output Areas (LSOAs) typically contain 4 to 6 OAs with a population of around 1500

⁴⁵ <http://www.communities.gov.uk/communities/research/indicesdeprivation/deprivation10/>

⁴⁶ <http://wales.gov.uk/topics/statistics/publications/wimd11guidance/?lang=en>

Figure D.5: Indices of Multiple Deprivation



Data relating to drinking water quality, pollution incidents and air quality, which may have indirect effects on amenity and human health. The Consumer Council for Water (CCW) reports on complaints and enquiries for the year 2021-22 shows that total written customer complaints to water companies decrease by 0.1% compared to the previous year and total written complaints to the CCW decreased by 13%⁴⁷. The main causes of written complaints were bills (61%) followed by water and wastewater at 20% and 19% respectively. Thames Water’s written complaints increased by 1.3 per cent as the company reported 40,060.

The WRMP could also affect communities in terms of nuisance, loss of sense of place and other adverse effects on well-being. It is not possible to collect baseline data against which to assess such effects. These effects will need to be assessed in the SEA based on the specific effects identified at the option, programme and plan level taking account of any planned mitigation measures to be included.

In general, the health of the population in the regions that the Thames Water supply area and Thames River basin covers is good. Health-related sustainability indicators are reported in the annual ONS Sustainable Development Indicators report⁴⁸. Data relating to drinking water quality and pollution incidents and air quality, which could also be affected by the WRMP, and as a result affect amenity and health are covered in separate sections of this SEA Scoping Report.

⁴⁷ Consumer Council for Water (2022) *Household customer written complaint handling by water companies in England and Wales* [CCW-HH-complaint-2022.pdf](https://www.ccw.org.uk/CCW-HH-complaint-2022.pdf)

⁴⁸ONS (2015) Sustainable Development Indicators, July 2015: http://www.ons.gov.uk/ons/dcp171766_407238.pdf (accessed 23/02/16)

Life expectancy at birth for both males and females in the WRSE region is better than the England average at around 81 years old and 84 years old respectively⁴⁹. Against the various indicators included within the Public Health Profiles, the region is generally better than the national average. Where the region is performing worse than the national average is against the following indicators: estimated diabetes diagnosis rate; year 6: prevalence of obesity (including severe obesity); emergency hospital admissions for intentional self-harm; and killed and seriously injured (KSI) casualties on roads⁵⁰.

The percentage of the population describing their general health as very good, good, fairly good, not good, and very bad is shown in Table D.13⁵¹. London and South East are similar to one another with slight differences in those describing their health as very good, good and fair, and tend to be aligned to the average for England.

Table D.13: Population health by region

Region	General health very good (%)	General health good (%)	General health fairly good (%)	General health bad(%)	General health very bad (%)
London	51	33	11	4	1
South East	47	35	13	4	1
England	47	34	13	4	1

Source: ONS - Census 2011

Affordability

Nationally, approximately 24% of households spend more than 3% of their income (after housing costs) on water and sewerage bills, and 11% spend more than 5%⁵². Ofwat and government policy has focused on addressing this issue through continued incentives for water companies to drive out financial efficiencies in its operations and investment programmes, as well as consider the use of ‘social tariffs’ for those struggling to pay their water bills. In 2014-15, 2,682 Thames Water households were paying for water in line with the company’s means-tested social tariff. Thames Water’s level of “doubtful” debt (i.e. unpaid household water bills) remains the second highest in England and Wales (after North West England) reflecting the customer affordability challenge in the Thames Water supply area.

49 Public Health England (2019). Public Health Profiles for South East and London. Available at: <https://fingertips.phe.org.uk/profile/health-profiles/data#page/0/gid/1938132701/pat/15/par/E92000001/ati/6/are/E12000004/iid/90323/age/201/sex/4/cid/4/page-options/ovw-do-0>

50 Public Health England (2019). Public Health Profiles for South East and London.

51 ONS (2013). General Health in England and Wales. Available at: <https://www.ons.gov.uk/peoplepopulationandcommunity/healthandsocialcare/healthandwellbeing/articles/generalhealthinenglandandwales/2013-01-30#general-health-across-the-english-regions-and-wales>

52 Ofwat (2015) Affordability and debt 2014-15. http://www.ofwat.gov.uk/wp-content/uploads/2015/12/prs_web20151201affordability.pdf

Water metering can help customers reduce their bills through improved water use efficiency. However, there are concerns that metering can disadvantage vulnerable and low income groups: this is recognised by Thames Water through various activities to offer help to customers on low incomes, including special tariffs. Currently, only around 35% of Thames Water's household customers are on a water meter with the company's strategy being to increase meter penetration as far as economically feasible (i.e. taking account of the costs and practical difficulties of metering multi-occupancy dwellings, especially high-rise flats and apartment blocks) over the coming decades.

Recreation and Tourism

WRMP options have the potential to affect areas with recreation value. Effects could arise as a result of scheme operation (for example on river water levels), or due to scheme construction (for example due to restricted access).

Many areas in the Thames Water region are used for recreational purposes including National Trails, Areas of Outstanding Natural Beauty (AONB) (see Landscape topic), National Nature Reserves (NNRs) and Local Nature Reserves (LNRs) (see Biodiversity topic). Many of the recreational and cultural offerings are represented in other topic areas in the baseline. For example there are a number of water-related resources of recreation importance including canals (e.g. the Kennet & Avon and Oxford canals), reservoirs for sailing or fishing and river sections of particular importance with respect to navigation (e.g. the River Thames and the River Wey) and angling (e.g. River Kennet), and the Thames Path and Blue Ribbon Network in London.

Angling is a popular pastime in the South East Region⁵³. The River Severn (a potential source of future water supplies) caters for the full range of freshwater angling; traditional river fly fishing for trout in the upper reaches, specimen chub and barbel in the middle reaches, roach and bream in the lower reaches and salmon fishing in some of the upland tributaries. Data relating to fishing recreation use is determined through the analysis of catch return figures by the Environment Agency and Natural Resources Wales who assess and manage salmon and sea trout stocks in a sustainable way. The Salmonid and Fisheries Statistics for England and Wales 2018 shows a 14% decrease when compared to 2017 in the total number of salmon and sea trout commercial net licenses issued in England and Wales. With the Thames River Basin situated in the South East region, there was a reported 51% decrease in salmon rod catches; 1% increase in sea trout rod catches and no changes in the salmon and sea trout net and fixed engine catches, respectively, when compared to 2017 values for the South East region. Furthermore, analysis of the rivers in the South East region showed a 100% release of salmon rod catches and an 83% release of sea trout rod catches. There were no reported salmon and sea trout net catches.

Public areas of open space, National Parks (see Landscape and Visual Amenity topic), country parks⁵⁴, Rights of Way, walking routes and cycle routes are also important with respect to recreation and tourism. Some, for example the Thames Path, form features of particular importance. The National Planning Policy Framework (NPPF) states planning policies should protect and enhance public rights of way and access. All Local Authorities are required to prepare and publish Rights of Way Improvement Plans (ROWIPs). These plans explain how improvements made by local authorities to the public rights of way network will provide a better experience for a

⁵³ https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/459174/FishStatsReport2014.v4.pdf (accessed 23/06/16)

⁵⁴ Area designated for people to visit and enjoy recreation in a countryside environment

range of users, including pedestrians, cyclists, horse riders, horse and carriage drivers, people with mobility problems, and people using motorised vehicles (e.g. motorbikes).

The NPPF defines green infrastructure as ‘a network of multi-functional green space, urban and rural, which is capable of delivering a wide range of environmental and quality of life benefits for local communities’ (including rivers and ponds). Local planning authorities are required to plan positively for strategic networks of green infrastructure, and take account of the benefits of green infrastructure in reducing the risks posed by climate change. The majority of LAs have therefore developed Green Infrastructure Strategies or Studies addressing these issues. Green infrastructure will often play a large part in local recreational resources.

The Archaeology and Cultural Heritage topic identifies the importance of the Thames River Basin with respect to heritage assets, including 6 internationally-recognised World Heritage Sites and 1213 Scheduled Monuments.

Tourism is a key sector in the British economy, contributing around £106 billion and is responsible for employing around 2.6 million people⁵⁵. London represents one of the most visited cities in the world and 16.2 million tourists were reported to have visited London in 2021, although this has not reached pre pandemic levels⁵⁶. With the potential to hold major international events (sporting and cultural), the additional non-domestic population can cause the number of people relying on water supply to swell relatively significantly, although this will be offset to some extent by the number of people on holiday or away from their homes. Many tourist attractions have some connection with the water environment. For example, various waterways were restored as a showcase project for the Olympics and now offer improved recreation value.

Tourism is an important sector across the WRSE region’s economy attracting visitors from across the UK and internationally. In 2019, there were 15.8 million domestic overnight trips to the South East, making it the most visited place second to the South West, and there were 12.2 million overnight trips to London⁵⁷. International visits to the WRSE region in 2019 were around 27 million in 2019, up 3% from the previous year, with an average night stay of around 6 nights and total expenditure of £18.3 billion⁵⁸. These visits are predominately for holidays (48%) followed by visiting friends and relatives (27%) and business (19%), the remainder is for study and miscellaneous.

Economy

The Greater South East region is a prosperous region of the UK and has relatively low rates of unemployment. For the three months ending June 2023, the employment rate (those between ages 16 and 64) in the South East region was higher than the UK average (76.0%) and had the highest employment rate across the whole of the UK at 78.6%⁵⁹. The employment rate in the East was 78.5%, 78.4% in the South West and for London it was 76.5%. Compared to a UK average

⁵⁵ Visit Britain (2018). England Tourism Factsheet for 2019: <https://www.visitbritain.org/value-tourism-england>

⁵⁶ Statista (2023). Tourism in London - statistics and facts. Available at: <https://www.statista.com/topics/9944/tourism-in-london/#topicOverview>

⁵⁷ Visit England (2020). Great Britain Tourist Annual Report 2019 – London and South East. Available at: https://www.visitbritain.org/sites/default/files/vb-corporate/gb_tourist_annual_report_2019.pdf

⁵⁸ Visit England (2020). Inbound nation, region & county data – London and South East. Available at: https://www.visitbritain.org/nation-region-county-data?area=1800_100

⁵⁹ ONS (2023). Labour market in the regions of the UK: June 2023. Available at: <https://www.ons.gov.uk/employmentandlabourmarket/peopleinwork/employmentandemployeetypes/bulletins/regionalabourmarket/june2023>

(February – April 2023) of 3.8%, the unemployment rate in the South East was slightly lower at 3.7%, showing a 0.2% decrease compared to November 2022 to January 2023. The unemployment rate was 4.3% in the East, 3.1% in the South West and 4.3% in London over the same period (February – April 2023).

The South East region is one of the most densely populated and urbanised parts of the UK, where businesses services make up a significant proportion of the economy; however, agriculture is also one of the more important industries outside of Greater London.

The WRSE region contributes around 37% of the total UK economy with London and the South East being the first and second largest contributors respectively⁶⁰. Gross Domestic Product (GDP) per head is £59,885 in London and £36,174 in the South East both of which are higher than the national UK average of £33,745. The service industry dominates the employment sector across the WRSE region with London having the highest proportion of service jobs compared to anywhere else in the UK⁶¹. The South East is made up of a higher proportion of production jobs compared to London.

The Index of Multiple Deprivation (IMD) (2015) for the Lower Super Output Areas (LSOAs) within the region are ranked from 1 to 10 with 1 being the most deprived and 10 being the least. Around 50% of the LSOAs in the region have an IMD ranking of between 3 and 6, 27% have a ranking of 7 or over and the remaining 23% are 2 or below⁶².

Historic environment

Options in the WRMP could affect historic landscape character and historic structures associated with the water environment and the historical context of their setting. Archaeological remains are sensitive to changes in water quality, water levels (for example waterlogged deposits), pollution and land use practices.

Heritage designations for the Thames River Basin are shown in D.6. The Thames River Basin includes internationally recognised World Heritage Sites⁶³ (for example, the Tower of London, Blenheim Palace, the Royal Botanic Gardens at Kew, the Palace of Westminster, Westminster Abbey and St. Margaret's Church, Maritime Greenwich).

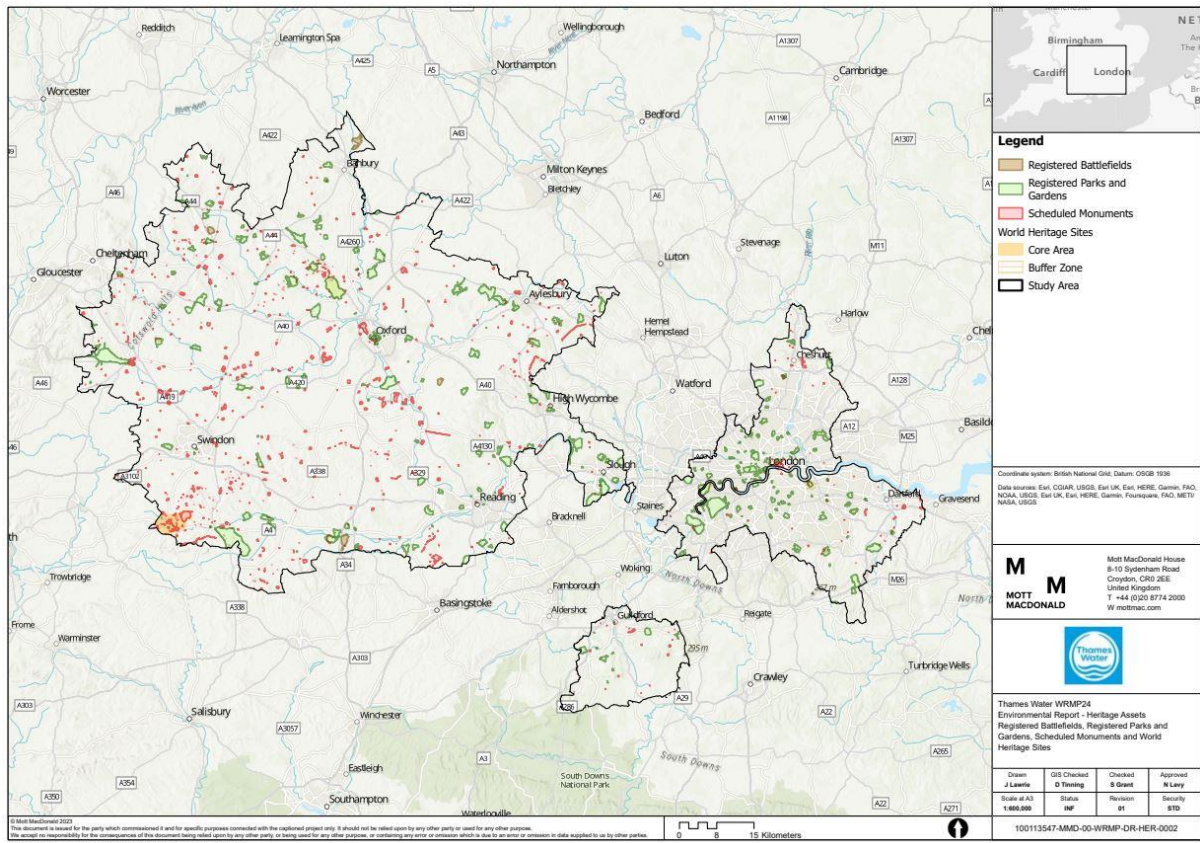
60 ONS (2019). Regional economic activity by gross domestic product, UK: 1998 to 2018. Available at: <https://www.ons.gov.uk/economy/grossdomesticproductgdp/bulletins/regionaleconomicactivitybygrossdomesticproductuk/1998to2018>

61 (ONS (2020). Labour market in the regions of the UK: August 2020. Available at: <https://www.ons.gov.uk/employmentandlabourmarket/peopleinwork/employmentandemployeetypes/bulletins/regionallabourmarket/august2020>

62 Ministry of Housing, Communities & Local Government (2015). English indices of deprivation 2015. Available at: <https://www.gov.uk/government/statistics/english-indices-of-deprivation-2015>

63 World Heritage Sites are places of international importance for the conservation of mankind's cultural and natural heritage. The World Heritage List was set up by the World Heritage Convention, established by UNESCO in 1972. www.english-heritage.org.uk

Figure D.6: Heritage Assets



Nationally important archaeological sites are statutorily protected as Scheduled Monuments (SMs)⁶⁴. There are currently around 19,923 entries in the Schedule for the UK⁶⁵. There are approximately 1,213 SMs located within the Thames Water region. Registered Parks and Gardens also make up part of the UK’s cultural heritage of national importance (1,696 in 2021 in England). There are approximately 326 sites designated as such in the Thames Management Catchment. An overview of all cultural heritage sites in the Thames Management Catchment area is provided in Table D.14.

Table D.14: Regional Heritage counts - All option areas

Asset	Thames Water Region
World Heritage Site	6
Scheduled Monuments	1,213
Conservation Areas	2,804
Listed Buildings	46,795
Registered Historic Parks and Gardens	326

⁶⁴ Nationally important archaeological sites designated under the Ancient Monuments and Archaeological Areas Act, 1979, www.culture.gov.uk/historic_environment/scheduled_ancient_monuments/

⁶⁵ English Heritage (2022) Heritage Indicators 2021. Available at: <https://historicengland.org.uk/content/heritage-counts/pub/2021/heritage-indicators-2021/>

Registered Historic Battlefields	4
Protected Historic Wrecks	0

Sources: Historic England and Cadw public domain datasets

Conservation Areas are usually designated by the local planning authority (England and Wales), or Historic England (previously known as English Heritage) can designate them in London (in consultation with London Boroughs). They are designated for their special architectural and historic interest. Conservation Areas can include historic town and city centres, fishing and mining villages, 18th and 19th century suburbs, model housing estates, country houses set in historic parks and/or historic transport links and their environment. There are over 9,900 conservation areas in England in 2021. Individual local authorities provide details on specific conservation areas.

Heritage England publishes an annual register which is a yearly health-check of England's most valued historic places and those most at risk of being lost forever as a result of neglect, decay or inappropriate development. 1,459 buildings and structures were added in England in 2020-21 with an overall of 233 entries removed from the Register for positive reasons.

With Thames Water covering the South East and parts of the London region, according to the Heritage at Risk Register 2021, 20 sites in the South East have been saved and 15 sites have been added to the Risk Register whereas 32 historic buildings and sites across London have been removed from the register to be re-used with 18 historic sites and buildings being added to the Register.

Historic Environment Record (HER) databases linked to a Geographic Information System (GIS) are held by County Councils, District Councils or Unitary Authorities. They represent unique repositories of, and signposts to, information relating to landscapes, buildings, sites and artefacts spanning from the Palaeolithic period to modern times. Presenting this wealth of information for the TWUL supply area would be difficult, however, it can be interrogated where the WRMP options have the potential to affect such assets.

In relation to unknown assets, there are a number of floodplains within the Thames Water supply region which are either known or suspected to be of high importance for waterlogged archaeology. Such evidence includes both material (wooden artefacts and structures such as trackways) and evidence of past environmental change from the deposits themselves. The waterlogged conditions that preserve these remains may be rain-fed or groundwater fed. If the latter, then clearly abstraction levels can be a critical factor in maintaining conditions in which preservation of the remains is viable. In addition, there are waterlogged deposits that are specifically associated with chalk, such as springs and their intimately associated wetlands which again can contain important archaeological information, especially palaeo-environmental evidence. Approximate locations of areas important for palaeo-environmental deposits were identified according to a spreadsheet supplied by English Heritage⁶⁶.

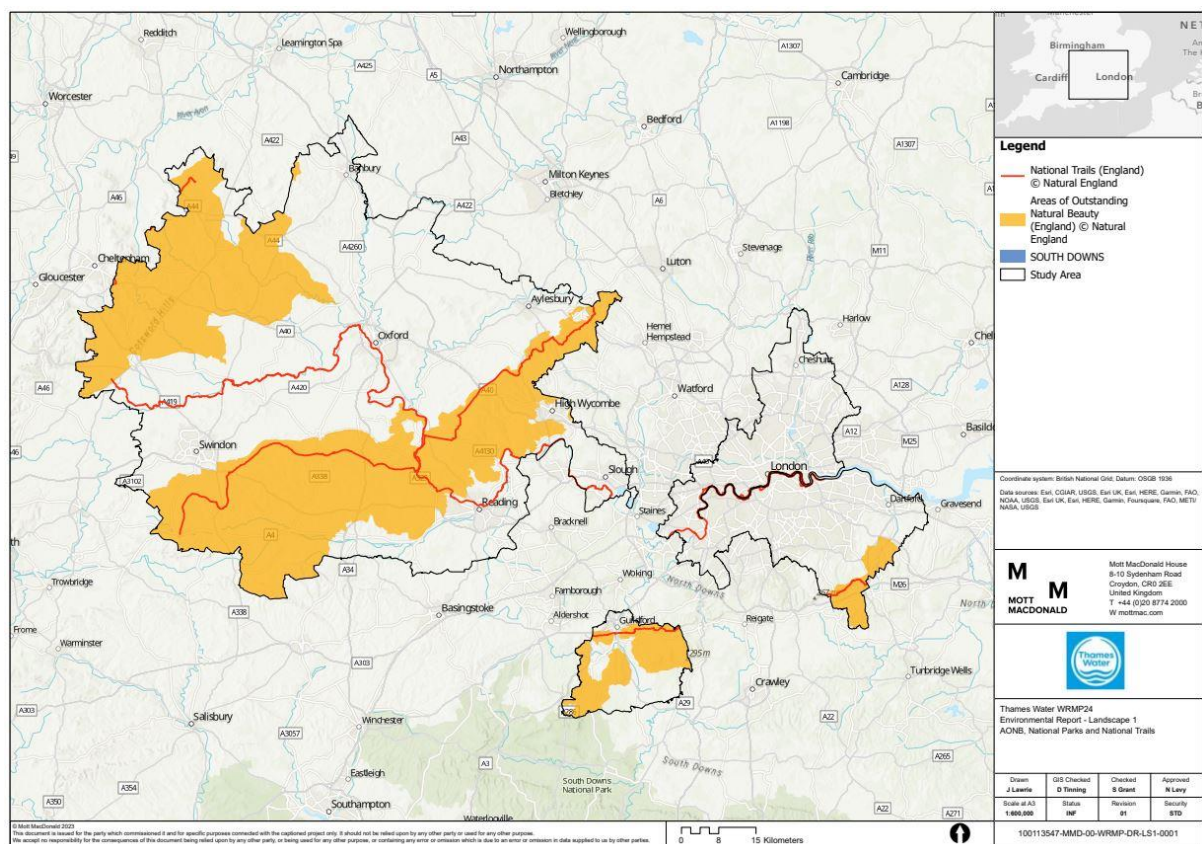
Landscape

⁶⁶ English Heritage (2011) National Monument Record Wetland Heritage List Data 111006.

The landscape character network⁶⁷ defines landscape character as 'a distinct, recognisable and consistent pattern of elements in the landscape that makes one landscape different from another, rather than better or worse'. Some landscapes are special because they have a particular amenity value, such as those designated as Areas of Outstanding Natural Beauty (AONB). Others may have an intrinsic value as good examples or be the only remaining examples of a particular landscape type. Some landscapes are more sensitive to development whereas others have a greater capacity to accommodate development. Assessments of landscape character and landscape sensitivity enable decisions to be made about the most suitable location of development to minimise impacts on landscapes.

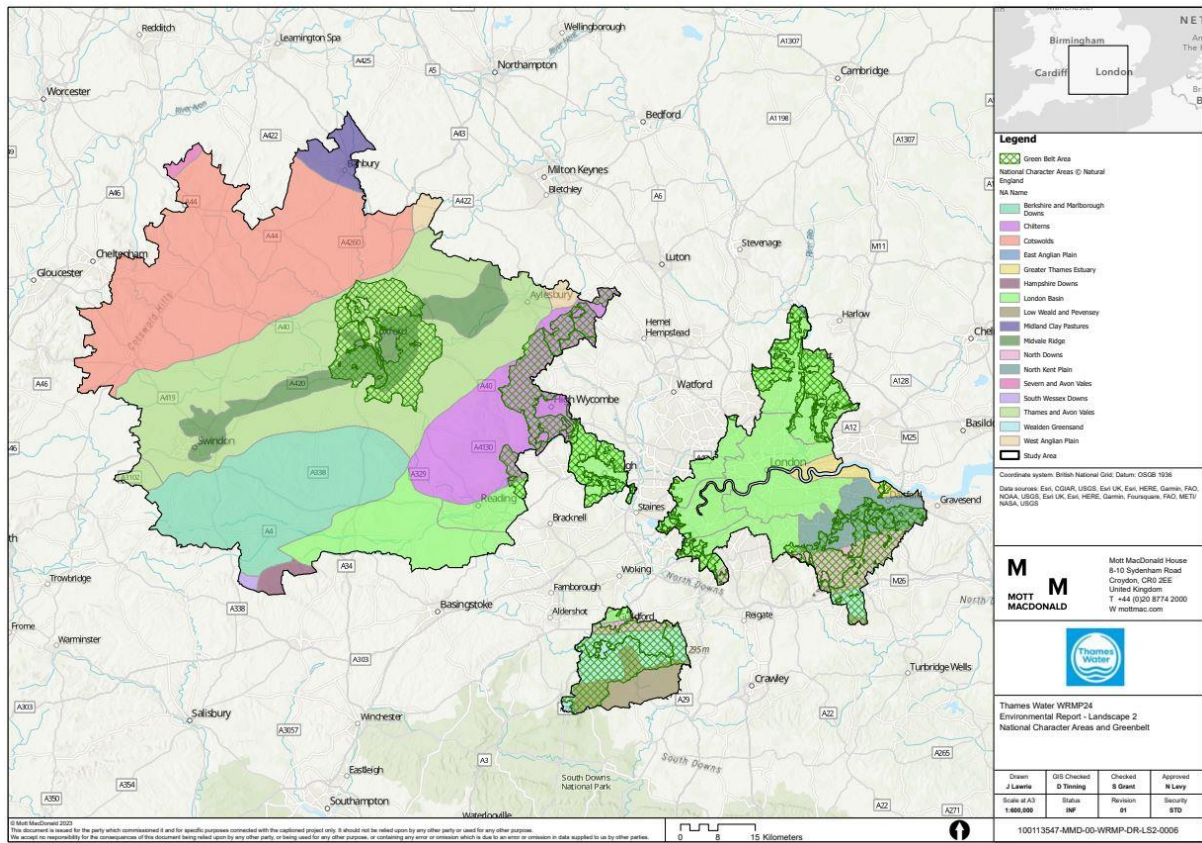
Nationally designated landscape sites (including AONBs, National Parks and Green Belt) and Natural England National Character Areas (NCAs) are shown on Figures D.7 and D.8.

Figure D.7: AONBs



⁶⁷ www.landscapecharacter.org.uk, accessed 14th July 2006

Figure D.8: National Character Areas



Nationally Designated Sites

AONB are defined as ‘precious landscapes whose distinctive character and natural beauty are so outstanding that it is in the nation's interest to safeguard them’¹⁶⁸. They are designated under National Parks and Access to the Countryside Act, 1949, strengthened by the Countryside and Rights of Way Act, 2000. The primary purpose of the AONB is ‘to conserve and enhance the natural beauty of the landscape.’ There are five AONB within, or partially within, the Thames Water supply area and one which lies outside the supply area, but within a 5km buffer (the High Weald). This is summarised in Table D.15. National Parks are areas protected due to their beautiful countryside, wildlife and cultural heritage. The South Downs National Park covers a small part of the southern Thames river basin within the Guildford WRZ. Water supply for the Guildford WRZ is based on the upper River Wey. Most of the River Wey valley falls within the boundary of the Surrey Hills AONB.

Table D.15: AONBs within Thames WRZs

Name of Site and Type	Water Resource Zone and Distance	Region(s)	Key Characteristics
Chilterns	SWOX, SWA, Henley, Kennet	South East, London and	<ul style="list-style-type: none"> Part of the Chalk ridge extending from Dorset to Yorkshire. Heavily wooded character.

Name of Site and Type	Water Resource Zone and Distance	Region(s)	Key Characteristics
	Valley (AONB within each WRZ)	East of England	<ul style="list-style-type: none"> • Important diversity of habitats from chalk grassland to beech woodland. • Major recreation resource – used for scenic drives, walking and riding.
Cotswolds	SWOX (AONB within WRZ)	London, South East, West Midlands, South West	<ul style="list-style-type: none"> • Jurassic limestone creating distinctive character. • Nationally important for limestone grassland and ancient beechwood. • Recreation resource – includes the Cotswolds National Trail.
Kent Downs	London (AONB within WRZ).	London and South East	<ul style="list-style-type: none"> • Traversed by three river valleys – Darent, Medway and Stour. • Chalk ridge – unimproved chalk grassland is an important habitat. • Orchards, hop gardens, horticulture & arable farmland. • River valleys, ancient lanes and wooded foreground of upland ridges.
North Wessex Downs	SWOX, Kennet Valley (AONB within WRZ)	London, South East and South West	<ul style="list-style-type: none"> • Includes the uplands of Marlborough, Berkshire and North Hampshire Downs. • Richly farmed landscapes including Pewsey Meadows. • Includes the Neolithic stone circle at Avebury. • Recreation resource – at Avebury, also Ridgeway National Trail and Kennet and Avon Canal.
Surrey Hills	London and Guildford (AONB within WRZ)	South East and London	<ul style="list-style-type: none"> • Links together a chain of upland landscapes. • Chalk landscape – chalk landscape and unimproved heath, deciduous woodland. • Recreation resource – Box Hill and Devil's Punch Bowl, Greensand Way and North Downs National Trail.

The main characteristics of Green Belt is their openness and their permanence. The main aim of Green Belt policy is to prevent urban sprawl by keeping land permanently open. The Green Belt therefore aims to check the unrestricted sprawl of large built-up areas; prevent neighbouring towns merging into one another; assist in safeguarding the countryside from encroachment; preserve the setting and special character of historic towns; and assist in urban regeneration by encouraging the recycling of derelict and other urban land.

Natural England National Character Areas

Natural England National Character Areas are shown geographically in Figure D.8 and Table D.16 summarises the key features.

Table D.16: National Character Areas

National Character Area	Location / option area	Key Objectives
Chilterns	Thames	<ul style="list-style-type: none"> • The Chilterns NCA is a predominantly wooded and farmed landscape with an underlay of chalk bedrock rising from the London Basin and offering wide views over adjacent vales. • River Thames breaches escarpment to the south at Goring Gap, flowing past riverside towns such as Henley. • The surrounding countryside is an area utilised for agriculture interspersed with woodland and hedged boundaries. • Parts of Chilterns area furthest from London are recognised as special and attractive, falling within the Chilterns AONB. • Major urban fringe and growth areas such as Luton and Hemel Hempstead are located within the Chilterns NCA, although outside of these AONBs.
South Suffolk and North Essex Claylands	Thames	<ul style="list-style-type: none"> • The NCA stretches from Bury St Edmunds to Ipswich following the line of the A14 through Gipping Valley. The landscape is gently undulating with a chalky boulder clay plateau as a result of multiple small-scale river valleys dissecting the plateau. • The area is one dominated by its ancient landscape of wooded arable countryside, with a noticeable feeling of enclosure throughout and a complex network of hedgerows, meadows and parklands extending eastwards. • The soils within the area are moderately fertile, chalky clay soils which provide vegetation with a calcareous character. • Irregular field patterns can still be seen despite enlargements in the second half of the 20th century.
Northern Thames Basin	Thames	<ul style="list-style-type: none"> • Area extends from Hertfordshire to the west to Essex coast in the east and include notable areas such as the suburbs of North London, St. Albans and Colchester. • Arable agriculture is a large part of the industry in the area, although despite this, soil quality ranges from good to poor, with the London clay often waterlogged in winter and cracking in summer. • The area is rich in geodiversity, archaeology and history with landscapes spanning from the Hertfordshire plateau to the more open arable sections of the Essex heathlands. • Rapid urban expansion since the mid-19th century has led to an increase in housing developments, schools and amenities for local populations, leading to a detrimental effect on tranquillity.
North Kent Plain	Thames	<ul style="list-style-type: none"> • The North Kent Plain is a strip of open, low and gently undulating land between the Thames Estuary to the north and the chalk of the Kent Downs to the south. • It is a highly productive agricultural area with good quality soils used predominately for arable farming.

National Character Area	Location / option area	Key Objectives
		<ul style="list-style-type: none"> • Ancient woodland surrounds Blean, with additional woodland further west. Despite this, the landscape is mostly open and expansive, leading to the area being called as the “Garden of England”.
North Downs	Thames	<ul style="list-style-type: none"> • Forming a chain of chalk hills, the North Downs NCA extends from Hogs Back in Surrey to the famous White Cliffs of Dover. • The settlements in the area consist of traditional small villages and farms while twisting sunken lanes cut across the scarp and are a feature of much of the dip slope. • The beauty of the area is reflected by its location within the Kent Downs and Surrey Hills AONB.
Thames Basin Lowlands	Thames	<ul style="list-style-type: none"> • The Thames Basin Lowlands is a low lying plain situated within the London Basin between the suburbs of South Norwood and Hale, located on the Surrey/Hampshire border. • Overall the landscape is largely flat, with small sections of gently undulating land. <p>The underlying geology consists mostly of London Clay, with small outcrops of Bracklesham and Barton Group sand, silt and clay between Esher and Cobham.</p> <ul style="list-style-type: none"> • Part of the North Downs Chalk bedrock, fringed with Thanet Formation and Lambeth Group sediments, underlies Croydon and Sutton.
High Weald	Thames	<ul style="list-style-type: none"> • High Weald NCA is covered by ancient countryside and cited as one of the best surviving medieval landscapes in northern Europe. • It encompasses the ridged and faulted sandstone core of the Kent and Sussex Weald and comprises a mixture of fields, small woodlands and farmsteads with extensive connections to these areas through historic tracks and paths. • The majority of the area (78%) is covered by the High Weald AONB with prominent medieval patterns of small pasture fields enclosed by thick hedgerows and shaws (narrow woodlands) remaining fundamental to the character of the landscape.
Low Weald	Thames	<ul style="list-style-type: none"> • A broad area of low lying clay which wraps around the northern, western and southern edges of the High Weald. • Mostly agricultural land able to support pastoral farming as a result of the heavy clay soils, although lighter soils can be found to the east. • The landscape is predominantly covered by densely wooded areas with a large amount of ancient woodland. • Approximately 9% of the NCA is situated within the adjacent designated Surrey Hills, Kent Downs and High Weald AONB with 23% of the land categorised as greenbelt.
Wealden Greensand	Thames	<ul style="list-style-type: none"> • Around 25% of the area contains extensive belts of woodland, including ancient woods and more recent conifer plantations. Area also features open areas of heath on acidic soils, river valleys and mixed farming with areas of fruit growing.

National Character Area	Location / option area	Key Objectives
		<ul style="list-style-type: none"> • Over half of area covered by South Downs National Park, Kent Downs AONB and Surrey Hills AONB and serves as a significant place of interest for landscape, geology and biodiversity. • Underlying geology has shaped the scarp-and-dip slope topography with clear links apparent between vernacular architecture, industry and local geology. • The area accommodates a mix of internationally and nationally designated sites related to biodiversity, including 3 SPAs 2 Ramsar sites and 8 SACs.
Thames Valley	Thames	<ul style="list-style-type: none"> • Majority of the landscape is urban with low lying land situated within a wedge shaped area. It widens from Reading, including Slough, Windsor, the Colne Valley and the southwest London Fringes. • Hydrological features are the most prominent within the area and include the Thames and its tributaries, the Grand Union Canal and the reservoirs which form the South- West London Waterbodies SPA and Ramsar site. These features are vital for providing water supply services to London and surrounding suburbs whilst also being crucial for wildlife and recreation. • Due to the flood risk, flows and water levels in the River Thames are managed upstream of Teddington. Both flood defence and water quality improvement techniques enhance opportunities for biodiversity and recreation throughout the NCA.
Berkshire and Marlborough Downs	Thames	<ul style="list-style-type: none"> • A vast area containing arable fields stretching across rolling Chalk hills with scattered settlements. The escarpment provides wide views of the Berkshire and Marlborough Downs with visible landmarks including chalk-cut horse figures, beech clumps and ancient monuments. • Avebury stone circle is a popular visitor destination and part of a World Heritage Site, with numerous other Scheduled Monuments and heritage features across the landscape, although Heritage features are at risk from damage by cultivation and animal burrowing.
Upper Thames Clay Vales	Thames	<ul style="list-style-type: none"> • An area characterised by its open, gently undulating lowland farmland on mostly Jurassic and Cretaceous clays. • The World Heritage site of Blenheim Palace falls within the NCA boundaries, coupled with 5000 ha of the North Wessex Downs AONB and smaller sections of the Chilterns and Cotswolds AONB. • The landscape is contrasting, with enclosed pastures of the clay lands with wet valleys, mixed farming, hedge trees and field trees opposed by more open, arable lands.
Midvale Ridge	Thames	<ul style="list-style-type: none"> • A band of low lying limestone hills stretch from east to west across the area from the Vale of Aylesbury to Swindon. It is surrounded by the flat lands of the Oxfordshire clay vales, which allows for extensive views across the countryside. • Swindon and Oxford are the main towns within the area; outside of this the remaining settlements are mostly small nucleated villages along the top of the ridge and the springline.

National Character Area	Location / option area	Key Objectives
		<ul style="list-style-type: none"> • The majority of the area is agricultural with a mixed arable/ pastoral farming landscape, cereals being the most important arable crop. • The soil types are made up of heavy rendzinas, stagnogleys and lighter sandy brown earths with small patches of sandy soils. • It is an area of significant importance for its geological sites, yielding fossils of international importance.
Cotswolds	Thames River Severn Warwickshire Avon	<ul style="list-style-type: none"> • An area known for its predominantly oolitic Jurassic Limestone belt that stretches from the Dorset coast to Lincolnshire. The limestone within the area has been widely used in buildings and walls. • The pattern of the landscape is steep scarp crowned by a high, open wold. The scarp provides a backdrop to the major settlements of Cheltenham, Gloucester, Stroud and Bath and provides expansive views across the Severn and Avon Vales to the west. Smaller settlements are located at the scarp foot linked by a network of roads and public rights of way.
Avon Vale	Thames	<ul style="list-style-type: none"> • A landscape of mixed, largely pastoral agriculture and small limestone built towns. Over 80% of the area is used for agricultural purposes and less than 10% for urban, although development has occurred rapidly from the late 20th century onwards. • It is an undulating and low lying area cut by the River Avon (Bristol) and surrounded to the west, south and east by higher land. • Smaller settlements and farmsteads are clustered along streams and lesser rivers, linked by narrow winding lanes. Ancient patterns of flood meadows and drainage ditches dominate these valley floors, with wet grasslands and woodlands.
Salisbury Plain and West Wiltshire Downs	Thames	<ul style="list-style-type: none"> • An area dominated by its gently rolling chalk downland which forms part of the sweep of Cretaceous Chalk spanning the Dorset coast and across the Chilterns to north of the wash. • The area is sparsely populated with a main focus on agriculture. There are few settlements, leading to a vast, open landscape and a strong sense of remoteness • The plain is predominantly covered by its chalk grassland, one of the largest remaining areas of calcareous grassland in north western Europe • The area is well protected with SPA, SAC and SSSI designations due to its rich populations of stone curlew, hen harrier and rare bumblebee species
Northamptonshire Uplands	Thames Warwickshire Avon	<ul style="list-style-type: none"> • Rounded undulating hills with many long, low ridgelines. Great variety of landform with distinctive local features, such as Hemplow Hills. • Dominant Jurassic scarp slope of limestone and Lias clay hills capped locally with ironstone-bearing Marlstone and Northampton Sands. Glacial boulder clay covers the northern and eastern areas, with sands and gravels along river valleys. • The Upper Nene Valley divides the gently undulating Northamptonshire Heights to the north from the hillier

National Character Area	Location / option area	Key Objectives
		<p>Cherwell/Ouse plateau (the 'Ironstone Wolds') to the south and has been exploited for sand and gravel.</p> <ul style="list-style-type: none"> • Rivers rise and flow outwards in all directions, including the rivers Cherwell, Avon, Welland, Tove, Ouse, Nene and Ise, and the area forms the main watershed of Middle England. • Sparse woodland cover, but with scattered, visually prominent, small, broadleaved woods, copses and coverts, particularly on higher ground. • Mixed farming dominates with open arable contrasting with permanent pasture. • Typical 'planned countryside' with largely rectangular, enclosed field patterns surrounded by distinctive, high, often A-shaped hedgerows of predominantly hawthorn and blackthorn, with many mature hedgerow trees, mostly ash and oak. Some ironstone and limestone walls in places and some localised areas of early irregular enclosure.
Bedfordshire and Cambridge-shire Claylands	Thames	<ul style="list-style-type: none"> • A landscape which is broad and gently undulating, with a lowland plateau dissected by shallow river valleys • This is contrasted by the Bedfordshire Greensand Ridge, a narrow and elevated outcrop of Greensand with acidic soils and grassland, heathland and woodland habitats. • The Forest of Marston Vale is located within the NCA, as well as a small section of the Chilterns AONB. The area is visible from the elevated ground of the Yardley Whittlewood Ridge, Bedfordshire Greensand Ridge, East Anglian Chalk and Chilterns NCAs • Semi natural habitats supporting an array of rare species can be found within the predominantly arable and commercially farmed landscape • The River Great Ouse and its tributaries run through the site and are visible across the landscape.
Greater Thames Estuary	Thames	<ul style="list-style-type: none"> • A largely remote and tranquil landscape between the North Sea and rising ground inland, consisting of shallow creeks, drowned estuaries, mudflats and broad tracts of tidal salt marsh. • Despite proximity to London, the NCA only has a few major settlements and small villages towards the higher ground. It contains some of the most scarcely populated sections of the English coast and is vastly different to the densely populated urban areas towards London. • Sea defences protect large areas of reclaimed grazing marsh and its associated ancient fleet and ditch systems, and productive arable farmland. Historic military landmarks are characteristic features of the coastal landscape.
Hampshire Downs	Thames	<ul style="list-style-type: none"> • Part of the central southern England belt of chalk, the Hampshire Downs rises 297m in the north-west and is located on the Hampshire-Wiltshire border. • A steep scarp to the north delineates the Downs. The area overlooks the Thames Basin the Weald to the east. It is characterised by its elevated, open and rolling landscape covered

National Character Area	Location / option area	Key Objectives
		<p>by large arable fields with low hedgerows on thin chalk soils, scattered woodland blocks and shelterbelts.</p> <ul style="list-style-type: none"> • The Chalk is a large and important aquifer; hence groundwater protection and source inerrability designations cover most of the area. Catchment sensitive farming to control pollution, run-off and soil erosion is a vital activity. • The aquifer feeds a number of small streams flowing north and east, although the dominant catchments are those of the rivers Test and Itchen, which flow in straight sided with relatively deeply incised valleys across most of the area. • The Itchen is a SAC and the Test a designated SSSI. These rivers, with the watermeadows, peat soils, mires and fens of their flood plains, are the most important habitats of the area. • The valleys are home to the main settlements, the local road system and important economic activities such as watercress growing and fly fishing.
South Wessex Downs	Thames	<ul style="list-style-type: none"> • The area is characterised by its “whale-backed” spine of chalk and stretches from the Hampshire downs in the west to the coastal cliffs of Beachy Head in East Sussex. • Its location falls largely within the South Downs National Park. 8% of the area is classified as urban, with the coastal conurbation of Brighton and Hove situated in the east of the NCA • The landscape is diverse and complex with significant variation from physical, historical and economic influences Much of the landscape today has been formed and maintained by human activities, most notably agriculture and forestry
Severn and Avon Vales	Thames River Severn Warwickshire Avon	<ul style="list-style-type: none"> • Diverse range of flat and gently undulating landscapes, united by broad river valley character. Riverside landscapes with little woodland, often very open. Many ancient market towns and large villages along the rivers. Prominent views of hills – such as the Cotswolds, Bredon and the Malverns – at the edges of the character area.
Dunsmore and Feldon	Warwickshire Avon Thames	<ul style="list-style-type: none"> • Farmland with large geometric fields divided by straight hedges with many hedgerow trees. Generally well-wooded appearance but also extensive open arable farmland. Heathland character still evident in woodland clearings and roadsides. Plateau landscape of open, flat, rather empty character, with long views. Large ancient woodlands of high nature-conservation value in the west. Strong urban influence in some areas.

Tranquillity is recognised as a natural resource and one which is beneficial to health and wellbeing, however infrastructure and development is putting more pressure on this special quality⁶⁹. The Council for Protection of Rural England (CPRE) advocates for a sustainable, enriching countryside with healthy communities available to as many people as possible. This enables for a countryside that enriches all lives and regenerates wellbeing. CPRE produced a tranquillity map of England in 2007 which determined the South East region occupied by

69 CPRE (2015). Give Peace a Chance. Available at: https://www.cpre.org.uk/wp-content/uploads/2019/11/CPRE_-_Give_peace_a_chance_-_May_2015.pdf

Thames Water to be a mix 30% highly tranquil (undisturbed areas), 50% medium tranquil and 20% highly tranquil; and with the areas around London region to be the least tranquil, reflective of the densely populated urban lifestyle. The areas identified as the least tranquil are also considered areas disturbed by noise and visual intrusion, particularly due to urban development and major infrastructure projects which has had a detrimental effect on overall tranquillity.

Material assets

Water Use

Thames Water supply around 2,600 million litres of water per day (Ml/d) into its supply system to around 10 million people and 220,000 businesses⁷⁰. Leakage from the water distribution system for 2021/22 was reported as three year average of 605.6Ml/d, meeting their 3-year average leakage performance target of 10.2% reduction against the baseline⁷¹. Average water consumption per capita in the Thames Water supply area is 147.5 litres/day (2021/22). Thames Water has ongoing programmes to reduce leakage from its network and to encourage more efficient use of water by customers.

Transport

The WRSE region boasts an extensive transport network which connects people, places and services both within the region and beyond to support the regional and national economy. It supports gateways for international trade with the UK's two busiest airports, Heathrow and Gatwick, and the two busiest UK ports are also located within the region. Southampton is a deep-sea port on the main international shipping line and Dover is where one seventh of the UK's trade passes through and is Europe's busiest ferry port⁷². The rail link to Europe via the Channel Tunnel Rail Link is also located within the region.

Resource use and waste

There is an ongoing need for society to reduce the amount of waste it generates, by using materials more efficiently, and improving the management of waste that is produced.

Across England, 8.1% of all local authority waste was sent to landfill in 2021/22, equating to 2.1 million tonnes⁷³. This has increased by 4.6% from 2020/21 at 0.1 million tonnes. Household recycling equates to around 10.8 million tonnes for 2021/22 which shows a decrease of 1.2% at around 0.1 million tonnes compared to 2020/21. Waste incineration has increased by 0.1 million tonnes to 12.4 million tonnes, equating to 1.2%, in 2021/22 compared to 2020/21.

⁷⁰ Thames Water (2022) Draft Water Resources Management Plan 2024 – Introduction and Background. Available at: <https://thames-wrmp.co.uk/document-library/>

⁷¹ Thames Water (2022) Annual Performance Report. Available at: <https://www.thameswater.co.uk/media-library/home/about-us/investors/our-results/current-reports/annual-performance-report-2021-2022.pdf>

⁷² Transport for the South East (2018). Economic Connectivity Review. Available at: <https://transportforthesoutheast.org.uk/wp-content/uploads/2018/07/FINAL-Economic-Connectivity-Review.pdf>

⁷³ National Statistics (2022). Statistics on waste managed by local authorities in England in 2021/22. Available at: <https://www.gov.uk/government/statistics/local-authority-collected-waste-management-annual-results-202122/local-authority-collected-waste-management-annual-results-202122#:~:text=England%20Local%20Authority%20and%20Household.via%20landfill%20in%202021%2F22.>

The South East managed the largest tonnage of local authority collected waste in 2021/22 at 4,121 thousand tonnes and London managed 3,628 thousand tonnes in the same period⁷⁴. Incineration accounts for the most common waste disposal method by local authorities in the region with the South East sending 46.5% of all waste for incineration, and London sending 64.4% which made it the highest out of all the regions across England. Recycling and composting is the second most common waste disposal method, accounting for 45.8% of total waste in the South East and 29.3% in London. Landfill waste is 4.9% and 1% of the total in the South East and London respectively.

In line with the widely adopted 'waste hierarchy', best practice for waste management is to reduce, re-use, recycle and recover, and only then should disposal (or storage) in landfill be considered. Water Resource Management options which require infrastructure may result in the use of raw materials and the production of waste. The operation of WRMP options may result in additional

Energy use

Thames Water is taking steps to reduce its grid energy requirements. Energy generation from renewable sources (wind and solar PV) was 510 Gigawatt hours (Gwh) in 2021/22, an increase of 34 GWh compared to 2020/21. Renewable generation from sludge was increased by 13 GWh to 317 GWh renewable heat generation by increased by 21 GWh to 180 GWh across the same reporting period.

Natural capital

The WRSE region contains a diverse range of Natural Capital stocks that provide a range of ecosystem services at the national, regional and local levels. The landscape is a mixture of coastal area, lowlands and small hills that contain all eight broad habitat types included within the National Ecosystem Services assessment. The region also contains several key abiotic stocks including fertile soils and coastal shelves.

Soils and geology

Detailed Information on soils stocks is provided in the Soils section. The WRSE region contains important stocks of soils nationally.

Freshwater

Freshwater natural capital stocks cover approximately 1.5% of the WRSE regions. This encompasses all waterbodies and wetlands such as rivers ponds fens marshes and bogs. Within the WRSE region artificial freshwater habitats, such as canals and reservoirs are also an important natural capital stock. These natural capital stocks are vital to support the regions biodiversity and provide other ecosystem services such as water supply, climate regulation and cultural services.

Farmland

Farmland natural capital stocks cover approximately 56.5% of the WRSE regions, agriculture with cereal and livestock grazing being the most predominant type of farming. Examples of

⁷⁴ National Statistics (2022). Statistics on waste managed by local authorities in England in 2021/22. Available at: <https://www.gov.uk/government/statistics/local-authority-collected-waste-management-annual-results-202122/local-authority-collected-waste-management-annual-results-202122#:~:text=England%20Local%20Authority%20and%20Household.via%20landfill%20in%202021%2F22.>

types of Farmland stocks include Arable and rotational leys, Horticulture, Improved grassland, Orchards and top fruit and Permanent pasture. In addition to the primary production of agricultural products, farmland provides many other services such as supporting biodiversity and providing cultural and heritage services.

Grasslands

Grassland natural capital stocks cover approximately 5.3% of the WRSE region and include predominately semi natural grasslands. These habitats provide key services supporting biodiversity, sequestering carbon and mitigating climate change and livestock production. In addition, this stock is associated with reaction and physical benefits.

Urban

Urban natural capital stocks cover approximately 23.2% of the WRSE region and include greenspace, blue space and mosaic habitats within urban areas. These natural capital stocks provide a wide range of ecosystem services supporting a diverse array of plants and animals and can be particularly important for pollination services. Amenity greenspaces (parks, outdoor sports facilities) are vital for community cohesion, and the mental and physical health of urban residents.

Woodland

Woodland natural capital stocks cover approximately 13.5% of the WRSE region and consist of several sub habitat types including Broadleaved, mixed and yew woodland, Coniferous woodland, Individual trees/veteran trees and Woodland priority habitats. The quality of woodland stocks vary within the region as the majority is under management however several high-quality stocks include ancient woodland. These stocks provide services such as carbon sequestration, air purification and flood prevention.

Coastal and marine

Coastal and marine habitats cover less than 1% of the land cover within the WRSE region however include several key habitats and natural capital stocks such as:

- Beach
- Salt marsh
- Sand dunes
- Intertidal rock
- Intertidal sediment
- Reefs
- Sea grass beds
- Shallow subtidal sediment.

These stocks support a range of services including reaction, cultural service, hazard prevention and climate regulation.

Future baseline

The SEA Directive requires that “*the relevant aspects of the current state of the environment and the likely evolution thereof without implementation of the Plan or Programme*” is identified. Prediction of future trends is difficult because they depend on a wide range of global, national and regional factors and decision making. Key trends have been identified and from an initial review it is likely that the following trends will continue:

Air quality - new development, economic growth and tourism may lead to increased car journeys and congestion within the area leading to localised air quality effects. Public transport improvements, national air quality targets and European emissions standards for new vehicles should contribute to reducing future air quality impacts from motor vehicles.

Water – water quality is likely to continue to be maintained and improved through legislation such as the WFD. The region is already water-stressed and projected economic and population growth will likely place further pressure on the region’s water resources and water dependent environments. There is potential for an increased need for wastewater treatments as a result of WFD water quality standards combined with population increase. Given the energy intensity of wastewater treatment, the water industry CO₂ emissions may increase and further contribute to climate change.

Climatic factors - the climate is expected to continue to change with annual average temperatures projected to increase, particularly in summer. Winters are projected to be wetter and summers drier. Climate change is projected to result in more extreme weather events, potentially causing or exacerbating periods of drought which alongside population and economic growth will impact water availability. Carbon and other GHG emissions will continue to be emitted, however regulations and legislation will likely continue to promote the reduction in emissions through commitments to net zero. The water industry in the UK is aiming to become net zero by 2030⁷⁵.

Biodiversity, flora and fauna - habitats and species are likely to continue to be protected through European and UK legislation. England’s wildlife habitats have become increasingly fragmented and isolated, leading to declines in the provision of some ecosystem services, and losses to species populations’. Lawton (2010) recognises that future climate change, demographic change, economic growth, new technologies, societal preferences and changes in policy and regulatory environments may all have profound consequences⁷⁶. However, new legislation such as the Environment Bill is likely to continue protection of biodiversity by providing a framework for a legally binding target of net gain within the planning system.

Population and human health – water available for consumptive use may be affected by climate change whereby access to water is limited through more frequent droughts or floods. Population is projected to increase in the region and life expectancy is also higher than the nation average meaning that the numbers of elderly residents are likely to increase. As such, water demand will increase, and further pressure will be placed on water resources within the region.

Material assets - regeneration and future investment and demand are likely to increase the number and quality of material assets such as housing, transport infrastructure, waste facilities, and community facilities.

75 Available at: <https://www.water.org.uk/news-item/water-industry-plans-to-reach-net-zero-carbon-by-2030/>

76 Lawton (2010). Making Space for Nature.

Landscape – changing and continued development will affect the quality and character of landscapes.

Soil – as the population increases it is likely that more brownfield land will be remediated and developed. There is potential for a loss of agricultural land through development pressures.

Historic environment - Historic England recently reported that heritage assets at risk are decreasing. There are now 87 fewer heritage assets at risks than in 2018 with successes in buildings and structures and archaeology⁷⁷. Heritage assets will likely continue to be protected through European and UK legislation. Development could put pressure on heritage assets and their setting.

⁷⁷ Historic England (2019). Heritage at Risk. Available at: <https://historicengland.org.uk/advice/heritage-at-risk/findings/>

Annex E: SEA Scoring Criteria

Table E.1 SEA Scoring Criteria

SEA Objective	Datasets/Key Themes	Effect		Description
Biodiversity, Flora, Fauna: <ul style="list-style-type: none"> Protect and enhance biodiversity, priority species, vulnerable habitats and habitat connectivity (no loss and improve connectivity where possible) 	<ul style="list-style-type: none"> SPA SAC Ramsar site SSSIs Marine Protected Area (MPA) Marine Conservation Zone (MCZ) National Nature Reserves (NNR) Local Nature Reserve (LNR) Priority habitats and species Non-designated sites Terrestrial, aquatic and marine habitats, species and protected sites Green networks and corridors (e.g. foraging areas and commuting routes, migration routes, hibernation areas etc. at all scales) 	+++	Major Positive	The option would result in a major enhancement on the quality of designated sites/habitats due to changes in flow or groundwater levels, water quality or habitat quality and availability. The option would result in a major increase in the population of a priority species. Effects could be caused by beneficial changes in water flows/water quality, or large amounts of creation or enhancement of habitat, promoting a major increase in ecosystem structure and function. The option would result in a major reduction or management of INNS.
		++	Moderate Positive	The option would result in a moderate enhancement on the quality of designated and/or non-designated sites / habitats due to changes in flow or groundwater levels, water quality or habitat creation and enhancement measures. The option would result in a moderate increase in the population of a priority species. Effects could be caused by beneficial changes in water flows/water quality, or moderate amounts of creation or enhancement of habitat, promoting a moderate increase in ecosystem structure and function. The option would result in a moderate reduction or management of INNS.
		+	Minor Positive	The option would result in a minor enhancement of the quality of designated and/or non-designated sites / habitats due to changes in flow or groundwater levels, water quality or habitat creation and enhancement measures. The option would result in a minor increase in the population of a priority species. Effects could be caused by beneficial changes in water flows/water quality, or small amounts of creation or enhancement of habitat, promoting a minor increase in ecosystem structure and function. The option would result in a minor reduction or management of INNS.
		0	Neutral	The option would not result in any effects on designated or non-designated sites including habitats and/or species). It will not have an effect on INNS.
		-	Minor Negative	The option would result in a minor negative effect on the quality of designated and/or non-designated sites / habitats due to changes in flow or groundwater levels, water quality or habitat loss or degradation. The option would result in a minor decrease in the population of a priority species. Effects could be caused by detrimental changes in flows/water quality, or small losses or degradation of habitat leading to a minor loss of ecosystem structure and function. The option would result in a minor increase or spread of INNS.

SEA Objective	Datasets/Key Themes	Effect		Description
		--	Moderate Negative	The option would result in a moderate negative effect on the quality of designated and/or non-designated sites / habitats due to changes in flow or groundwater levels, water quality or habitat loss or degradation. The option would result in a moderate decrease in the population of a priority species. Effects could be caused by detrimental changes in flows/water quality, or moderate loss or degradation of habitat leading to a moderate loss of ecosystem structure and function. The options would result in a moderate increase or spread of INNS.
		---	Major Negative	The option would result in a major negative effect on the quality of designated and/or non-designated sites / habitats due to changes in flow or groundwater levels, water quality or habitat loss or degradation. HRA results indicate potential for Likely Significance Effects. The option would result in a major decrease in the population of a priority species. Effects could be caused by detrimental changes in flows/water quality, or large losses or degradation of habitat leading to a major loss of ecosystem structure and function. The option would result in a major increase or spread of INNS.
		?	Uncertain	From the level of information available the effect that the option would have on this objective is uncertain.
Soil: <ul style="list-style-type: none"> Protect and enhance the functionality, quantity and quality of soils 	<ul style="list-style-type: none"> Agricultural Land Classification Landfill sites – authorised and historic 	+++	Major Positive	The option would result in a major enhancement on the quality of soils through the implementation of catchment approaches, remediation or other measures.
		++	Moderate Positive	The option would result in a moderate enhancement on the quality of soils through the implementation of catchment approaches, remediation or other measures.
		+	Minor Positive	The option is located on a brownfield site and has no effect on soils or existing land use. The option results in the remediation of contaminated land.
		0	Neutral	The option would not result in any effects on soils or land use.
		-	Minor Negative	The option is not located on a brownfield site and/or results in a minor loss of best and most versatile agricultural land or is in conflict with existing land use. The option results in land contamination.
		--	Moderate Negative	The option will result in a moderate loss of best and most versatile agricultural land or is in substantial conflict with existing land use. The option is partially overlying mineral resources leading to partial mineral sterilisation.

SEA Objective	Datasets/Key Themes	Effect		Description
		---	Major Negative	The option will result in a major loss of best and most versatile agricultural land or is in substantial conflict with existing land use. The option results in land contamination. The option is directly overlying mineral resources leading to mineral sterilisation.
		?	Uncertain	From the level of information available the effect that the option would have on this objective is uncertain.
Water: <ul style="list-style-type: none"> • Increase resilience and reduce flood risk • Protect and enhance the quality of the water environment and water resources • Deliver reliable and resilient water supplies 	<ul style="list-style-type: none"> • Environment Agency Flood Defences • Environment Agency Main Rivers • Flood Zones 2 and 3 • Surface Water Features • WFD River Waterbody Catchments • WFD River Waterbodies Cycle 2 • Bathing Waters (for desal options) • Shellfish Waters (desal options) • Source Protection Zones • WFD Groundwater bodies 	+++	Major Positive	The option results in addressing failure of WFD Good Ecological Status / Good Ecological Potential. The option would result in a major improvement to flood risk. The option would result in a major improvements in water efficiency, reduces demand and improves resilience. Additional MI/d capacity over 50MI/d.
		++	Moderate Positive	The option achieves savings through demand management and does not require abstraction to achieve yield. The option contributes to addressing failure of WFD Good Ecological Status / Good Ecological Potential. The option would result in a moderate improvement to flood risk. The option would result in a moderate improvements in water efficiency, reduces demand and improves resilience. Additional MI/d capacity between 25.1 and 50MI/d.
		+	Minor Positive	The option achieves savings through demand management and does not require abstraction to achieve yield. The option would result in a minor improvement to flood risk. The option would result in a minor improvements in water efficiency, reduces demand and improves resilience. Additional MI/d capacity between 0.1 and 25MI/d.
		0	Neutral	The option would have no discernible effect on river flows or surface/coastal water quality or on groundwater quality or levels. The option would not have an effect on or be affected by flood risk.
		-	Minor Negative	The option would result in minor decreases in river flows. River and/or coastal water quality may be affected and lead to short-term or intermittent effects on receptors (e.g. designated habitats, protected species or recreational users of rivers and the coastline) that could not be avoided but could be mitigated. The option would result in minor decreases in groundwater quality or levels. The option is located in Flood Zone 2. The option would result in minor decreases in water efficiency, increases demand and reduces resilience.

SEA Objective	Datasets/Key Themes	Effect		Description
		--	Moderate Negative	<p>The option would result in moderate decreases in river flows. River and/or coastal water quality may be affected and lead to long-term or continuous effects on receptors (e.g. designated habitats, protected species or recreational users of rivers and the coastline) that could not reasonably be mitigated.</p> <p>The option results in the likely deterioration of WFD classification.</p> <p>The option would result in moderate decreases in groundwater quality or levels.</p> <p>The option is located in Flood Zone 3.</p> <p>The option would result in moderate decreases in water efficiency, increases demand and reduces resilience.</p>
		---	Major Negative	<p>The option would result in major decreases in river flows. River and/or coastal water quality may be affected and lead to long-term or continuous effects on receptors (e.g. designated habitats, protected species or recreational users of rivers and the coastline) that could not reasonably be mitigated.</p> <p>The option results in the deterioration of WFD classification.</p> <p>The option would result in major decreases in groundwater quality or levels.</p> <p>The option is located in Flood Zone 3 and further contributes to flood risk.</p> <p>The option would result in major decreases in water efficiency, increases demand and reduces resilience.</p>
		?	Uncertain	From the level of information available the effect that the option would have on this objective is uncertain.
Air: • Reduce and minimise air emissions	<ul style="list-style-type: none"> • Air Quality Management Zones (AQMAS) • Air quality monitoring sites 	+++	Major Positive	The option would result in a major enhancement of the air quality within one or more AQMAS.
		++	Moderate Positive	The option would result in a moderate enhancement of the air quality within one or more AQMAS.
		+	Minor Positive	The option would result in an enhancement of the air quality.
		0	Neutral	The option would not result in any effects on air quality and AQMAS.
		-	Minor Negative	The option would result in a decrease of the air quality.
		--	Moderate Negative	The option would result in a decrease of the air quality within one or more AQMAS.
		---	Major Negative	The option would result in a major decrease in the air quality within one or more AQMAS.
		?	Uncertain	From the level of information available the effect that the option would have on this objective is uncertain.

SEA Objective	Datasets/Key Themes	Effect		Description
Climate Factors: <ul style="list-style-type: none"> • Reduce embodied and operational carbon emissions • Reduce vulnerability to climate change risks and hazards 	Option Carbon data UKCP18 climate data Sea level rise projections	+++	Major Positive	The option will generate significant additional zero carbon energy that can be fed back into the grid/reduce carbon emissions (see carbon scale). The option will result in a major increase in carbon sequestration. The option will increase resilience/decrease vulnerability to climate change effects.
		++	Moderate Positive	The option will increase resilience/decrease vulnerability to climate change effects. The option will result in a moderate increase in carbon sequestration. The option will generate moderate additional zero carbon energy that can be fed back into the grid/reduce carbon emissions (see carbon scale).
		+	Minor Positive	The option will increase resilience/decrease vulnerability to climate change effects. The option will result in a minor increase in carbon sequestration. The option will generate minor additional zero carbon energy that can be fed back into the grid/reduce carbon emissions (see carbon scale).
		0	Neutral	The option would have no discernible effect on greenhouse gas emissions, nor would the option increase resilience/decrease vulnerability to climate change effects.
		-	Minor Negative	The option will have a minor impact on resilience/decrease vulnerability to climate change effects. The option will generate minor construction and/or operational carbon emissions (see carbon scale).
		--	Moderate Negative	The option will have a moderate impact on resilience/significantly decrease vulnerability to climate change effects. The option will generate moderate construction and/or operational carbon emissions (see carbon scale). The option will result in a moderate release of previously sequestered carbon.
		---	Major Negative	The option will have a major impact on resilience/significantly decrease vulnerability to climate change effects. The option will generate significant construction and/or operational carbon emissions (see carbon scale). The option will result in a major release of previously sequestered carbon.
		?	Uncertain	From the level of information available the effect that the option would have on this objective is uncertain.
Landscape: <ul style="list-style-type: none"> • Conserve, protect and enhance landscape, townscape and seascape character and visual amenity 	<ul style="list-style-type: none"> • Areas of Outstanding Natural Beauty • National Character Areas • Green Belt land • National Park 	+++	Major Positive	The option would have a major positive contribution to designated landscape (AONB or National Park) management plan objectives. The option results in new, above ground infrastructure that significantly enhances the local landscape, townscape or seascape.
		++	Moderate Positive	The option would have a moderate positive contribution to designated landscape management plan objectives.

SEA Objective	Datasets/Key Themes	Effect		Description
				The option results in new, above ground infrastructure that has a moderate positive effect on the local landscape, townscape or seascape.
		+	Minor Positive	The option results in new, above ground infrastructure that has a minor positive effect on the local landscape, townscape or seascape.
		0	Neutral	The option would not result in any effects on the local landscape, townscape or seascape.
		-	Minor Negative	The option results in new, above ground infrastructure that has a minor negative effect on the local landscape, townscape or seascape.
		--	Moderate Negative	The option would have a moderate negative effect on a designated landscape or feature (i.e. significant visually intrusive infrastructure) whose effects could not be reasonably mitigated. The option results in new, above ground infrastructure that has a moderate negative effect on the local landscape, townscape or seascape.
		---	Major Negative	The option would have a negative effect on a designated landscape or feature (i.e. significant visually intrusive infrastructure) whose effects could not be reasonably mitigated. The option results in new, above ground infrastructure that has a major negative effect on the local landscape, townscape or seascape.
		?	Uncertain	From the level of information available the effect that the option would have on this objective is uncertain.
Historic Environment <ul style="list-style-type: none"> • Conserve, protect and enhance the historic environment, including archaeology 	<ul style="list-style-type: none"> • Listed buildings: <ul style="list-style-type: none"> - Grade I listed structures - Grade II* listed structures - Grade II listed structures • Registered Parks and Gardens: <ul style="list-style-type: none"> - Grade I Registered Parks and Gardens - Grade II* Registered Parks and Gardens - Grade II Registered Parks and Gardens • Protected Wreck • Registered Battlefields • Scheduled Monuments • Conservation Areas • World Heritage Sites 	+++	Major Positive	The option will result in enhancements to designated heritage assets and/or their setting, fully realising the significance and value of the asset, such as: <ul style="list-style-type: none"> • Securing repairs or improvements to heritage assets, especially those identified in the Historic England Buildings/Monuments at Risk Register. • Improving interpretation and public access to important heritage assets.
		++	Moderate Positive	The option will result in enhancements to designated heritage assets and/or their setting. Improving interpretation and public access to important heritage assets.
		+	Minor Positive	The option will result in enhancements to non-designated heritage assets and/or their setting.
		0	Neutral	The option will have no effect on cultural heritage assets or archaeology.
		-	Minor Negative	The option will result in the loss of significance of undesignated heritage assets and/or their setting, notwithstanding remedial recording of any elements affected. There will be limited damage to known, undesignated archaeology important sites with a consequent loss of significance only partly mitigated by archaeological investigation.
		--	Moderate Negative	The option will result in the loss of significance of undesignated heritage assets and/or their setting, notwithstanding remedial recording of any elements affected.

SEA Objective	Datasets/Key Themes	Effect		Description
				The option will diminish the significance of designated heritage assets and/or their setting, notwithstanding remedial recording of any elements affected.
		---	Major Negative	The option will diminish the significance of designated heritage assets and/or their setting such as: <ul style="list-style-type: none"> • Demolition or further deterioration in the condition of designated heritage assets especially those identified in the Historic England Buildings/Monuments at Risk Register. • Loss of public access to important heritage assets and lack of appropriate interpretation. • There will be major damage to known, designated archaeology important sites with a consequent loss of significance only partly mitigated by archaeological investigation.
		?	Uncertain	From the level of information available the effect that the option would have on this objective is uncertain.
Population, Human Health	<ul style="list-style-type: none"> • Noise action important area • Indices of Multiple Deprivation 2015 • Functional site: <ul style="list-style-type: none"> - Schools - Medical facilities • OS Greenspace dataset: <ul style="list-style-type: none"> - Allotments - Bowling green - Cemetery - Golf course - Sports facility - Play space - Playing field - Public park or garden - Religious grounds - Tennis courts • Natural England - Country Parks • National Parks • Section 15 open access areas • CRoW S4 Conclusive Registered Common Land 	+++	Major Positive	The option leads to major positive effect on the health of local communities and will ensure that surface water and bathing water quality is maintained within statutory limits. The option creates new, and significantly enhances existing, recreational facilities, publicly accessible greenspace and/or tourism within the operational area.
		++	Moderate Positive	The option leads to positive effect on the health of local communities and will ensure that surface water and bathing water quality is maintained within statutory limits. The option enhances existing, recreational facilities, publicly accessible greenspace and/or tourism within the operational area.
		+	Minor Positive	The option has a temporary positive effect on the health of local communities and will ensure that surface water and bathing water quality is maintained within statutory limits.
		0	Neutral	The option would not result in any effects on human health and existing recreational facilities and/or tourism.
		-	Minor Negative	The option has a temporary effect on human health (e.g. noise or air quality). The option reduces the availability and quality of existing recreational facilities and/or tourism within the operational area.
		--	Moderate Negative	The option results in the permanent removal of existing recreational facilities, publicly accessible greenspace and/or tourism within the operational area.
		---	Major Negative	The option has a significant long-term effect on human health (e.g. noise or air quality). The option results in the removal of existing recreational facilities, publicly accessible greenspace and/or tourism within the operational area.
		?	Uncertain	From the level of information available the effect that the option would have on this objective is uncertain.

SEA Objective	Datasets/Key Themes	Effect		Description
Material Assets <ul style="list-style-type: none"> • Minimise resource use and waste production • Avoid negative effects on built assets and infrastructure 	<ul style="list-style-type: none"> • Transport: <ul style="list-style-type: none"> - Major roads – A roads - Major roads motorway - Railway line - National cycle route - National trails 	+++	Major Positive	<p>The option will reuse or recycle substantial quantities of waste materials and any new infrastructure will incorporate substantial sustainable design measures and materials. There will be no increase in energy consumption or energy will be from 100% renewable sources.</p> <p>The option improves national cycle routes or national trails.</p>
		++	Moderate Positive	<p>The option will reuse or recycle moderate quantities of waste materials and any new infrastructure will incorporate some sustainable design measures and materials. There will be no increase in energy consumption or energy will be from 90% renewable sources.</p> <p>The option improves national cycle routes or national trails.</p>
		+	Minor Positive	<p>The option will reuse or recycle a limited quantity of waste materials and any new infrastructure will incorporate some limited sustainable design measures and materials. There will be no increase in energy consumption or energy will be from 80% renewable sources.</p> <p>The option improves national cycle routes or national trails.</p>
		0	Neutral	<p>The option would not result in any effects on material assets.</p>
		-	Minor Negative	<p>The option will require new infrastructure with only limited opportunities for the reuse or recycling of waste materials. There are limited opportunities for sustainable design or the use of sustainable materials.</p> <p>The option results in a minor increase in energy consumption with no renewable energy options.</p> <p>The option results in a minor disruption on built assets and infrastructure, including transport.</p>
		--	Moderate Negative	<p>The option will require new infrastructure with only limited opportunities for the reuse or recycling of waste materials.</p> <p>The option results in a moderate increase in energy consumption with no renewable energy options.</p> <p>The option results in a moderate disruption on built assets and infrastructure, including transport links.</p>
		---	Major Negative	<p>The option will require significant new infrastructure that cannot be provided through the reuse or recycling of waste materials. There are no opportunities for sustainable design or the use of sustainable materials.</p> <p>The option results in a major increase in energy consumption with no renewable energy options.</p> <p>The option results in a major distribution on built assets and infrastructure, including transport links.</p>
		?	Uncertain	<p>From the level of information available the effect that the option would have on this objective is uncertain.</p>

Annex F: SEA Option Assessments

Detailed SEA Summary Sheets can be provided upon request as excel files.

Annex G: Other Developments and Local Plan Allocations

County	Council	Scheme Type	Allocation	Reference	Location	Description
Greater London	West London Waste Authority	Waste Allocation	328: Quattro, Victoria Road, Park Royal	ALL.WAS.LON1	Victoria Road, Park Royal, Ealing	Waste site
Greater London	West London Waste Authority	Waste Allocation	222 Council Depot	ALL.WAS.LON2	Forward Drive, Harrow	Waste site
Greater London	West London Waste Authority	Waste Allocation	331 Rigby Lane Waste Transfer Station	ALL.WAS.LON3	Hayes, Hillingdon	Waste site
Greater London	West London Waste Authority	Waste Allocation	342 Twickenham Depot	ALL.WAS.LON4	Langhorn Drive, Twickenham, Richmond	Waste site
Greater London	West London Waste Authority	Waste Allocation	2861 Western International Market	ALL.WAS.LON5	Hayes Road, Southall, Hounslow	Waste site
Greater London	North London Waste Authority	Waste Allocation	A12-EN Eleys Estate	ALL.WAS.LON6	Industrial area of Eleys Estate which incorporates a number of existing waste sites and neighbours Edmonton Eco Park and Aztec A406 Industrial Estate.	Integrated resource recovery facilities/resource parks, Thermal treatment, anaerobic digestion, pyrolysis/gasification, mechanical biological treatment, Waste transfer, indoor composting, in-vessel composting, processing and recycling
Greater London	North London Waste Authority	Waste Allocation	A15-HC Millfields LSIS	ALL.WAS.LON7	Industrial Site occupied by a Hackney Council Waste Transfer Station and Fleet Depot and a Power Station	Waste Transfer which is protected under the London Plan. Areas which are not within flood zone 3 are potentially suitable to handle hazardous waste
Greater London	North London Waste Authority	Waste Allocation	A19-HR Brantwood Road	ALL.WAS.LON8	Industrial Estate	Thermal treatment, anaerobic digestion, pyrolysis/gasification, mechanical biological treatment, waste transfer, processing and recycling. Areas not within Source Protection Zone 1 are potentially suitable to handle hazardous waste.

County	Council	Scheme Type	Allocation	Reference	Location	Description
Greater London	North London Waste Authority	Waste Allocation	A21-HR North East Tottenham	ALL.WAS.LON9	To the east of the area lies the Lee Valley Regional Park. To the west, the site is bound by a railway line, with a train station to the south. Beyond the railway line are industrial and residential uses. There are allotments to the south and an Ikea retail development to the north.	Thermal treatment, anaerobic digestion, pyrolysis/gasification, mechanical biological treatment, waste transfer, processing and recycling
Greater London	North London Waste Authority	Waste Allocation	A22-HR Friern Barnet Sewage Works (LEA 4)/ Pinkham Way, Haringey	ALL.WAS.LON10	Pinkham Way and retail park to north, industrial properties east. Golf course south and a park and residential properties to the west.	Waste transfer, Recycling, Composting, including indoor in-vessel composting and outdoor composting. Areas not lying within Flood Zone 3 are potentially suitable to handle hazardous waste
Greater London	North London Waste Authority	Waste Allocation	A24-WF Argall Avenue, Waltham Forest	ALL.WAS.LON11	There is a sports ground to the north, Lea Valley Park, allotments and residential properties to the east, industrial properties to the south and a railway line to the west.	Waste transfer, indoor/in-vessel composting, processing and recycling. Areas not lying within Flood Zone 3 are potentially suitable to handle hazardous waste
Greater London	Barking and Dagenham	No large scale allocations identified within local plan site allocation document				
Greater London	Barnet	No large scale allocations identified within local plan site allocation document				
Greater London	Bexley	Site Allocation	SA2 ABW02 Lesnes Estate/Coralline Walk	ALL.LON.BEX1	SE2 9SY	This site is allocated for primarily residential development through estate regeneration, proposed by Peabody, the registered housing provider and landowner, to deliver approximately 1,850 new homes, replacing 746 units of existing housing
Greater London	Bexley	Site Allocation	SA9 BEL07Crabtree Manorway South	ALL.LON.BEX2	DA17 6BH	This site is allocated for primarily residential development with green, open spaces. The design-led approach for optimising site capacity indicates that, as a minimum, the provision of 740 new homes is achievable on this site

County	Council	Scheme Type	Allocation	Reference	Location	Description
Greater London	Brent	Site Allocation	BEGA1A Neasdens Stations Growth Area	ALL.LON.BRE1	The area around the existing Neasden underground station and a potential West London Orbital overground station. Neasden Lane, Denzil Road and Selbie Avenue NW10.	In addition to around 2000 homes, the area will through co-location of industrial and other commercial floorspace, provide a major boost to business and employment opportunities.
Greater London	Brent	Site Allocation	BEGA2A Staples Corner Growth Area	ALL.LON.BRE2	Staples Corner Strategic Industrial Land, adjacent to the Edgware Road and North Circular Road	In addition to around 2,200 homes, the area will through industrial intensification together with co-location of industrial provide a major boost to business and employment opportunities through increased floorspace.
Greater London	Bromley	Site Allocation	Site 2: Land adjacent to Bromley North Station	ALL.LON.BRO1	Land adjacent to Bromley North Station	Redevelopment for mixed use including 525 residential units, 2000 sqm of office accommodation, space for community use, 230 sqm café/retail, transport interchange and parking.
Greater London	Bromley	Site Allocation	Site 10: West of Bromley High Street and land at Bromley South	ALL.LON.BRO2	West of Bromley High Street and land at Bromley South	Redevelopment for mixed use including 1230 residential units, offices, retail and transport interchange.
Greater London	Camden	No large scale allocations identified within local plan site allocation document				
Greater London	City of London	No large scale allocations identified within local plan site allocation document				
Greater London	Croydon	Site Allocation	25: Morrisons Supermarket	ALL.LON.CRO1	500 Purley Way, CR0 4NZ	Redevelopment of a mix of residential, retail, commercial and community uses to form the basis of a new residential community. 251 to 1028 homes.
Greater London	Croydon	Site Allocation	60: Cane Hill Hospital Site	ALL.LON.CRO2	Cane Hill Hospital Site, Farthing Way, CR5 3YL	Residential development with new community, health and educational facilities. 650 homes.
Greater London	Croydon	Site Allocation	172: Ruskin Square and surface car park	ALL.LON.CRO3	61 Dingwall Road and Lansdowne Road, CR0 2EW	Mixed use development comprising residential, offices, restaurant/café and fitness centre. 550 to 625 homes.
Greater London	Croydon	Site Allocation	218: Lunar House	ALL.LON.CRO4	Lunar House, Wellesley Road, CR0 9YD	Office and residential and/or hotel (with healthcare facility if required by the NHS) if the site is no longer required by the Home Office. 188 to 542 homes.

County	Council	Scheme Type	Allocation	Reference	Location	Description
Greater London	Croydon	Site Allocation	314: Valley Park	ALL.LON.CRO5	Valley Park (B&Q and Units A-G Daniell Way), Hesterman Way, CR0 4YJ	Redevelopment of this area to a mixture of residential, retail, healthcare facility (if required by the NHS), community and leisure to form the basis of a new residential community and local centre. 403 to 1092 homes.
Greater London	Croydon	Site Allocation	393: Whitgift Centre	ALL.LON.CRO6	Whitgift Centre, North End	Expansion of shopping centre, improved public realm and residential development and car parking provision. 400 to 1000 homes.
Greater London	Ealing	No large scale allocations identified within local plan site allocation document				
Greater London	Enfield	No large scale allocations identified within local plan site allocation document				
Greater London	Greenwich	Emerging Site Allocations	CR2 Charlton Riverside Central	ALL.LON.GRE1	Land between Anchor & Hope Lane, Woolwich Road and Eastmoor Street	Mixed use development including retention, diversification and intensification of industrial floorspace, workspace suitable for SMEs, residential, small-scale retail/leisure/cultural uses, primary school, primary healthcare centre, other appropriate community facilities and new Public Open Spaces including small local park with sports/recreation provision and riverside pocket parks.
Greater London	Greenwich	Emerging Site Allocations	GP3 Site between A102 and Millennium Way	ALL.LON.GRE2	The site is located on the western side of Greenwich Peninsula, south of North Greenwich Station and bounded by Millennium Way and the A102.	Residential-led mixed use development including local-scale Greenwich Peninsula retail/café/restaurant/leisure uses, hotel, offices, B1 workspace, archiving/storage facilities, appropriate D1 community facilities and public open space.
Greater London	Greenwich	Emerging Site Allocations	GP4 Knight Dragon	ALL.LON.GRE3	Greenwich Peninsula	Residential-led mixed use development up to 12,678 residential units
Greater London	Greenwich	Emerging Site Allocations	GP5 Phases 3, 4 & 5 Greenwich Millennium Village	ALL.LON.GRE4	Peartree Way, SE10	Residential-led mixed use development including local-scale retail/café/restaurant/leisure uses, B1 workspace and appropriate community facilities, including a nursery

County	Council	Scheme Type	Allocation	Reference	Location	Description
Greater London	Greenwich	Emerging Site Allocations	T3 Thamesmead Waterfront	ALL.LON.GRE5	Thamesmead Waterfront	Residential-led mixed-use development including a site for an all through school (primary and secondary). Area currently designated as MOL to be made publically accessible as a District Park.
Greater London	Greenwich	Emerging Site Allocations	T4 Thamesmead Town Centre	ALL.LON.GRE6	Thamesmead Town Centre	Town centre uses with significant residential development
Greater London	Hackney	Site Allocation	MH1	ALL.LON.HAC1	Woodberry Down, Seven Sisters Road N4 1DH	Residential units: 4045 (gross) 2915 (net) to 2033 and beyond
Greater London	Hammersmith and Fulham	Site Allocation	Strategic Policy WCRA	ALL.LON.H&F1	White City Regeneration Area	6000 indicative additional homes
Greater London	Hammersmith and Fulham	Site Allocation	Strategic Policy HRA	ALL.LON.H&F2	Hammersmith Regeneration Area	2800 indicative additional homes
Greater London	Hammersmith and Fulham	Site Allocation	Strategic Policy FRA	ALL.LON.H&F3	Fulham Regeneration Area	7000 indicative additional homes
Greater London	Hammersmith and Fulham	Site Allocation	Strategic Policy SFRRRA	ALL.LON.H&F4	South Fulham Riverside Regeneration Area	4000 indicative additional homes
Greater London	Haringey	Site Allocation	SA22 Calrendon Square	ALL.LON.HAR1	Clarendon Square, Hornsey Park Rd, Mayes Rd, Clarendon Rd, N8	1080 net residential units
Greater London	Harrow	No large scale allocations identified within local plan site allocation document				
Greater London	Havering	No large scale allocations identified within local plan site allocation document				
Greater London	Hillingdon	Site Allocation	SA5 Land to the south of railway including Nestle Factory	ALL.LON.HIL1		1800 homes from 2021-2026
Greater London	Hounslow	No large scale allocations identified within local plan site allocation document				
Greater London	Islington	No large scale allocations identified within local plan site allocation document				

County	Council	Scheme Type	Allocation	Reference	Location	Description
Greater London	Kensington and Chelsea	Site Allocation	CA1: Kensal Canalside Opportunity Area	ALL.LON.K&C1	Kensal Canalside Opportunity Area	Comprehensive development of the site, including a minimum of: i. 3,500 new residential (C3) units; ii. 10,000sq.m of new offices; iii. 2,000sq.m of new non-residential floorspace, including social and community and local shopping facilities in addition to the supermarket; b. a station on the Elizabeth Line; c. the relocation and re-provision of the existing Sainsbury's supermarket
Greater London	Kensington and Chelsea	Site Allocation	CA4: Earl's Court Exhibition Centre	ALL.LON.K&C2	Earl's Court Exhibition Centre	The Council allocates development on the site to deliver, in terms of: Land use a. a minimum of 900 (C3) homes within the Royal Borough; b. a minimum of 10,000sq.m of office floor space; c. retail and other uses within the A class of the Use Classes Order 1987 (as amended) to serve the day-to-day needs of the new development; d. a significant cultural facility to retain Earl's Court's long standing brand as an important cultural destination, located on the area of the Opportunity Area nearest to public transport accessibility; e. other non-residential uses required to deliver a sustainable and balanced mixed-use development, such as hotel and leisure uses; f. social and community uses;

County	Council	Scheme Type	Allocation	Reference	Location	Description
Greater London	Kensington and Chelsea	Site Allocation	CA5 Warwick Road Sites	ALL.LON.K&C3	Former Territorial Army site, 245 Warwick Road · Former Empress Telephone Exchange, 213-215 Warwick Road · Former Homebase, 195 Warwick Road · 100 and 100a West Cromwell Road	The Council allocates development on the site to deliver, in terms of: Land use a. a minimum of 1,219 total combined residential (C3) units across all four sites: i. 255 residential (C3) units on the Former Territorial Army site; ii. 163 residential units (C3) on the Former Empress Telephone Exchange; iii. a minimum of 375 residential (C3/C2) units of which a minimum are 283 C3 residential units on the former Homebase site; iv. a minimum of 450 (C3) residential units on the 100/100A West Cromwell Road site;
Greater London	Kingston upon Thames	No large scale allocations identified within local plan site allocation document				
Greater London	Lambeth	Site Allocation	Site Allocation 13	ALL.LON.LAM1	Land Bounded By Wandsworth Road To The West, Parry Street To The North, Broadway And Railway Line To The East (Vauxhall Square)	578 residential units
Greater London	Lewisham	Emerging Site Allocation	Lewisham Gateway	ALL.LON.LEW1	Lewisham High Street, London, SE13	649 remaining net residential units to delivered
Greater London	Lewisham	Emerging Site Allocation	Lewisham Shopping Centre	ALL.LON.LEW2	33A Molesworth Street, Lewisham, London, SE13 7HB	1,579 net residential units to be delivered
Greater London	Lewisham	Emerging Site Allocation	Lewisham Retail Park	ALL.LON.LEW3	Nos. 66-76 Loampit Vale, Lewisham, SE13	529 net residential units to be delivered
Greater London	Lewisham	Emerging Site Allocation	Catford Shopping Centre and Milford Towers	ALL.LON.LEW4	Winslade Way, Catford, SE6 4J	1,084 net residential units to be delivered
Greater London	Lewisham	Emerging Site Allocation	Catford Island	ALL.LON.LEW5	Plassy Road, Catford, SE6 2AW	602 net residential units to be delivered
Greater London	Lewisham	Emerging Site Allocation	Wickes and Halfords, Catford Road	ALL.LON.LEW6	1-7 Catford Hill, Catford, SE6 4NU	512 net residential units to be delivered

County	Council	Scheme Type	Allocation	Reference	Location	Description
Greater London	Lewisham	Emerging Site Allocation	Convoys Wharf Mixed Use Employment Location	ALL.LON.LEW7	Convoys Wharf, SE8 3JF	3,500 net residential units to be delivered
Greater London	Lewisham	Emerging Site Allocation	Deptford Landings Mixed Use Employment Location	ALL.LON.LEW8	Crown, New Celtic Pak, Bridge and Victoria Wharves bounded by Grove Street, Dragoon Road, Oxestalls Road, London, SE8	1,737 remaining net residential units to be delivered
Greater London	Lewisham	Emerging Site Allocation	Surrey Canal Triangle Mixed Use Employment Location	ALL.LON.LEW9	Surrey Canal Road, SE14	4,089 net residential units to be delivered
Greater London	Lewisham	Emerging Site Allocation	Former Hatcham Works, New Cross Road	ALL.LON.LEW10	New Cross Road, SE14 5UQ	800 net residential units to be delivered
Greater London	Lewisham	Emerging Site Allocation	Bell Green Retail Park	ALL.LON.LEW11	SE6 4RS	748-1,831 net residential units to be delivered
Greater London	Lewisham	Emerging Site Allocation	Sainsbury's Bell Green	ALL.LON.LEW12	Southend Lane, SE26 4PU	550-1,347 net residential units to be delivered
Greater London	Merton	No large scale allocations identified within local plan site allocation document				
Greater London	Newham	Site Allocation	S21 – Silvertown Quays	ALL.LON.NEW1	Silvertown Quays	Residential-led mixed-use with potential for leisure and hospitality, green industries, and research and development, building on the visitor attraction cluster at the western end of the docks (ExCeL, Siemens building).
Greater London	Newham	Site Allocation	S22 – Minoco Wharf	ALL.LON.NEW2	Minoco Wharf	The Managed Release of land designated as a Strategic Industrial Location at Thameside West up to the eastern boundary of Lyle Park, will assist in the development of a new neighbourhood at West Silvertown.

County	Council	Scheme Type	Allocation	Reference	Location	Description
Greater London	Redbridge	Site Allocation	LP Site Number: 2	ALL.LON.RED1	Sainsbury's, Roden Street, Ilford	Comprehensive redevelopment of site is proposed, to include provision of a new supermarket, employment floorspace and the delivery of approximately 700 new homes.
Greater London	Redbridge	Site Allocation	LP Site Number: 47	ALL.LON.RED2	Land in and around King George/ Goodmayes Hospitals	The site is proposed to be comprehensively redeveloped to deliver approximately 500 new homes, new secondary school, health/community hub and open space/sport provision. The existing King George Hospital and Sunflowers Court will be retained
Greater London	Redbridge	Site Allocation	LP Site Number: 68	ALL.LON.RED3	822 High Road (Tesco), Goodmayes	Comprehensive redevelopment of this underutilised site is proposed including housing (723 homes), retail and education uses
Greater London	Redbridge	Site Allocation	LP Site Number: 70	ALL.LON.RED4	Goodmayes Retail Park, High Road Goodmayes	Comprehensive redevelopment of the site is proposed to deliver approximately 514 new homes and a health facility.
Greater London	Redbridge	Site Allocation	LP Site Number: 99	ALL.LON.RED5	Billet Road	The site is proposed to be comprehensively redeveloped to deliver approximately 800 new homes, a new secondary school and public open space and sports provision.
Greater London	Richmond upon Thames	No large scale allocations identified within local plan site allocation document				
Greater London	Southwark	Site Allocation	NSP13	ALL.LON.SOU1	Biscuit Factory	1548 residential units
Greater London	Southwark	Site Allocation	NSP19	ALL.LON.SOU2	Sampson House	598 residential units
Greater London	Southwark	Site Allocation	NSP48	ALL.LON.SOU3	Elephant and Castle Shopping Centre and London College of Communications	977 residential units
Greater London	Southwark	Site Allocation	NSP58/OKR3	ALL.LON.SOU4	Mandela Way	724 residential units

County	Council	Scheme Type	Allocation	Reference	Location	Description
Greater London	Southwark	Site Allocation	NSP66/OKR10	ALL.LON.SOU5	Land bounded by Glengall Road, Latona Road and Cantium Retail Park	13000 residential units
Greater London	Southwark	Site Allocation	NSP68/OKR13	ALL.LON.SOU6	Sandgate Street and Verney Road	1152 residential units
Greater London	Southwark	Site Allocation	NSP70/OKR16	ALL.LON.SOU7	Hatcham Road, Penarth Street and Ilderton Road	1154 residential units
Greater London	Southwark	Site Allocation	NSP71/OKR17	ALL.LON.SOU8	760 and 812 Old Kent Road (ToysRUs) and 840 Old Kent Road (Aldi)	694 residential units
Greater London	Southwark	Site Allocation	NSP74	ALL.LON.SOU9	Aylesham Centre and Peckham Bus Station	850 residential units
Greater London	Southwark	Site Allocation	NSP80	ALL.LON.SOU10	Decathlon Site and Mulberry Business Park	1031 residential units
Greater London	Southwark	Site Allocation	NSP81	ALL.LON.SOU11	Harmsworth Quays, Surrey Quays Leisure Park, Surrey Quays Shopping Centre and Robert's Close	2735 residential units
Greater London	Sutton	No large scale allocations identified within local plan site allocation document				
Greater London	Tower Hamlets	Site Allocation	2.1 Bow Common Lane	ALL.LON.TOW1	SEE IMAGE	Housing and employment allocation
Greater London	Tower Hamlets	Site Allocation	2.2 Chrisp Street Town Centre	ALL.LON.TOW2	SEE IMAGE	Housing and retail allocation
Greater London	Tower Hamlets	Site Allocation	3.1 Ailsa Street	ALL.LON.TOW3	SEE IMAGE	Housing and employment allocation
Greater London	Tower Hamlets	Site Allocation	3.2 Leven Road Gas Works	ALL.LON.TOW4	SEE IMAGE	Housing and employment allocation
Greater London	Tower Hamlets	Site Allocation	4.1 Aspen Way	ALL.LON.TOW5	SEE IMAGE	Housing and employment allocation
Greater London	Tower Hamlets	Site Allocation	4.2 Billingsgate Market	ALL.LON.TOW6	SEE IMAGE	Housing and employment allocation

County	Council	Scheme Type	Allocation	Reference	Location	Description
Greater London	Tower Hamlets	Site Allocation	4.3 Crossharbour Town Centre	ALL.LON.TOW7	SEE IMAGE	Housing allocation
Greater London	Tower Hamlets	Site Allocation	4.4 Limeharbour	ALL.LON.TOW8	SEE IMAGE	Housing and employment allocation
Greater London	Tower Hamlets	Site Allocation	4.5 Marsh Wall East	ALL.LON.TOW9	SEE IMAGE	Housing and employment allocation
Greater London	Tower Hamlets	Site Allocation	4.6 Marsh Wall West	ALL.LON.TOW10	SEE IMAGE	Housing and employment allocation
Greater London	Tower Hamlets	Site Allocation	4.7 Millharbour South	ALL.LON.TOW11	SEE IMAGE	Housing and employment allocation
Greater London	Tower Hamlets	Site Allocation	4.8 Millharbour	ALL.LON.TOW12	SEE IMAGE	Housing and employment allocation
Greater London	Tower Hamlets	Site Allocation	4.9 North Quay	ALL.LON.TOW13	SEE IMAGE	Housing and employment allocation
Greater London	Tower Hamlets	Site Allocation	4.10 Reuters Ltd	ALL.LON.TOW14	SEE IMAGE	Housing and employment allocation
Greater London	Tower Hamlets	Site Allocation	4.11 Riverside South	ALL.LON.TOW15	SEE IMAGE	Housing and employment allocation
Greater London	Tower Hamlets	Site Allocation	4.12 Westferry Printworks	ALL.LON.TOW16	SEE IMAGE	Housing and employment allocation
Greater London	Tower Hamlets	Site Allocation	4.13 Wood Wharf	ALL.LON.TOW17	SEE IMAGE	Housing and employment allocation
Greater London	Waltham Forest	No large scale allocations identified within local plan site allocation document				
Greater London	Wandsworth	Emerging Site Allocation	WT2 Ram Brewery/Capital Studios/Former Dexion/Duvall site	ALL.LON.WAN1	Ram Street/Armoury Way, Wandsworth, SW18	Mixed use development including residential, replacement economic floorspace; retail, restaurants, business space, cultural, and entertainment uses with provision for a riverside walk.
Greater London	Wandsworth	Emerging Site Allocation	WT4 Gasholder Site	ALL.LON.WAN2	Armoury Way, SW18	Development should provide a mix of residential and intensified economic uses, including cultural workspace and provision for SMEs.

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Greater London	Wandsworth	Emerging Site Allocation	NE12 New Covent Garden Market	ALL.LON.WAN3	The site is located to the east of the junction of the A3205 (Nine Elms Lane/Battersea Park Road) and 'A Road', which separates this site and 41-49 Nine Elms Lane, and 49-59 Battersea Park Road site (NE2). It is bounded to the south by the Metropolitan Police Warehouse Garage site (NE4).	Residential-led, mixed-use development with retail and flexible workspace, a permeable network of new streets and urban spaces, and publicly accessible open space (forming part of Nine Elms Park)
Greater London	Wandsworth	Emerging Site Allocation	OUT3 Springfield Hospital	ALL.LON.WAN4	Burntwood Lane / Glenburnie Road, SW17	New and improved hospital facilities, residential and small-scale commercial / retail use serving the hospital, residential and school facilities.
Greater London	Westminster	No large scale allocations identified within local plan site allocation document				
Gloucestershire	Cotswold	No large scale allocations identified within local plan site allocation document				
Oxfordshire	Cherwell	Site Allocation	Policy Bicester 1: North West Bicester Eco-Town	ALL.OXF.CHE1	North West Bicester	A new zero carbon mixed use development including 6,000 homes will be developed on land identified at North West Bicester.
Oxfordshire	Cherwell	Site Allocation	Policy Bicester 2: Graven Hill	ALL.OXF.CHE2	Graven Hill	This predominantly brownfield site to the south of Bicester is proposed for a mixed use development of 2,100 dwellings, significant employment land providing for high quality job opportunities, associated services, facilities and other infrastructure including the potential for the incorporation of a rail freight interchange.
Oxfordshire	Cherwell	Site Allocation	Policy Bicester 3: South West Bicester Phase 2	ALL.OXF.CHE3	South West Bicester	726 homes with associated services, facilities and other infrastructure.

County	Council	Scheme Type	Allocation	Reference	Location	Description
Oxfordshire	Cherwell	Site Allocation	Policy Banbury 1: Banbury Canalside	ALL.OXF.CHE4	Banbury Canalside	Provision of new homes, retail, office and leisure uses, public open space, pedestrian and cycle routes including new footbridges over the railway line, river and canal, and multi-storey car parks to serve Banbury railway station.
Oxfordshire	Cherwell	Site Allocation	Policy Banbury 2: Hardwick Farm, Southam Road (East and West)	ALL.OXF.CHE5	Hardwick Farm, Southam Road (East and West)	Residential development (of approximately 600 dwellings).
Oxfordshire	Cherwell	Site Allocation	Policy Banbury 4: Bankside Phase 2	ALL.OXF.CHE6	Bankside Phase 2	600 homes with associated services, facilities and other infrastructure.
Oxfordshire	Cherwell	Site Allocation	Policy Banbury 5: North of Hanwell Fields	ALL.OXF.CHE7	North of Hanwell Fields	Residential-led strategic development site will provide approximately 544 dwellings with associated facilities.
Oxfordshire	Cherwell	Site Allocation	Policy Banbury 17: South of Salt Way - East	ALL.OXF.CHE8	South of Salt Way - East	New neighbourhood of up to 1,345 dwellings with associated facilities and infrastructure as part of South West Banbury.
Oxfordshire	Cherwell	Site Allocation	Policy Villages 5: Former RAF Upper Heyford	ALL.OXF.CHE9	Former RAF Upper Heyford	A settlement of approximately 1,600 dwellings (in addition to the 761 dwellings (net) already permitted) and necessary supporting infrastructure, including primary and secondary education provision and appropriate community, recreational and employment opportunities, enabling environmental improvements and the heritage interest of the site as a military base with Cold War associations to be conserved, compatible with achieving a satisfactory living environment.

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Oxfordshire	South Oxfordshire	Site Allocation	STRAT3: Didcot Garden Town & H2: New Housing in Didcot	ALL.OXF.SOU1	Didcot Garden Town	At Didcot, provision will be made for around 6,399* new homes between 2011 and 2035.
Oxfordshire	Vale of White Horse	Site Allocation	H3: Housing in the Towns of Henley-on-Thames, Thame and Wallingford	ALL.OXF.VAL1	West of Wallingford	Land within the allocation at West of Wallingford will be developed to deliver approximately 555 new homes.
Oxfordshire	West Oxfordshire	Site Allocation	WIT2: North Witney Strategic Development Area	ALL.OXF.WES1	Land to the north of Witney	Land to the north of Witney to accommodate a sustainable, integrated community that forms a positive addition to Witney, including about 1,400 homes with a balanced and appropriate mix of residential accommodation to meet identified needs, including affordable housing.
Oxfordshire	West Oxfordshire	Site Allocation	CN1: East Chipping Norton strategic development area	ALL.OXF.WES2	Land to the east of Chipping Norton	Land to the east of Chipping Norton to accommodate a sustainable, integrated community that forms a positive addition to the town, including about 1,200 homes with a balanced and appropriate mix of residential accommodation to meet identified needs, including affordable housing
Oxfordshire	West Oxfordshire	Site Allocation	EW1: Oxfordshire Cotswolds Garden Village Strategic Location for Growth	ALL.OXF.WES3	Land to the north of the A40, near Eynsham	A working assumption of about 2,200 homes with a balanced and appropriate mix of house types and tenures to meet identified needs including affordable housing.

County	Council	Scheme Type	Allocation	Reference	Location	Description
Oxfordshire	West Oxfordshire	Site Allocation	EW2: West Eynsham Strategic Development Area	ALL.OXF.WES4	Land to the west of Eynsham	Land to the west of Eynsham to accommodate a sustainable integrated community that forms a positive addition to Eynsham, including: about 1,000 homes with a balanced and appropriate mix of house types and tenures to meet identified needs including affordable housing.
Oxfordshire	Oxford	Site Allocation	Policy SP47: Thornhill Park	ALL.OXF.OXF1	Thornhill Park	Planning permission will be granted for a residential-led mixed use redevelopment of the Thornhill Park site. This should include some employment use, given the strategic location of the site. Other complementary uses will be considered on their merits. The minimum number of homes to be delivered is 534 which includes the conversion of the existing building to residential.
Berkshire	West Berkshire	No large scale allocations identified within local plan site allocation document				
Berkshire	Reading	Local Plan Allocation	CR11c, Station Hill & Friars Walk	ALL.BER.REA1	STATION HILL & FRIARS WALK	Indicative potential: 380-570 dwellings, 80,000-100,000 sq m of offices, retail and leisure (no significant net gain assumed)
Berkshire	Reading	Local Plan Allocation	CR12e, Hosier Street	ALL.BER.REA2	Hosier Street	Indicative potential: 500-750 dwellings, 4,000-6,000 sq m of retail and leisure.
Berkshire	Reading	Local Plan Allocation	CR13b, Forbury Retail Park	ALL.BER.REA3	Forbury Retail Park	Indicative potential: 1,230-1,840 dwellings, no net gain of retail

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Berkshire	Reading	Local Plan Allocation	SR2: Land north of Manor Farm Road Major Opportunity Area	ALL.BER.REA4	Land north of Manor Farm Road Major Opportunity Area	Redevelopment of the Manor Farm Road site will primarily be for housing (between 680- 1,020 dwellings), an extension to the Whitley District Centre, school provision and open space and public realm improvements, but also include small employment units to replace the Micro Centre, community uses, in addition to a limited amount of employment uses.
Berkshire	Wokingham	Local Plan Allocation	Arborfield Garrison SDL	ALL.BER.WOK1	Arborfield Garrison	1200 homes from 2021-26
Berkshire	Wokingham	Local Plan Allocation	South Wokingham SDL	ALL.BER.WOK2	South Wokingham	600 homes from 2021-26
Wiltshire & Swindon	Wiltshire & Swindon	Minerals Allocation	Cox's Farm	ALL.MIN.WIL1	Grid reference: E 413500 N 197000	Sand and Gravel site.
Wiltshire & Swindon	Wiltshire & Swindon	Minerals Allocation	Blackburr Farm	ALL.MIN.WIL2	Grid reference: E 414200 N 196400	Sand and Gravel site.
Wiltshire & Swindon	Wiltshire & Swindon	Minerals Allocation	North Farm	ALL.MIN.WIL3	Grid reference: E 413600 N 195700	Sand and Gravel site.
Wiltshire & Swindon	Wiltshire & Swindon	Minerals Allocation	Land east of Calcutt	ALL.MIN.WIL4	Grid reference: E 411900 N 193800	Sand and Gravel site.
Wiltshire & Swindon	Wiltshire & Swindon	Minerals Allocation	Land at Costwold Community	ALL.MIN.WIL5	Grid reference: E 403600 N 195600	Sand and Gravel site.
Wiltshire & Swindon	Wiltshire & Swindon	Waste Allocation	Parkgate Farm, Purton	ALL.WAS.WIL1	Grid reference 407675 188866	Materials Recovery Facility/Waste Transfer Station, Local Recycling, Inert Waste Recycling/Transfer and Waste Treatment.
Wiltshire & Swindon	Wiltshire & Swindon	Waste Allocation	Purton Brickworks Employment Allocation, Purton	ALL.WAS.WIL2	Grid reference 408777 188722	Materials Recovery Facility/Waste Transfer Station, Local Recycling and Waste Treatment.
Wiltshire & Swindon	Wiltshire & Swindon	Waste Allocation	Hills Resource Recovery Centre, Compton Bassett	ALL.WAS.WIL3	Grid reference 402156 170841	Waste Treatment (excluding energy from waste).

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Wiltshire & Swindon	Wiltshire & Swindon	Waste Allocation	Land East of HRC/WTS, Stanton St Quintin	ALL.WAS.WIL4	Grid reference 392539 179518	Materials Recovery Facility/Waste Transfer Station, Local Recycling and Waste Treatment.
Wiltshire & Swindon	Wiltshire & Swindon	Waste Allocation	Land West of HRC/WTS, Stanton St Quintin	ALL.WAS.WIL5	Grid reference 391965 179461	Materials Recovery Facility/Waste Transfer Station, Local Recycling, Inert Waste Recycling/Transfer and Waste Treatment.
Wiltshire & Swindon	Wiltshire & Swindon	Waste Allocation	Park Grounds Farm, Royal Wootton Bassett	ALL.WAS.WIL6	Grid reference 405054 183946	Landfill/landraise extension and Waste Treatment
Wiltshire & Swindon	Wiltshire & Swindon	Waste Allocation	Chapel Farm, Blunsdon	ALL.WAS.WIL7	Grid reference 413200 190900	Waste Treatment (energy from waste).
Wiltshire & Swindon	Wiltshire & Swindon	Waste Allocation	Waterside Park, Swindon	ALL.WAS.WIL8	Grid reference 413199 186317	Local Recycling, Inert Waste Recycling /Transfer and Waste Treatment.
Wiltshire & Swindon	Swindon	Local Plan Allocation	Policy NC1: Wichelstowe	ALL.WIL.SWI1		Land at Wichelstowe, as defined on the Policies Map, is allocated for a mixed-use development. b. The development at Wichelstowe shall provide: a total of 4,500 homes (including those already completed) at an average density of 40 dwellings per hectare and a mix and percentage of affordable homes
Wiltshire & Swindon	Swindon	Local Plan Allocation	Policy NC3: New Eastern Villages - including Rowborough and South Marston Village Expansion	ALL.WIL.SWI2		Land to the East of the A419, as defined on the Policies Map, is allocated for a mixed-use development. The form of the development shall comprise a series of new inter-connected distinct villages and an expanded South Marston village defined by the network of green infrastructure corridors. b. The development shall provide: a design led approach to housing density leading to an overall average density of 40 dwellings per hectare; comprising: about 6,000 dwellings at the New Eastern Villages (south of the A420); about 1,500 dwellings at Rowborough (north of the A420). 500 dwellings at South Marston
Wiltshire & Swindon	Wiltshire	Local Plan Allocation	Policy H3.1 Land at Netherhampton Road	ALL.WIL.WIL1	Land at Netherhampton Road	640 dwellings

County	Council	Scheme Type	Allocation	Reference	Location	Description
Hampshire	Basingstoke and Deane	Local Plan Allocation	SS3.10 Manydown	ALL.HAM.BAS1	Manydown, west of Basingstoke	290 hectare site that will deliver a high quality mixed use development that will provide for the phased delivery of approximately 3,400 dwellings.
Hampshire	Basingstoke and Deane	Local Plan Allocation	SS3.11 Basingstoke Golf Course	ALL.HAM.BAS2	Basingstoke Golf Course, south west of Basingstoke	44.5 hectare site that will deliver a high quality mixed-use development that will: a) Make provision for approximately 1,000 dwellings.
Hampshire	Basingstoke and Deane	Local Plan Allocation	SS3.12 Hounsome Fields	ALL.HAM.BAS3	Hounsome Fields, south west of Basingstoke	43 hectare site lies to the south west of Basingstoke and will deliver a high quality mixed-use development that will: a) Make provision for approximately 750 dwellings.
Buckinghamshire	Aylesbury Vale	Local Plan Allocation	D-AGT1 South Aylesbury	ALL.BUC.AYL1	South Aylesbury	95ha site allocated for 1,000 dwellings, primary school, multi-functional green infrastructure, Aylesbury South East Link Road (A413 to B4443 Lower Road), local centre cycling and walking link.
Buckinghamshire	Aylesbury Vale	Local Plan Allocation	D-AGT2 South west Aylesbury	ALL.BUC.AYL2	South west Aylesbury	113ha site allocated for At least 1,490 dwellings up to 2033, primary school, multi-functional green infrastructure (totalling 56.33ha), strategic flood defences and surface water attenuation, South West Link Road between Stoke Mandeville A4010 realignment and A418 Oxford Road single carriageway (safeguarded for future dualling) Junction improvements at A413 and A418. Provision of a linear park, buffer zone for HS2 and noise mitigation cycling and walking links.

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Buckinghamshire	Aylesbury Vale	Local Plan Allocation	D-AGT3 Aylesbury north of A41	ALL.BUC.AYL3	Aylesbury north of A41	Around 102,800 sqm of employment land (appropriate class E (25,600sqm), B2 (44,400 sqm) and B8 (32,800 sqm)). At least 1,747 dwellings up to 2033 (including custom and self build units). 60 residential extra care units (Use Class C2). Mixed use local centre of around 4,000 sqm (appropriate classes E, F.1, F.2 & Sui Generis). Strategic link road connecting with the ELR (N) and the A41 Aston Clinton Road. Strategic flood defences Around 6,000 sqm hotel and conference centre (Use Class C1) etc.
Buckinghamshire	Aylesbury Vale	Local Plan Allocation	D-AGT4 Aylesbury south of A41	ALL.BUC.AYL4	Aylesbury south of A41	At least 2,913 dwellings 60-bed care home/extra care facility Land for a park & ride site 6.90ha of employment land Two primary schools A mixed use local centre Multi-functional green infrastructure (totalling 108.43ha) Strategic flood defences and surface water attenuation A dualled Southern Link Road between A413 Wendover Road and A41 Aston Clinton Road and a strategic link road between the Southern Link Road and Marroway Cycling and walking links
Buckinghamshire	Aylesbury Vale	Local Plan Allocation	D-AGT5 Berryfields	ALL.BUC.AYL5	Berryfields	2,885 homes built up to 2020, 487 homes to be delivered 2020-2025 and no homes to be delivered 2025-2033. 9ha of employment and a district centre.
Buckinghamshire	Aylesbury Vale	Local Plan Allocation	D-AGT6 Kingsbrook	ALL.BUC.AYL6	Kingsbrook	2,450 homes 10ha employment Two primary schools A neighbourhood centre Construction of the northern section of the Eastern Link Road and the rural section of the Stocklake Link road
Buckinghamshire	Aylesbury Vale	Local Plan Allocation	D-NLV001 Land south of the A421 and east of the Whaddon Road	ALL.BUC.AYL7	Land south of the A421 and east of Whaddon Road, Newton Longville	300 homes to be delivered 2020-2025 and 1,555 homes to be delivered 2025-2033

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Buckinghamshire	Aylesbury Vale	Local Plan Allocation	D-WHA001 Shenley Park	ALL.BUC.AYL8	Shenley Park	The development will provide a balanced mix of facilities to ensure that it meets the needs and aspirations of new and existing residents, at least 1,150 homes, 110 bed care home/extra care facility, new primary school, subject to need a site for new secondary school, multi-functional green infrastructure (in compliance with Policies I1 and I2 and associated Appendices), mixed use local centre, exemplary Sustainable Drainage Systems, new link road between A421 Buckingham Road and H6 and or H7 Childs Way/Chaffron Way, public transport and cycling and walking links.
Buckinghamshire	Aylesbury Vale	Local Plan Allocation	D-HAL003 RAF Halton	ALL.BUC.AYL9	RAF Halton	At least 1,000 homes during the Plan period and associated infrastructure, services and facilities including a primary school, new local centre, new access routes if needed and new green infrastructure.
Buckinghamshire	Wycombe	Local Plan Allocation	HW5	ALL.BUC.WYC1	Abbey Barn South and Wycombe Summit	505 dwellings
Buckinghamshire	Wycombe	Local Plan Allocation	HW6	ALL.BUC.WYC2	Gomm Valley and Ashwells	530 dwellings
Buckinghamshire	Wycombe	Local Plan Allocation	HW7	ALL.BUC.WYC3	Terriers Farm and Terriers House	500 dwellings
Buckinghamshire	Wycombe	Local Plan Allocation	PR3	ALL.BUC.WYC4	Princes Risborough Expansion Area	1662 dwellings
Hertfordshire	Dacorum	Local Plan Allocation	LA3	ALL.HER.DAC1	West Hemel Hempstead	Local Allocation LA3 at West Hemel Hempstead as identified on the Policies Map has been released from the Green Belt and will deliver the following: · 900 new homes; · shop, doctors surgery, and additional social and community provision, including a new primary school; · a traveller site of 7 pitches; · new open space/playing fields; and · extension of Shrubhill Common Nature Reserve and the creation of wider green infrastructure links.

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Hertfordshire	Hertfordshire	Emerging Minerals Allocation	MAS01: The Briggens Estate	ALL.MIN.HER1	Located to the east of Stanstead Abbots, between the A414 and B180 Easting: 540509, Northing: 212096	Sand and Gravel site. Extraction expected to take 18 years.
Hertfordshire	Broxbourne	Local Plan Allocation	BR2	ALL.HER.BRO1	Brookfield Garden Village	Brookfield Garden Village is expected to provide approximately 1,250 new homes (40% of which should be affordable); elderly persons' accommodation; a primary school providing 3 forms of entry; open space for leisure and recreation; and a neighbourhood centre containing local shop(s) and facilities
Hertfordshire	Broxbourne	Local Plan Allocation	CH1	ALL.HER.BRO2	Cheshunt Lakeside	Cheshunt Lakeside will be developed as a new mixed use urban village to accommodate: 1. c. 1,750 new homes; 2. 40% affordable homes; 3. Buildings limited to a maximum of 8 storeys in height; 4. Elderly persons' accommodation; 5. Approximately 20,000 square metres of business space to accommodate existing businesses within the allocated land area that could be satisfactorily located within the proposed mixed use urban village, new business start-ups and additional business space; 6. A neighbourhood centre, situated along Windmill Lane, connecting Cheshunt Lakeside to Cheshunt Railway Station; 7. A two form of entry primary school; 8. Landscaped open space; and 9. Relocation of Network Rail depot.
Hertfordshire	Broxbourne	Local Plan Allocation	CH2	ALL.HER.BRO3	Rosedale Park	Rosedale Park will be developed as a series of interlinked new suburban parkland communities as follows: Rosedale Park South (Tudor Nursery and environs) approximately 360 new homes; South of Andrews Lane and East of Burton Lane approximately 60 homes; Rosedale Park North (Rags Valley) approximately 380 new homes.
Hertfordshire	East Hertfordshire	Local Plan Allocation	BISH5	ALL.HER.EAS1	Bishop's Stortford South	750 dwellings
Hertfordshire	East Hertfordshire	Local Plan Allocation	BISH7	ALL.HER.EAS2	The Goods Yard, Bishop's Stortford	600 dwellings
Hertfordshire	East Hertfordshire	Local Plan Allocation	HERT3	ALL.HER.EAS3	West of Hertford	550 dwellings

County	Council	Scheme Type	Allocation	Reference	Location	Description
Hertfordshire	East Hertfordshire	Local Plan Allocation	EOS1	ALL.HER.EAS4	East of Stevenage	600 dwellings
Hertfordshire	East Hertfordshire	Local Plan Allocation	WARE2	ALL.HER.EAS5	Land North and East of Ware	1000 dwellings
Hertfordshire	East Hertfordshire	Local Plan Allocation	GA1	ALL.HER.EAS6	The Gilston Area	3050 dwellings
Hertfordshire	East Hertfordshire	Local Plan Allocation	EWEL1	ALL.HER.EAS7	Land East of Welwyn Garden City	1350 dwellings
Surrey	Waverley	No large scale allocations identified within local plan site allocation document				
Surrey	Guildford	Local Plan Allocation	A24	ALL.SUR.GUI1	Slyfield Area Regeneration Project, Guildford	Mixed-use development including 1000 dwellings
Surrey	Guildford	Local Plan Allocation	A25	ALL.SUR.GUI2	Gosden Hill Farm, Merrow Lane, Guildford	Mixed-use development including 1700 dwellings
Surrey	Guildford	Local Plan Allocation	A26	ALL.SUR.GUI3	Blackwell Farm, Hogs Back, Guildford	Mixed-use development including 1500 dwellings
Surrey	Guildford	Local Plan Allocation	A31	ALL.SUR.GUI4	Land to the south and east of Ash and Tongham	1750 homes (C3) and new road and footbridge
Surrey	Guildford	Local Plan Allocation	A35	ALL.SUR.GUI5	Former Wisley airfield, Ockham	Mixed-use development including 2000 dwellings
Surrey	Guildford	Local Plan Allocation	A41	ALL.SUR.GUI6	Land at Garlick's Arch, Send Marsh Burnt Common and Ripley	Homes (C3) and Travelling Show people plots (sui generis) comprising 550 dwellings
Surrey	Mole Valley	No large scale allocations identified within local plan site allocation document				
Surrey	Elmbridge	No large scale allocations identified within local plan site allocation document				
Surrey	Epsom and Ewell	Emerging Local Plan Allocation	SA1: Hook Road Car Park and SGN Site	ALL.SUR.EPS1	Hook Road, KT19 8TH	The site is allocated for a comprehensive residential led mixed use development, comprising at least 640 new homes
Surrey	Spelthorne	No large scale allocations identified within local plan site allocation document				

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Essex	Epping Forest	Emerging Local Plan Allocation	Waltham Abbey North Masterplan	ALL.ESS.EPP1	Waltham Abbey North	612 homes, including the following Site Allocations; WAL.R1 Land West of Galley Hill Road; WAL.R2 Land at Lea Valley Nursery; WAL.R3 Land Adjoining Parklands; WAL.T1 Land to the rear of Lea Valley Nursery.
Essex	Epping Forest	Emerging Local Plan Allocation	North Weald Bassett Masterplan	ALL.ESS.EPP2	North Weald Bassett	1050 homes, including the following Site Allocations; NWB.R1 Land at Bulmans; NWB.R2 Land at Tylers Farm; NWB.R3 Land South of Vicarage Lane; NWB.R4 Land at Chase Farm; NWB.R5 Land at The Acorns; NWB.T1 Land West of Tylers Green.
Kent	Dartford	No large scale allocations identified within local plan site allocation document				
Kent	Sevenoaks	No large scale allocations identified within local plan site allocation document				

County	Council	Application Type	Scheme	Location	Description	Submission Date	Status/Stage
Greater London	Ealing	TWAO	Old Oak Common (Great Western Mainline track access)	South side of the Great Western Mainline between Acton West Junction and Kensal Green Junction	Application to confer powers to compulsorily acquire land to carry out works to create a new railway logistics compound to support the delivery of changes to the railway infrastructure and the construction of HS2's Old Oak Common station	17/04/2023	Awaiting decision

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Oxfordshire	Cherwell	DCO	Oxfordshire Strategic Rail Freight Interchange	Land west of the B430, east of Upper Heyford Former Airfield, and south of the village of Ardley.	The proposed development consists of the construction of a rail freight terminal served via new connections to the Chiltern Railway Line.	The application is expected to be submitted to the Planning Inspectorate Q2 2023.	Pre-application
Surrey	Guildford	DCO	M25 Junction 10/A3 Wisley Interchange Improvement	M25 Junction 10, near Wisley, Surrey and A3 between Cobham/Byfleet and Ripley/Ockham	Improvement of the Wisley interchange to allow free-flowing movement in all directions, together with improvements to the neighbouring Painshill interchange on the A3 to improve safety and congestion across the two sites	Granted 12/05/2022	Granted
Surrey	Mole Valley	DCO	River Thames Scheme	The flood channels are proposed between Egham Hythe and Chertsey and between Laleham and Weybridge.	A new river channel built in two sections between Egham Hythe in Runnymede and Shepperton in Spelthorne; capacity improvements to existing river structures (including at Sunbury, Molesey and Teddington Weirs and Desborough Cut); new green open spaces; habitat creation and enhancement; active travel provision and associated development.	The Applicant has not yet set a timetable for this project.	Pre-application
		Hybrid	HS2	Phase 1 London to West Midlands	HS2	Examination Hearing Phase 1 08/01/2014	
Oxfordshire	Oxford	TWAO	Oxford Station Phase 2 Improvements	Oxford Station	Improvement and upgrade works in and around Oxford Station.	Granted 22/06/2022	Granted

County	Council	Application Type	Scheme	Location	Description	Submission Date	Status/Stage
Oxfordshire	Cherwell	TWAO	East West Rail Bicester to Bedford Improvements	Bicester to Bletchley and Aylesbury to Claydon Junction	Upgrade the Bicester to Bletchley and Aylesbury to Claydon Junction together with station works at Winslow, Bletchley, Aylesbury Vale Parkway, Woburn Sands and Ridgmont.	Granted 29/1/2020	Granted
Greater London	Barking and Dagenham	TWAO	Barking Riverside Extension		Extension of the Barking to Gospel Oak London Overground line.	Granted 15/08/2017	Granted

